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## Chesapeake Operating

Lea County (NM27E)

Sec 28-T22S-R36E

Millard Deck Estate 28 Federal 1

Wellbore #1

Survey: MWD Survey

## Standard Survey Report

30 August, 2007

SUR: B-28-22s-36e, 965/N & 1590/E  
BHL: B-28-22s-36e, 789/N & 1466/E  
API # 30-025-38103

# Quantum Survey Report

|                  |                                  |                                     |                                       |
|------------------|----------------------------------|-------------------------------------|---------------------------------------|
| <b>Company:</b>  | Chesapeake Operating             | <b>Local Co-ordinate Reference:</b> | Well Millard Deck Estate 28 Federal 1 |
| <b>Project:</b>  | Lea County (NM27E)               | <b>TVD Reference:</b>               | WELL @ 0.0ft (Original Well Elev)     |
| <b>Site:</b>     | Sec 28-T22S-R36E                 | <b>MD Reference:</b>                | WELL @ 0.0ft (Original Well Elev)     |
| <b>Well:</b>     | Millard Deck Estate 28 Federal 1 | <b>North Reference:</b>             | True                                  |
| <b>Wellbore:</b> | Wellbore #1                      | <b>Survey Calculation Method:</b>   | Minimum Curvature                     |
| <b>Design:</b>   | Wellbore #1                      | <b>Database:</b>                    | EDM 2003.16 Single User Db            |

|             |                                      |               |                |
|-------------|--------------------------------------|---------------|----------------|
| Project:    | Lea County (NM27E)                   |               |                |
| Map System: | US State Plane 1927 (Exact solution) | System Datum: | Mean Sea Level |
| Geo Datum:  | NAD 1927 (NADCON CONUS)              |               |                |
| Map Zone:   | New Mexico East 3001                 |               |                |

|                        |        |              |               |                   |                   |
|------------------------|--------|--------------|---------------|-------------------|-------------------|
| Site: Sec 28-T22S-R36E |        |              |               |                   |                   |
| Site Position:         |        | Northing:    | 498,972.30 ft | Latitude:         | 32° 22' 2.193 N   |
| From:                  | Map    | Easting:     | 829,431.30 ft | Longitude:        | 103° 15' 58.987 W |
| Position Uncertainty:  | 0.0 ft | Slot Radius: | "             | Grid Convergence: | 0.57 °            |

|                      |                                  |                     |           |               |            |                   |
|----------------------|----------------------------------|---------------------|-----------|---------------|------------|-------------------|
| Well:                | Millard Deck Estate 28 Federal 1 |                     |           |               |            |                   |
| Well Position        | +N/-S                            | 0.0 ft              | Northing: | 498,972.30 ft | Latitude:  | 32° 22' 2.193 N   |
|                      | +E/-W                            | 0.0 ft              | Easting:  | 829,431.30 ft | Longitude: | 103° 15' 58.987 W |
| Position Uncertainty | 0.0 ft                           | Wellhead Elevation: | ft        | Ground Level: | 0.0 ft     |                   |

|           |             |             |                 |               |                     |
|-----------|-------------|-------------|-----------------|---------------|---------------------|
| Wellbore  | Wellbore #1 |             |                 |               |                     |
| Magnetics | Model Name  | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
|           | BGGM2006    | 8/10/2007   | 7.94            | 60.49         | 49,200              |

|                   |                  |        |        |               |     |
|-------------------|------------------|--------|--------|---------------|-----|
| Design            | Wellbore #1      |        |        |               |     |
| Audit Notes:      |                  |        |        |               |     |
| Version:          | 1.0              | Phase: | ACTUAL | Tie On Depth: | 0.0 |
| Vertical Section: | Depth From (TVD) | +N/-S  | +E/-W  | Direction     |     |
|                   | (ft)             | (ft)   | (ft)   | (°)           |     |
|                   | 0.0              | 0.0    | 0.0    | 35.22         |     |

| Survey Program |            | Date                      | 8/30/2007 |                |
|----------------|------------|---------------------------|-----------|----------------|
| From<br>(ft)   | To<br>(ft) | Survey (Wellbore)         | Tool Name | Description    |
| 200.0          | 4,000.0    | Gyro Survey (Wellbore #1) | MWD       | MWD - Standard |
| 4,027.0        | 9,800.0    | MWD Survey (Wellbore #1)  | MWD       | MWD - Standard |

|               |                         |                    |                |                       |              |              |                         |                    |                   |                  |
|---------------|-------------------------|--------------------|----------------|-----------------------|--------------|--------------|-------------------------|--------------------|-------------------|------------------|
| <b>Survey</b> | <b>Measured Depth</b>   | <b>Inclination</b> | <b>Azimuth</b> | <b>Vertical Depth</b> | <b>+N/-S</b> | <b>+E/-W</b> | <b>Vertical Section</b> | <b>Dogleg Rate</b> | <b>Build Rate</b> | <b>Turn Rate</b> |
|               | (ft)                    | (°)                | (°)            | (ft)                  | (ft)         | (ft)         | (ft)                    | (°/100ft)          | (°/100ft)         | (°/100ft)        |
|               | 4,000.0                 | 0.25               | 316.07         | 3,999.5               | 34.5         | 15.4         | 37.1                    | 0.00               | 0.00              | 0.00             |
|               | <b>Tie Onto Gyro</b>    |                    |                |                       |              |              |                         |                    |                   |                  |
|               | 4,027.0                 | 0.80               | 300.50         | 4,026.5               | 34.6         | 15.2         | 37.1                    | 2.09               | 2.04              | -57.67           |
|               | <b>First MWD Survey</b> |                    |                |                       |              |              |                         |                    |                   |                  |
|               | 4,089.0                 | 1.00               | 331.50         | 4,088.5               | 35.3         | 14.6         | 37.3                    | 0.84               | 0.32              | 50.00            |
|               | 4,152.0                 | 2.10               | 13.60          | 4,151.4               | 36.9         | 14.6         | 38.6                    | 2.40               | 1.75              | 66.83            |
|               | 4,215.0                 | 2.50               | 11.20          | 4,214.4               | 39.4         | 15.1         | 40.9                    | 0.65               | 0.63              | -3.81            |
|               | 4,278.0                 | 2.50               | 25.00          | 4,277.3               | 42.0         | 16.0         | 43.5                    | 0.95               | 0.00              | 21.90            |
|               | 4,341.0                 | 2.50               | 40.40          | 4,340.3               | 44.3         | 17.4         | 46.2                    | 1.06               | 0.00              | 24.44            |
|               | 4,403.0                 | 1.70               | 46.40          | 4,402.2               | 45.9         | 19.0         | 48.5                    | 1.34               | -1.29             | 9.68             |
|               | 4,466.0                 | 2.10               | 46.30          | 4,465.2               | 47.4         | 20.5         | 50.5                    | 0.63               | 0.63              | -0.16            |
|               | 4,529.0                 | 2.60               | 15.00          | 4,528.1               | 49.6         | 21.7         | 53.0                    | 2.15               | 0.79              | -49.68           |

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Company: Chesapeake Operating  
Project: Lea County (NM27E)  
Site: Sec 28-T22S-R36E  
Well: Millard Deck Estate 28 Federal 1  
Wellbore: Wellbore #1  
Design: Wellbore #1

Local Co-ordinate Reference: Well Millard Deck Estate 28 Federal 1  
TVD Reference: WELL @ 0.0ft (Original Well Elev)  
MD Reference: WELL @ 0.0ft (Original Well Elev)  
North Reference: True  
Survey Calculation Method: Minimum Curvature  
Database: EDM 2003.16 Single User Db

## Survey

| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100ft) | Build Rate (°/100ft) | Turn Rate (°/100ft) |
|---------------------|-----------------|-------------|---------------------|------------|------------|-----------------------|-----------------------|----------------------|---------------------|
| 4,592.0             | 2.30            | 21.20       | 4,591.1             | 52.1       | 22.5       | 55.6                  | 0.63                  | -0.48                | 9.84                |
| 4,648.0             | 1.40            | 38.30       | 4,647.1             | 53.7       | 23.3       | 57.3                  | 1.87                  | -1.61                | 30.54               |
| 4,711.0             | 1.20            | 20.80       | 4,710.0             | 54.9       | 24.1       | 58.8                  | 0.70                  | -0.32                | -27.78              |
| 4,774.0             | 1.10            | 46.90       | 4,773.0             | 56.0       | 24.7       | 60.0                  | 0.84                  | -0.16                | 41.43               |
| 4,836.0             | 2.20            | 37.50       | 4,835.0             | 57.3       | 25.9       | 61.8                  | 1.82                  | 1.77                 | -15.16              |
| 4,899.0             | 2.10            | 48.20       | 4,898.0             | 59.0       | 27.5       | 64.1                  | 0.66                  | -0.16                | 16.98               |
| 4,962.0             | 2.20            | 44.00       | 4,960.9             | 60.7       | 29.2       | 66.4                  | 0.30                  | 0.16                 | -6.67               |
| 5,025.0             | 2.20            | 44.10       | 5,023.9             | 62.4       | 30.9       | 68.8                  | 0.01                  | 0.00                 | 0.16                |
| 5,087.0             | 1.80            | 50.70       | 5,085.8             | 63.9       | 32.5       | 70.9                  | 0.74                  | -0.65                | 10.65               |
| 5,150.0             | 1.80            | 46.30       | 5,148.8             | 65.2       | 33.9       | 72.8                  | 0.22                  | 0.00                 | -6.98               |
| 5,213.0             | 1.90            | 49.30       | 5,211.8             | 66.6       | 35.4       | 74.8                  | 0.22                  | 0.16                 | 4.76                |
| 5,276.0             | 2.20            | 44.70       | 5,274.7             | 68.1       | 37.1       | 77.0                  | 0.54                  | 0.48                 | -7.30               |
| 5,370.0             | 2.10            | 37.90       | 5,368.7             | 70.7       | 39.4       | 80.5                  | 0.29                  | -0.11                | -7.23               |
| 5,558.0             | 1.90            | 45.30       | 5,556.5             | 75.7       | 43.7       | 87.0                  | 0.17                  | -0.11                | 3.94                |
| 5,652.0             | 2.30            | 41.20       | 5,650.5             | 78.2       | 46.1       | 90.4                  | 0.45                  | 0.43                 | -4.36               |
| 5,746.0             | 1.90            | 34.30       | 5,744.4             | 80.9       | 48.2       | 93.9                  | 0.50                  | -0.43                | -7.34               |
| 5,840.0             | 1.90            | 29.80       | 5,838.4             | 83.5       | 49.9       | 97.0                  | 0.16                  | 0.00                 | -4.79               |
| 5,934.0             | 2.20            | 48.00       | 5,932.3             | 86.1       | 52.0       | 100.3                 | 0.76                  | 0.32                 | 19.36               |
| 6,028.0             | 2.20            | 54.30       | 6,026.2             | 88.3       | 54.8       | 103.8                 | 0.26                  | 0.00                 | 6.70                |
| 6,122.0             | 1.80            | 56.80       | 6,120.2             | 90.2       | 57.5       | 106.8                 | 0.44                  | -0.43                | 2.66                |
| 6,216.0             | 1.70            | 45.50       | 6,214.1             | 92.0       | 59.7       | 109.6                 | 0.38                  | -0.11                | -12.02              |
| 6,310.0             | 1.90            | 31.00       | 6,308.1             | 94.3       | 61.5       | 112.5                 | 0.53                  | 0.21                 | -15.43              |
| 6,404.0             | 1.80            | 34.40       | 6,402.0             | 96.9       | 63.2       | 115.5                 | 0.16                  | -0.11                | 3.62                |
| 6,498.0             | 2.40            | 40.10       | 6,496.0             | 99.6       | 65.3       | 119.0                 | 0.68                  | 0.64                 | 6.06                |
| 6,592.0             | 2.40            | 53.60       | 6,589.9             | 102.2      | 68.1       | 122.8                 | 0.60                  | 0.00                 | 14.36               |
| 6,686.0             | 2.70            | 48.70       | 6,683.8             | 104.9      | 71.4       | 126.8                 | 0.39                  | 0.32                 | -5.21               |
| 6,780.0             | 2.90            | 43.60       | 6,777.7             | 108.1      | 74.7       | 131.3                 | 0.34                  | 0.21                 | -5.43               |
| 6,874.0             | 2.90            | 42.20       | 6,871.6             | 111.5      | 77.9       | 136.0                 | 0.08                  | 0.00                 | -1.49               |
| 6,968.0             | 2.20            | 25.30       | 6,965.5             | 114.9      | 80.3       | 140.2                 | 1.09                  | -0.74                | -17.98              |
| 7,062.0             | 2.30            | 34.60       | 7,059.4             | 118.1      | 82.1       | 143.8                 | 0.40                  | 0.11                 | 9.89                |
| 7,156.0             | 2.30            | 38.80       | 7,153.3             | 121.1      | 84.4       | 147.6                 | 0.18                  | 0.00                 | 4.47                |
| 7,261.0             | 2.20            | 43.40       | 7,258.2             | 124.2      | 87.1       | 151.7                 | 0.20                  | -0.10                | 4.38                |
| 7,350.0             | 1.30            | 43.60       | 7,347.2             | 126.2      | 88.9       | 154.4                 | 1.01                  | -1.01                | 0.22                |
| 7,444.0             | 1.20            | 41.20       | 7,441.2             | 127.7      | 90.3       | 156.4                 | 0.12                  | -0.11                | -2.55               |
| 7,538.0             | 1.50            | 46.70       | 7,535.2             | 129.3      | 91.9       | 158.6                 | 0.35                  | 0.32                 | 5.85                |
| 7,632.0             | 1.80            | 37.90       | 7,629.1             | 131.3      | 93.7       | 161.3                 | 0.42                  | 0.32                 | -9.36               |
| 7,726.0             | 1.70            | 39.10       | 7,723.1             | 133.6      | 95.4       | 164.2                 | 0.11                  | -0.11                | 1.28                |
| 7,820.0             | 2.10            | 36.00       | 7,817.0             | 136.0      | 97.3       | 167.3                 | 0.44                  | 0.43                 | -3.30               |
| 7,914.0             | 2.20            | 36.70       | 7,911.0             | 138.9      | 99.4       | 170.8                 | 0.11                  | 0.11                 | 0.74                |
| 8,008.0             | 2.20            | 37.60       | 8,004.9             | 141.8      | 101.6      | 174.4                 | 0.04                  | 0.00                 | 0.96                |
| 8,102.0             | 2.30            | 23.60       | 8,098.8             | 144.9      | 103.5      | 178.1                 | 0.59                  | 0.11                 | -14.89              |
| 8,196.0             | 2.40            | 23.80       | 8,192.7             | 148.5      | 105.0      | 181.8                 | 0.11                  | 0.11                 | 0.21                |
| 8,290.0             | 2.10            | 43.50       | 8,286.7             | 151.5      | 107.0      | 185.5                 | 0.88                  | -0.32                | 20.96               |
| 8,385.0             | 2.20            | 39.70       | 8,381.6             | 154.2      | 109.4      | 189.0                 | 0.18                  | 0.11                 | -4.00               |
| 8,479.0             | 2.10            | 39.30       | 8,475.5             | 156.9      | 111.6      | 192.5                 | 0.11                  | -0.11                | -0.43               |
| 8,573.0             | 2.30            | 38.10       | 8,569.5             | 159.7      | 113.9      | 196.1                 | 0.22                  | 0.21                 | -1.28               |
| 8,666.0             | 1.80            | 35.10       | 8,662.4             | 162.4      | 115.8      | 199.5                 | 0.55                  | -0.54                | -3.23               |
| 8,760.0             | 1.40            | 49.90       | 8,756.4             | 164.3      | 117.6      | 202.0                 | 0.61                  | -0.43                | 15.74               |
| 8,849.0             | 1.90            | 54.60       | 8,845.3             | 165.9      | 119.6      | 204.5                 | 0.58                  | 0.56                 | 5.28                |
| 8,945.0             | 2.20            | 11.50       | 8,941.3             | 168.6      | 121.3      | 207.7                 | 1.60                  | 0.31                 | -44.90              |
| 9,041.0             | 1.70            | 341.70      | 9,037.2             | 171.8      | 121.2      | 210.2                 | 1.16                  | -0.52                | -31.04              |
| 9,136.0             | 0.70            | 15.60       | 9,132.2             | 173.7      | 120.9      | 211.6                 | 1.25                  | -1.05                | 35.68               |
| 9,232.0             | 0.60            | 31.10       | 9,228.2             | 174.7      | 121.3      | 212.6                 | 0.21                  | -0.10                | 16.15               |
| 9,326.0             | 0.40            | 87.10       | 9,322.2             | 175.1      | 121.9      | 213.3                 | 0.53                  | -0.21                | 59.57               |
| 9,422.0             | 0.30            | 77.60       | 9,418.2             | 175.2      | 122.5      | 213.7                 | 0.12                  | -0.10                | -9.90               |

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Wellbore: Wellbore #1  
Design: Wellbore #1

Local Co-ordinate Reference: Well Millard Deck Estate 28 Federal 1  
TVD Reference: WELL @ 0.0ft (Original Well Elev)  
MD Reference: WELL @ 0.0ft (Original Well Elev)  
North Reference: True  
Survey Calculation Method: Minimum Curvature  
Database: EDM 2003.16 Single User Db

## Survey

| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100ft) | Build Rate (°/100ft) | Turn Rate (°/100ft) |
|---------------------|-----------------|-------------|---------------------|------------|------------|-----------------------|-----------------------|----------------------|---------------------|
| 9,517.0             | 0.30            | 78.10       | 9,513.2             | 175.3      | 123.0      | 214.1                 | 0.00                  | 0.00                 | 0.53                |
| 9,613.0             | 0.30            | 59.10       | 9,609.2             | 175.4      | 123.4      | 214.5                 | 0.10                  | 0.00                 | -19.79              |
| 9,708.0             | 0.50            | 46.10       | 9,704.2             | 175.9      | 123.9      | 215.1                 | 0.23                  | 0.21                 | -13.68              |
| 9,750.0             | 0.30            | 52.10       | 9,746.2             | 176.1      | 124.2      | 215.4                 | 0.49                  | -0.48                | 14.29               |
| 9,800.0             | 0.30            | 51.50       | 9,796.2             | 176.2      | 124.4      | 215.7                 | 0.01                  | 0.00                 | -1.20               |

Last MWD Survey - PBHL

## Targets

| Target Name                                                              | Dip Angle (°) | Dip Dir. (°) | TVD (ft) | +N/-S (ft) | +E/-W (ft) | Northing (ft) | Easting (ft) | Latitude        | Longitude         |
|--------------------------------------------------------------------------|---------------|--------------|----------|------------|------------|---------------|--------------|-----------------|-------------------|
| - hit/miss target                                                        |               |              |          |            |            |               |              |                 |                   |
| - Shape                                                                  |               |              |          |            |            |               |              |                 |                   |
| PBHL                                                                     | 0.00          | 0.00         | 9,996.0  | 153.1      | 108.0      | 499,126.47    | 829,537.77   | 32° 22' 3.707 N | 103° 15' 57.727 W |
| - survey misses by 201.8ft at 9800.0ft MD (9796 2 TVD, 176 2 N, 124.4 E) |               |              |          |            |            |               |              |                 |                   |
| - Point                                                                  |               |              |          |            |            |               |              |                 |                   |

## Survey Annotations

| Measured Depth (ft) | Vertical Depth (ft) | Local Coordinates |            | Comment          |
|---------------------|---------------------|-------------------|------------|------------------|
|                     |                     | +N/-S (ft)        | +E/-W (ft) |                  |
| 4,000.0             | 3,999.5             | 34.5              | 15.4       | Tie Onto Gyro    |
| 4,027.0             | 4,026.5             | 34.6              | 15.2       | First MWD Survey |
| 9,800.0             | 9,796.2             | 176.2             | 124.4      | Last MWD Survey  |

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