



30-015-39693

## **Chesapeake Operating Inc.**

Eddy County, New Mexico (NAD 1983)

PLU Big Sinks 15 25 30 USA 1H

Job # 1210176

Rig: Patterson 62

Survey: Phoenix MWD Surveys

## **Chesapeake Operating Survey Report**

18 March, 2012



|                  |                                    |                                     |                                   |
|------------------|------------------------------------|-------------------------------------|-----------------------------------|
| <b>Company:</b>  | Chesapeake Operating Inc.          | <b>Local Co-ordinate Reference:</b> | Well Job # 1210176                |
| <b>Project:</b>  | Eddy County, New Mexico (NAD 1983) | <b>TVD Reference:</b>               | WELL @ 3364.00usft (Patterson 62) |
| <b>Site:</b>     | PLU Big Sinks 15 25 30 USA 1H      | <b>MD Reference:</b>                | WELL @ 3364.00usft (Patterson 62) |
| <b>Well:</b>     | Job # 1210176                      | <b>North Reference:</b>             | Grid                              |
| <b>Wellbore:</b> | Rig: Patterson 62                  | <b>Survey Calculation Method:</b>   | Minimum Curvature                 |
| <b>Design:</b>   | Rig: Patterson 62                  | <b>Database:</b>                    | GCR DB v5000                      |

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

|                              |                               |                     |                 |                          |                    |
|------------------------------|-------------------------------|---------------------|-----------------|--------------------------|--------------------|
| <b>Site:</b>                 | PLU Big Sinks 15 25 30 USA 1H |                     |                 |                          |                    |
| <b>Site Position:</b>        |                               | <b>Northing:</b>    | 408,815.48 usft | <b>Latitude:</b>         | 32° 7' 23.0498 N   |
| <b>From:</b>                 | Map                           | <b>Easting:</b>     | 684,404.13 usft | <b>Longitude:</b>        | 103° 52' 16.2989 W |
| <b>Position Uncertainty:</b> | 0.00 usft                     | <b>Slot Radius:</b> | 13-3/16 "       | <b>Grid Convergence:</b> | 0.25 °             |

|                      |       |           |                     |                 |               |                    |
|----------------------|-------|-----------|---------------------|-----------------|---------------|--------------------|
| Well: Job # 1210176  |       |           |                     |                 |               |                    |
| Well Position        | +N/-S | 0.00 usft | Northing:           | 408,815.48 usft | Latitude:     | 32° 7' 23.0498 N   |
|                      | +E/-W | 0.00 usft | Easting:            | 684,404.13 usft | Longitude:    | 103° 52' 16.2989 W |
| Position Uncertainty |       | 0.00 usft | Wellhead Elevation: | 25.00 usft      | Ground Level: | 3,339.00 usft      |

|                  |                   |                    |                        |                      |                            |
|------------------|-------------------|--------------------|------------------------|----------------------|----------------------------|
| <b>Wellbore:</b> | Rig: Patterson 62 |                    |                        |                      |                            |
| <b>Magnetics</b> | <b>Model Name</b> | <b>Sample Date</b> | <b>Declination (°)</b> | <b>Dip Angle (°)</b> | <b>Field Strength (nT)</b> |
|                  | IGRF2010_14       | 02/27/12           | 7.63                   | 60.02                | 48,452                     |

|                          |                         |                     |                     |                      |      |
|--------------------------|-------------------------|---------------------|---------------------|----------------------|------|
| <b>Design:</b>           | Rig: Patterson 62       |                     |                     |                      |      |
| <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)</b> | <b>+N/-S (usft)</b> | <b>+E/-W (usft)</b> | <b>Direction (°)</b> |      |
|                          | 0.00                    | 0.00                | 0.00                | 359.75               |      |

|                       |                  |                                         |                  |                    |  |
|-----------------------|------------------|-----------------------------------------|------------------|--------------------|--|
| <b>Survey Program</b> | <b>Date:</b>     | 03/18/12                                |                  |                    |  |
| <b>From (usft)</b>    | <b>To (usft)</b> | <b>Survey (Wellbore)</b>                | <b>Tool Name</b> | <b>Description</b> |  |
| 199.00                | 13,446.00        | Phoenix MWD Surveys (Rig: Patterson 62) | MWD              | MWD - Standard     |  |



Phoenix Technology Services  
Chesapeake Operating Survey Report



|           |                                    |                              |                                   |
|-----------|------------------------------------|------------------------------|-----------------------------------|
| Company:  | Chesapeake Operating Inc.          | Local Co-ordinate Reference: | Well Job # 1210176                |
| Project:  | Eddy County, New Mexico (NAD 1983) | TVD Reference:               | WELL @ 3364.00usft (Patterson 62) |
| Site:     | PLU Big Sinks 15 25 30 USA, 1H     | MD Reference:                | WELL @ 3364.00usft (Patterson 62) |
| Well:     | Job # 1210176                      | North Reference:             | Grid                              |
| Wellbore: | Rig: Patterson 62                  | Survey Calculation Method:   | Minimum Curvature                 |
| Design:   | Rig: Patterson 62                  | Database:                    | GCR DB.v5000                      |

| Survey                              |            |                      |                 |               |               |               |                  |                     |                   |                    |            |
|-------------------------------------|------------|----------------------|-----------------|---------------|---------------|---------------|------------------|---------------------|-------------------|--------------------|------------|
| MD<br>(usft)                        | Inc<br>(°) | Azi (azimuth)<br>(°) | TVDSS<br>(usft) | TVD<br>(usft) | N/S<br>(usft) | E/W<br>(usft) | V. Sec<br>(usft) | DLeg<br>(°/100usft) | Easting<br>(usft) | Northing<br>(usft) |            |
| 0.00                                | 0.00       | 0.00                 | 3,364.00        | 0.00          | 0.00          | 0.00          | 0.00             | 0.00                | 0.00              | 684,404.13         | 408,815.48 |
| Surface                             |            |                      |                 |               |               |               |                  |                     |                   |                    |            |
| 199.00                              | 0.40       | 74.90                | 3,165.00        | 199.00        | 0.18          | 0.67          | 0.18             | 0.20                | 684,404.80        | 408,815.66         |            |
| First Phoenix MWD Surveys @ 199' MD |            |                      |                 |               |               |               |                  |                     |                   |                    |            |
| 308.00                              | 0.60       | 90.70                | 3,056.01        | 307.99        | 0.27          | 1.61          | 0.27             | 0.22                | 684,405.74        | 408,815.76         |            |
| 590.00                              | 0.10       | 94.30                | 2,774.01        | 589.99        | 0.24          | 3.33          | 0.22             | 0.18                | 684,407.46        | 408,815.72         |            |
| 780.00                              | 0.40       | 266.70               | 2,584.01        | 779.99        | 0.19          | 2.83          | 0.17             | 0.26                | 684,406.96        | 408,815.67         |            |
| 970.00                              | 1.30       | 223.50               | 2,394.03        | 969.97        | -1.42         | 0.69          | -1.42            | 0.55                | 684,404.82        | 408,814.07         |            |
| 1,107.00                            | 1.40       | 232.40               | 2,257.07        | 1,106.93      | -3.56         | -1.71         | -3.56            | 0.17                | 684,402.42        | 408,811.92         |            |
| 1,230.00                            | 1.80       | 227.60               | 2,134.12        | 1,229.88      | -5.78         | -4.32         | -5.76            | 0.34                | 684,399.80        | 408,809.70         |            |
| 1,420.00                            | 1.90       | 239.50               | 1,944.22        | 1,419.78      | -9.39         | -9.24         | -9.35            | 0.21                | 684,394.89        | 408,806.09         |            |
| 1,610.00                            | 2.00       | 251.80               | 1,754.33        | 1,609.67      | -12.03        | -15.11        | -11.96           | 0.23                | 684,389.02        | 408,803.46         |            |
| 1,800.00                            | 1.40       | 263.80               | 1,564.41        | 1,799.59      | -13.31        | -20.56        | -13.22           | 0.37                | 684,383.57        | 408,802.17         |            |
| 1,990.00                            | 1.40       | 276.00               | 1,374.47        | 1,989.53      | -13.32        | -25.18        | -13.21           | 0.16                | 684,378.95        | 408,802.16         |            |
| 2,181.00                            | 1.40       | 266.50               | 1,183.53        | 2,180.47      | -13.22        | -29.83        | -13.09           | 0.12                | 684,374.30        | 408,802.26         |            |
| 2,371.00                            | 1.50       | 260.60               | 993.59          | 2,370.41      | -13.77        | -34.60        | -13.62           | 0.09                | 684,369.53        | 408,801.71         |            |
| 2,561.00                            | 1.00       | 267.70               | 803.63          | 2,560.37      | -14.24        | -38.71        | -14.07           | 0.27                | 684,365.42        | 408,801.24         |            |
| 2,752.00                            | 0.90       | 268.90               | 612.66          | 2,751.34      | -14.34        | -41.87        | -14.15           | 0.05                | 684,362.25        | 408,801.15         |            |
| 2,942.00                            | 0.60       | 311.10               | 422.67          | 2,941.33      | -13.71        | -44.12        | -13.52           | 0.32                | 684,360.01        | 408,801.77         |            |
| 3,132.00                            | 0.50       | 282.60               | 232.68          | 3,131.32      | -12.88        | -45.67        | -12.68           | 0.15                | 684,358.45        | 408,802.61         |            |
| 3,322.00                            | 0.20       | 126.90               | 42.68           | 3,321.32      | -12.90        | -46.22        | -12.69           | 0.36                | 684,357.91        | 408,802.59         |            |
| 3,511.00                            | 1.00       | 129.60               | -146.30         | 3,510.30      | -14.14        | -44.68        | -13.95           | 0.42                | 684,359.44        | 408,801.34         |            |
| 3,702.00                            | 2.40       | 141.80               | -337.22         | 3,701.22      | -18.35        | -40.93        | -18.17           | 0.75                | 684,363.20        | 408,797.13         |            |
| 3,809.00                            | 2.50       | 140.80               | -444.12         | 3,808.12      | -21.92        | -38.07        | -21.75           | 0.10                | 684,366.06        | 408,793.56         |            |
| 3,912.00                            | 1.80       | 144.20               | -547.05         | 3,911.05      | -24.97        | -35.70        | -24.82           | 0.69                | 684,368.43        | 408,790.51         |            |
| 4,103.00                            | 1.10       | 161.10               | -737.98         | 4,101.98      | -29.14        | -33.35        | -28.99           | 0.43                | 684,370.78        | 408,786.34         |            |
| 4,292.00                            | 0.80       | 155.90               | -926.96         | 4,290.96      | -32.06        | -32.22        | -31.92           | 0.16                | 684,371.90        | 408,783.42         |            |



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|-----------|------------------------------------|------------------------------|-----------------------------------|
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| Project:  | Eddy County, New Mexico (NAD 1983) | TVD Reference:               | WELL @ 3364.00usft (Patterson 62) |
| Site:     | PLU Big Sinks 15 25 30 USA 1H      | MD Reference:                | WELL @ 3364.00usft (Patterson 62) |
| Well:     | Job # 1210176                      | North Reference:             | Grid                              |
| Wellbore: | Rig: Patterson 62                  | Survey Calculation Method:   | Minimum Curvature                 |
| Design:   | Rig: Patterson 62                  | Database:                    | GCR DB v5000                      |

| Survey       |            |                      |                 |               |               |               |                  |                     |                   |                    |  |
|--------------|------------|----------------------|-----------------|---------------|---------------|---------------|------------------|---------------------|-------------------|--------------------|--|
| MD<br>(usft) | Inc<br>(°) | Asl (azimuth)<br>(°) | TVDSS<br>(usft) | TVD<br>(usft) | N/S<br>(usft) | E/W<br>(usft) | V. Sec<br>(usft) | DLeg<br>(°/100usft) | Easting<br>(usft) | Northing<br>(usft) |  |
| 4,483.00     | 0.60       | 162.20               | -1,117.94       | 4,481.94      | -34.23        | -31.37        | -34.09           | 0.11                | 684,372.75        | 408,781.25         |  |
| 4,673.00     | 0.30       | 154.30               | -1,307.94       | 4,671.94      | -35.63        | -30.85        | -35.49           | 0.16                | 684,373.27        | 408,779.86         |  |
| 4,863.00     | 0.30       | 236.60               | -1,497.94       | 4,861.94      | -36.35        | -31.05        | -36.21           | 0.21                | 684,373.07        | 408,779.14         |  |
| 5,054.00     | 0.50       | 266.50               | -1,688.93       | 5,052.93      | -36.67        | -32.30        | -36.53           | 0.15                | 684,371.82        | 408,778.81         |  |
| 5,244.00     | 0.70       | 283.90               | -1,878.92       | 5,242.92      | -36.45        | -34.26        | -36.30           | 0.14                | 684,369.87        | 408,779.04         |  |
| 5,434.00     | 0.40       | 273.30               | -2,068.91       | 5,432.91      | -36.13        | -36.05        | -35.97           | 0.17                | 684,368.08        | 408,779.36         |  |
| 5,625.00     | 0.10       | 55.00                | -2,259.91       | 5,623.91      | -35.99        | -36.58        | -35.83           | 0.25                | 684,367.55        | 408,779.49         |  |
| 5,815.00     | 0.30       | 63.20                | -2,449.91       | 5,813.91      | -35.67        | -36.00        | -35.52           | 0.11                | 684,368.13        | 408,779.81         |  |
| 6,005.00     | 0.30       | 111.00               | -2,639.91       | 6,003.91      | -35.63        | -35.09        | -35.48           | 0.13                | 684,369.04        | 408,779.85         |  |
| 6,196.00     | 1.40       | 185.80               | -2,830.89       | 6,194.89      | -38.13        | -34.86        | -37.98           | 0.71                | 684,369.27        | 408,777.35         |  |
| 6,386.00     | 1.00       | 189.90               | -3,020.84       | 6,384.84      | -42.07        | -35.38        | -41.92           | 0.22                | 684,368.75        | 408,773.41         |  |
| 6,573.00     | 0.40       | 212.60               | -3,207.83       | 6,571.83      | -44.23        | -36.01        | -44.07           | 0.35                | 684,368.12        | 408,771.25         |  |
| 6,762.00     | 0.30       | 203.80               | -3,396.83       | 6,760.83      | -45.24        | -36.56        | -45.08           | 0.06                | 684,367.57        | 408,770.25         |  |
| 6,952.00     | 0.30       | 168.80               | -3,586.82       | 6,950.82      | -46.18        | -36.67        | -46.02           | 0.09                | 684,367.46        | 408,769.30         |  |
| 7,144.00     | 0.60       | 146.80               | -3,778.82       | 7,142.82      | -47.52        | -36.02        | -47.36           | 0.18                | 684,368.11        | 408,767.97         |  |
| 7,332.00     | 0.80       | 160.00               | -3,966.80       | 7,330.80      | -49.57        | -35.03        | -49.42           | 0.14                | 684,369.10        | 408,765.91         |  |
| 7,522.00     | 0.90       | 163.60               | -4,156.78       | 7,520.78      | -52.25        | -34.16        | -52.10           | 0.06                | 684,369.97        | 408,763.23         |  |
| 7,711.00     | 0.90       | 189.30               | -4,345.76       | 7,709.76      | -55.14        | -33.98        | -54.99           | 0.21                | 684,370.15        | 408,760.34         |  |
| 7,900.00     | 0.50       | 223.30               | -4,534.75       | 7,898.75      | -57.20        | -34.78        | -57.05           | 0.30                | 684,369.35        | 408,758.28         |  |
| 7,946.00     | 0.50       | 264.30               | -4,580.74       | 7,944.74      | -57.37        | -35.12        | -57.22           | 0.76                | 684,369.01        | 408,758.11         |  |
| 7,989.00     | 0.90       | 259.10               | -4,623.74       | 7,987.74      | -57.45        | -35.64        | -57.30           | 0.94                | 684,368.49        | 408,758.03         |  |
| 8,020.00     | 2.20       | 343.70               | -4,654.73       | 8,018.73      | -56.93        | -36.04        | -56.77           | 7.41                | 684,368.08        | 408,758.56         |  |
| 8,052.00     | 7.30       | 3.60                 | -4,686.61       | 8,050.61      | -54.31        | -36.09        | -54.15           | 16.51               | 684,368.04        | 408,761.18         |  |
| 8,083.00     | 12.00      | 6.60                 | -4,717.17       | 8,081.17      | -49.14        | -35.59        | -48.98           | 15.24               | 684,368.53        | 408,766.35         |  |
| 8,115.00     | 14.90      | 5.50                 | -4,748.29       | 8,112.29      | -41.74        | -34.82        | -41.58           | 9.10                | 684,369.31        | 408,773.75         |  |
| 8,147.00     | 19.00      | 4.10                 | -4,778.89       | 8,142.89      | -32.44        | -34.05        | -32.29           | 12.87               | 684,370.08        | 408,783.04         |  |
| 8,179.00     | 22.60      | 7.60                 | -4,808.80       | 8,172.80      | -21.15        | -32.86        | -21.00           | 11.90               | 684,371.26        | 408,794.34         |  |



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|           |                                    |                              |                                   |
|-----------|------------------------------------|------------------------------|-----------------------------------|
| Company:  | Chesapeake Operating Inc.          | Local Co-ordinate Reference: | Well Job # 1210176                |
| Project:  | Eddy County, New Mexico (NAD 1983) | TVD Reference:               | WELL @ 3364.00usft (Patterson 62) |
| Site:     | PLU Big Sinks 15 25 30 USA 1H      | MD Reference:                | WELL @ 3364.00usft (Patterson 62) |
| Well:     | Job # 1210176                      | North Reference:             | Grid                              |
| Wellbore: | Rig: Patterson 62                  | Survey Calculation Method:   | Minimum Curvature                 |
| Design:   | Rig: Patterson 62                  | Database:                    | GCR DB v5000                      |

| Survey       |            |                      |                 |               |               |               |                  |                     |                   |                    |  |
|--------------|------------|----------------------|-----------------|---------------|---------------|---------------|------------------|---------------------|-------------------|--------------------|--|
| MD<br>(usft) | Inc<br>(°) | Azi (azimuth)<br>(°) | TVDSS<br>(usft) | TVD<br>(usft) | N/S<br>(usft) | E/W<br>(usft) | V. Sec<br>(usft) | DLeg<br>(°/100usft) | Easting<br>(usft) | Northing<br>(usft) |  |
| 8,211.00     | 24.80      | 4.00                 | -4,838.10       | 8,202.10      | -8.35         | -31.58        | -8.22            | 8.23                | 684,372.55        | 408,807.13         |  |
| 8,245.00     | 28.90      | 358.40               | -4,868.43       | 8,232.43      | 6.98          | -31.31        | 7.12             | 14.16               | 684,372.81        | 408,822.46         |  |
| 8,277.00     | 32.20      | 359.40               | -4,895.99       | 8,259.99      | 23.24         | -31.62        | 23.38            | 10.43               | 684,372.51        | 408,838.72         |  |
| 8,309.00     | 35.10      | 357.60               | -4,922.62       | 8,286.62      | 40.96         | -32.09        | 41.10            | 9.58                | 684,372.03        | 408,856.45         |  |
| 8,341.00     | 38.80      | 357.60               | -4,948.19       | 8,312.19      | 60.18         | -32.90        | 60.32            | 11.56               | 684,371.23        | 408,875.66         |  |
| 8,372.00     | 42.50      | 358.60               | -4,971.71       | 8,335.71      | 80.36         | -33.56        | 80.50            | 12.12               | 684,370.57        | 408,895.84         |  |
| 8,404.00     | 46.10      | 359.90               | -4,994.61       | 8,358.61      | 102.70        | -33.85        | 102.85           | 11.60               | 684,370.28        | 408,918.18         |  |
| 8,436.00     | 50.20      | 0.40                 | -5,015.95       | 8,379.95      | 126.53        | -33.78        | 126.68           | 12.87               | 684,370.35        | 408,942.01         |  |
| 8,468.00     | 54.20      | 0.40                 | -5,035.56       | 8,399.56      | 151.81        | -33.60        | 151.96           | 12.50               | 684,370.52        | 408,967.29         |  |
| 8,499.00     | 58.20      | 0.60                 | -5,052.80       | 8,416.80      | 177.56        | -33.38        | 177.71           | 12.91               | 684,370.75        | 408,993.05         |  |
| 8,531.00     | 62.30      | 1.80                 | -5,068.68       | 8,432.68      | 205.33        | -32.79        | 205.48           | 13.22               | 684,371.34        | 409,020.82         |  |
| 8,563.00     | 66.60      | 2.60                 | -5,082.48       | 8,446.48      | 234.18        | -31.68        | 234.31           | 13.63               | 684,372.45        | 409,049.66         |  |
| 8,594.00     | 70.70      | 2.80                 | -5,093.76       | 8,457.76      | 263.01        | -30.32        | 263.14           | 13.24               | 684,373.81        | 409,078.49         |  |
| 8,626.00     | 76.40      | 1.80                 | -5,102.82       | 8,466.82      | 293.66        | -29.09        | 293.79           | 18.06               | 684,375.04        | 409,109.15         |  |
| 8,658.00     | 82.10      | 1.20                 | -5,108.79       | 8,472.79      | 325.08        | -28.27        | 325.20           | 17.91               | 684,375.86        | 409,140.56         |  |
| 8,689.00     | 88.30      | 1.40                 | -5,111.38       | 8,475.38      | 355.95        | -27.57        | 356.06           | 20.01               | 684,376.56        | 409,171.43         |  |
| 8,719.00     | 92.60      | 1.80                 | -5,111.14       | 8,475.14      | 385.93        | -26.73        | 386.04           | 14.40               | 684,377.40        | 409,201.41         |  |
| 8,781.00     | 92.10      | 1.60                 | -5,108.60       | 8,472.60      | 447.85        | -24.90        | 447.95           | 0.87                | 684,379.23        | 409,263.33         |  |
| 8,876.00     | 91.60      | 0.90                 | -5,105.53       | 8,469.53      | 542.77        | -22.82        | 542.87           | 0.91                | 684,381.30        | 409,358.26         |  |
| 8,972.00     | 92.80      | 1.10                 | -5,101.85       | 8,465.85      | 638.69        | -21.15        | 638.77           | 1.27                | 684,382.98        | 409,454.17         |  |
| 9,067.00     | 92.50      | 0.30                 | -5,097.46       | 8,461.46      | 733.58        | -19.99        | 733.66           | 0.90                | 684,384.14        | 409,549.06         |  |
| 9,162.00     | 92.90      | 0.00                 | -5,092.98       | 8,456.98      | 828.47        | -19.74        | 828.55           | 0.53                | 684,384.39        | 409,643.95         |  |
| 9,257.00     | 91.80      | 359.70               | -5,089.09       | 8,453.09      | 923.39        | -19.99        | 923.47           | 1.20                | 684,384.14        | 409,738.87         |  |
| 9,353.00     | 90.70      | 1.00                 | -5,086.99       | 8,450.99      | 1,019.36      | -19.40        | 1,019.44         | 1.77                | 684,384.72        | 409,834.84         |  |
| 9,448.00     | 90.70      | 0.90                 | -5,085.83       | 8,449.83      | 1,114.34      | -17.83        | 1,114.41         | 0.11                | 684,386.30        | 409,929.82         |  |
| 9,543.00     | 90.80      | 0.70                 | -5,084.59       | 8,448.59      | 1,209.32      | -16.50        | 1,209.38         | 0.24                | 684,387.63        | 410,024.81         |  |
| 9,638.00     | 90.30      | 0.80                 | -5,083.68       | 8,447.68      | 1,304.31      | -15.26        | 1,304.36         | 0.54                | 684,388.87        | 410,119.79         |  |



Phoenix Technology Services  
Chesapeake Operating Survey Report



|           |                                    |                              |                                   |
|-----------|------------------------------------|------------------------------|-----------------------------------|
| Company:  | Chesapeake Operating Inc.          | Local Co-ordinate Reference: | Well Job # 1210176                |
| Project:  | Eddy County, New Mexico (NAD 1983) | TVD Reference:               | WELL @ 3364.00usft (Patterson 62) |
| Site:     | PLU Big Sinks 15 25 30 USA 1H      | MD Reference:                | WELL @ 3364.00usft (Patterson 62) |
| Well:     | Job # 1210176                      | North Reference:             | Grid                              |
| Wellbore: | Rig: Patterson 62                  | Survey Calculation Method:   | Minimum Curvature                 |
| Design:   | Rig: Patterson 62                  | Database:                    | GCR DB.v5000                      |

| Survey       |            |                      |                 |               |               |               |                  |                     |                   |                    |  |
|--------------|------------|----------------------|-----------------|---------------|---------------|---------------|------------------|---------------------|-------------------|--------------------|--|
| MD<br>(usft) | Inc<br>(°) | Azi (azimuth)<br>(°) | TVDSS<br>(usft) | TVD<br>(usft) | N/S<br>(usft) | E/W<br>(usft) | V: Sec<br>(usft) | DLeg<br>(°/100usft) | Easting<br>(usft) | Northing<br>(usft) |  |
| 9,733.00     | 89.80      | 0.10                 | -5,083.59       | 8,447.59      | 1,399.31      | -14.51        | 1,399.36         | 0.91                | 684,389.61        | 410,214.79         |  |
| 9,828.00     | 90.20      | 0.50                 | -5,083.59       | 8,447.59      | 1,494.30      | -14.02        | 1,494.35         | 0.60                | 684,390.11        | 410,309.79         |  |
| 9,924.00     | 90.50      | 0.50                 | -5,083.01       | 8,447.01      | 1,590.30      | -13.18        | 1,590.34         | 0.31                | 684,390.95        | 410,405.78         |  |
| 10,019.00    | 91.30      | 1.20                 | -5,081.51       | 8,445.51      | 1,685.28      | -11.77        | 1,685.31         | 1.12                | 684,392.36        | 410,500.76         |  |
| 10,114.00    | 91.00      | 1.90                 | -5,079.61       | 8,443.61      | 1,780.22      | -9.20         | 1,780.24         | 0.80                | 684,394.93        | 410,595.70         |  |
| 10,210.00    | 90.70      | 2.00                 | -5,078.18       | 8,442.18      | 1,876.15      | -5.93         | 1,876.16         | 0.33                | 684,398.19        | 410,691.64         |  |
| 10,305.00    | 91.50      | 1.80                 | -5,076.36       | 8,440.36      | 1,971.08      | -2.78         | 1,971.08         | 0.87                | 684,401.34        | 410,786.57         |  |
| 10,400.00    | 91.10      | 0.80                 | -5,074.20       | 8,438.20      | 2,066.03      | -0.63         | 2,066.02         | 1.13                | 684,403.50        | 410,881.52         |  |
| 10,496.00    | 90.60      | 359.60               | -5,072.78       | 8,436.78      | 2,162.02      | -0.29         | 2,162.00         | 1.35                | 684,403.83        | 410,977.50         |  |
| 10,591.00    | 90.40      | 359.60               | -5,071.95       | 8,435.95      | 2,257.01      | -0.96         | 2,257.00         | 0.21                | 684,403.17        | 411,072.50         |  |
| 10,686.00    | 90.90      | 359.20               | -5,070.87       | 8,434.87      | 2,352.00      | -1.95         | 2,351.99         | 0.67                | 684,402.18        | 411,167.49         |  |
| 10,781.00    | 90.60      | 359.10               | -5,069.63       | 8,433.63      | 2,446.98      | -3.36         | 2,446.98         | 0.33                | 684,400.77        | 411,262.47         |  |
| 10,876.00    | 88.90      | 359.40               | -5,070.04       | 8,434.04      | 2,541.97      | -4.61         | 2,541.97         | 1.82                | 684,399.52        | 411,357.46         |  |
| 10,971.00    | 88.70      | 358.60               | -5,072.03       | 8,436.03      | 2,636.94      | -6.26         | 2,636.94         | 0.87                | 684,397.86        | 411,452.42         |  |
| 11,066.00    | 88.10      | 357.50               | -5,074.69       | 8,438.69      | 2,731.84      | -9.49         | 2,731.86         | 1.32                | 684,394.63        | 411,547.33         |  |
| 11,161.00    | 87.70      | 357.10               | -5,078.17       | 8,442.17      | 2,826.67      | -13.97        | 2,826.71         | 0.60                | 684,390.16        | 411,642.16         |  |
| 11,257.00    | 89.50      | 357.10               | -5,080.51       | 8,444.51      | 2,922.52      | -18.82        | 2,922.57         | 1.87                | 684,385.31        | 411,738.00         |  |
| 11,352.00    | 89.70      | 358.20               | -5,081.18       | 8,445.18      | 3,017.43      | -22.72        | 3,017.50         | 1.18                | 684,381.41        | 411,832.92         |  |
| 11,447.00    | 89.90      | 358.50               | -5,081.51       | 8,445.51      | 3,112.39      | -25.45        | 3,112.47         | 0.38                | 684,378.68        | 411,927.88         |  |
| 11,542.00    | 89.60      | 358.00               | -5,081.92       | 8,445.92      | 3,207.35      | -28.35        | 3,207.44         | 0.61                | 684,375.77        | 412,022.83         |  |
| 11,637.00    | 90.70      | 358.40               | -5,081.67       | 8,445.67      | 3,302.30      | -31.34        | 3,302.40         | 1.23                | 684,372.79        | 412,117.78         |  |
| 11,732.00    | 88.40      | 357.30               | -5,082.42       | 8,446.42      | 3,397.22      | -34.90        | 3,397.34         | 2.68                | 684,369.23        | 412,212.70         |  |
| 11,827.00    | 88.20      | 358.30               | -5,085.24       | 8,449.24      | 3,492.11      | -38.55        | 3,492.24         | 1.07                | 684,365.58        | 412,307.59         |  |
| 11,922.00    | 88.20      | 359.00               | -5,088.22       | 8,452.22      | 3,587.03      | -40.78        | 3,587.18         | 0.74                | 684,363.35        | 412,402.52         |  |
| 12,018.00    | 88.00      | 358.50               | -5,091.40       | 8,455.40      | 3,682.96      | -42.88        | 3,683.11         | 0.56                | 684,361.25        | 412,498.44         |  |
| 12,113.00    | 87.50      | 358.30               | -5,095.13       | 8,459.13      | 3,777.85      | -45.53        | 3,778.01         | 0.57                | 684,358.60        | 412,593.33         |  |
| 12,208.00    | 88.90      | 358.90               | -5,098.12       | 8,462.12      | 3,872.77      | -47.85        | 3,872.94         | 1.60                | 684,356.28        | 412,688.25         |  |



Phoenix Technology Services  
Chesapeake Operating Survey Report



|           |                                    |                              |                                   |
|-----------|------------------------------------|------------------------------|-----------------------------------|
| Company:  | Chesapeake Operating Inc.          | Local Co-ordinate Reference: | Well Job # 1210176                |
| Project:  | Eddy County, New Mexico (NAD 1983) | TVD Reference:               | WELL @ 3364.00usft (Patterson 62) |
| Site:     | PLU Big Sinks 15 25 30 USA 1H      | MD Reference:                | WELL @ 3364.00usft (Patterson 62) |
| Well:     | Job # 1210176                      | North Reference:             | Grid                              |
| Wellbore: | Rig: Patterson 62                  | Survey Calculation Method:   | Minimum Curvature                 |
| Design:   | Rig: Patterson 62                  | Database:                    | GCR DB V5000                      |

| MD<br>(usft)                         | Inc<br>(°) | Azi (azimuth)<br>(°) | TVDSS<br>(usft) | TVD<br>(usft) | N/S<br>(usft) | E/W<br>(usft) | V. Sec<br>(usft) | DLog<br>(°/100usft) | Easting<br>(usft) | Northing<br>(usft) |
|--------------------------------------|------------|----------------------|-----------------|---------------|---------------|---------------|------------------|---------------------|-------------------|--------------------|
| 12,304.00                            | 89.20      | 0.00                 | -5,099.71       | 8,463.71      | 3,968.75      | -48.77        | 3,968.93         | 1.19                | 684,355.36        | 412,784.23         |
| 12,399.00                            | 89.90      | 359.40               | -5,100.46       | 8,464.46      | 4,063.74      | -49.26        | 4,063.92         | 0.97                | 684,354.86        | 412,879.23         |
| 12,494.00                            | 91.20      | 0.00                 | -5,099.54       | 8,463.54      | 4,158.74      | -49.76        | 4,158.91         | 1.51                | 684,354.37        | 412,974.22         |
| 12,589.00                            | 91.60      | 0.10                 | -5,097.22       | 8,461.22      | 4,253.71      | -49.68        | 4,253.88         | 0.43                | 684,354.45        | 413,069.19         |
| 12,684.00                            | 92.10      | 0.20                 | -5,094.16       | 8,458.16      | 4,348.66      | -49.43        | 4,348.83         | 0.54                | 684,354.70        | 413,164.14         |
| 12,780.00                            | 92.20      | 0.30                 | -5,090.55       | 8,454.55      | 4,444.59      | -49.01        | 4,444.76         | 0.15                | 684,355.12        | 413,260.07         |
| 12,875.00                            | 89.60      | 359.40               | -5,089.06       | 8,453.06      | 4,539.57      | -49.26        | 4,539.74         | 2.90                | 684,354.87        | 413,355.05         |
| 12,970.00                            | 87.40      | 357.40               | -5,091.55       | 8,455.55      | 4,634.49      | -51.91        | 4,634.67         | 3.13                | 684,352.22        | 413,449.97         |
| 13,067.00                            | 90.50      | 357.40               | -5,093.33       | 8,457.33      | 4,731.36      | -56.31        | 4,731.56         | 3.20                | 684,347.82        | 413,546.84         |
| 13,164.00                            | 90.60      | 357.60               | -5,092.40       | 8,456.40      | 4,828.26      | -60.54        | 4,828.48         | 0.23                | 684,343.59        | 413,643.75         |
| 13,256.00                            | 91.50      | 359.70               | -5,090.71       | 8,454.71      | 4,920.22      | -62.71        | 4,920.44         | 2.48                | 684,341.42        | 413,735.70         |
| 13,351.00                            | 91.30      | 358.80               | -5,088.39       | 8,452.39      | 5,015.18      | -63.95        | 5,015.41         | 0.97                | 684,340.18        | 413,830.66         |
| Last Phoneix MWD Surveys @ 13351' MD |            |                      |                 |               |               |               |                  |                     |                   |                    |
| 13,446.00                            | 91.10      | 359.30               | -5,086.40       | 8,450.40      | 5,110.14      | -65.53        | 5,110.38         | 0.57                | 684,338.60        | 413,925.63         |
| Projection to TD @ 13446' MD         |            |                      |                 |               |               |               |                  |                     |                   |                    |

| Survey Annotations          |                             |                   |                 |                                      |
|-----------------------------|-----------------------------|-------------------|-----------------|--------------------------------------|
| Measured<br>Depth<br>(usft) | Vertical<br>Depth<br>(usft) | Local Coordinates |                 | Comment                              |
|                             |                             | +N/-S<br>(usft)   | +E/-W<br>(usft) |                                      |
| 0.00                        | 0.00                        | 0.00              | 0.00            | Surface                              |
| 199.00                      | 199.00                      | 0.18              | 0.67            | First Phoenix MWD Surveys @ 199' MD  |
| 13,351.00                   | 8,452.39                    | 5,015.18          | -63.95          | Last Phoneix MWD Surveys @ 13351' MD |
| 13,446.00                   | 8,450.40                    | 5,110.14          | -65.53          | Projection to TD @ 13446' MD         |

|                   |                    |             |
|-------------------|--------------------|-------------|
| Checked By: _____ | Approved By: _____ | Date: _____ |
|-------------------|--------------------|-------------|