



Chesapeake

**Winkler County, Texas
University 20-15 WNK E
No. 1H
OH**

Survey: Professional Directional LTD

Survey Completion Report

10 October, 2012



Completion Report

| | |
|---|---|
| Company: Chesapeake | Local Co-ordinate Reference: Well University 20-15 WNK E #1H |
| Project: Winkler County, Texas | TVD Reference: RKB @ 2804.50usft (Original Well Elev) |
| Site: University 20-15 | MD Reference: RKB @ 2804.50usft (Original Well Elev) |
| Well: University 20-15 WNK E #1H | North Reference: Grid |
| Wellbore: OH | Survey Calculation Method: Minimum Curvature |
| Design: OH | Database: EDM 5000.1 Single User Db |

| | | | |
|---|-------------------------------------|--|--|
| Project Winkler County, Texas | | | |
| Map System: US State Plane 1927 (Exact solution) | System Datum: Mean Sea Level | | |
| Geo Datum: NAD 1927 (NADCON CONUS) | | | |
| Map Zone: Texas Central 4203 | | | |

| | | | |
|--|-----------------------------------|--|--|
| Site University 20-15 | | | |
| Site Position: | Northing: 756,233.00 usft | Latitude: 31° 42' 43.330938 N | |
| From: Map | Easting: 1,076,067.00 usft | Longitude: 103° 18' 17.179099 W | |
| Position Uncertainty: 0.00 usft | Slot Radius: 13-3/16 " | Grid Convergence: -1.53 ° | |

| | | | |
|--|------------------------|-----------------------------------|--|
| Well University 20-15 WNK E #1H | | | |
| Well Position | +N/-S 0.00 usft | Northing: 756,233.00 usft | Latitude: 31° 42' 43.330938 N |
| | +E/-W 0.00 usft | Easting: 1,076,067.00 usft | Longitude: 103° 18' 17.179099 W |
| Position Uncertainty | 0.00 usft | Wellhead Elevation: usft | Ground Level: 2,779.50 usft |

| | | | | | |
|--------------------|-------------------|--------------------|------------------------|----------------------|----------------------------|
| Wellbore OH | | | | | |
| Magnetics | Model Name | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
| | IGRF2010 | 7/9/2012 | 7.30 | 59.73 | 48,233 |

| | | | | |
|--------------------------|--------------------------------|---------------------------|---------------------|----------------------|
| Design OH | | | | |
| Audit Notes: | | | | |
| Version: 1.0 | Phase: ACTUAL | Tie On Depth: 0.00 | | |
| Vertical Section: | Depth From (TVD) (usft) | +N/-S (usft) | +E/-W (usft) | Direction (°) |
| | 0.00 | 0.00 | 0.00 | 343.710 |

| | | | | |
|---------------------------------------|------------------|-------------------------------------|------------------|--------------------|
| Survey Program Date 10/10/2012 | | | | |
| From (usft) | To (usft) | Survey (Wellbore) | Tool Name | Description |
| 177.00 | 8,025.00 | University 20-15 Wnk E #1H MWD (OH) | MWD | MWD - Standard |



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North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

| Survey | | | | | | | | | | | | |
|---|------------|----------------------|---------------|------------------|---------------|---------------|----------------------------|------------------------|--------------------|-------------------|--|--|
| MD (usft) | Inc (°) | Azi (azimuth) (°) | TVD (usft) | V. Sec (usft) | N/S (usft) | E/W (usft) | Closure Distance (usft) | Closure Azimuth (°) | Northing (usft) | Easting (usft) | | |
| 0.00 | 0.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | 756,233.00 | 1,076,067.00 | | |
| 177.00 | 1.20 | 38.100 | 176.99 | 1.08 | 1.46 | 1.14 | 1.85 | 38.100 | 756,234.46 | 1,076,068.14 | | |
| Professional Directional Ltd MWD surveys | | | | | | | | | | | | |
| 327.00 | 1.30 | 38.100 | 326.95 | 2.98 | 4.03 | 3.16 | 5.13 | 38.100 | 756,237.03 | 1,076,070.16 | | |
| 439.00 | 1.50 | 32.500 | 438.92 | 4.69 | 6.27 | 4.73 | 7.86 | 37.057 | 756,239.27 | 1,076,071.73 | | |
| 484.00 | 1.80 | 34.100 | 483.90 | 5.53 | 7.35 | 5.45 | 9.15 | 36.535 | 756,240.35 | 1,076,072.45 | | |
| 664.00 | 2.30 | 46.500 | 663.78 | 8.98 | 12.18 | 9.65 | 15.54 | 38.397 | 756,245.18 | 1,076,076.65 | | |
| 844.00 | 3.00 | 57.500 | 843.59 | 11.95 | 17.20 | 16.24 | 23.66 | 43.370 | 756,250.20 | 1,076,083.24 | | |
| 1,024.00 | 1.90 | 65.400 | 1,023.43 | 13.70 | 20.97 | 22.93 | 31.07 | 47.558 | 756,253.97 | 1,076,089.93 | | |
| 1,204.00 | 1.80 | 75.300 | 1,203.33 | 14.05 | 22.93 | 28.38 | 36.48 | 51.063 | 756,255.93 | 1,076,095.38 | | |
| 1,384.00 | 1.00 | 75.400 | 1,383.28 | 13.92 | 24.04 | 32.63 | 40.53 | 53.619 | 756,257.04 | 1,076,099.63 | | |
| 1,564.00 | 1.30 | 65.500 | 1,563.24 | 14.17 | 25.28 | 36.01 | 44.00 | 54.926 | 756,258.28 | 1,076,103.01 | | |
| 1,744.00 | 1.00 | 107.400 | 1,743.21 | 13.59 | 25.66 | 39.37 | 46.99 | 56.902 | 756,258.66 | 1,076,106.37 | | |
| 1,924.00 | 0.70 | 153.900 | 1,923.19 | 11.63 | 24.20 | 41.35 | 47.91 | 59.657 | 756,257.20 | 1,076,108.35 | | |
| 2,104.00 | 0.40 | 214.100 | 2,103.18 | 10.15 | 22.70 | 41.48 | 47.28 | 61.314 | 756,255.70 | 1,076,108.48 | | |
| 2,284.00 | 0.80 | 54.500 | 2,283.18 | 10.16 | 22.91 | 42.15 | 47.97 | 61.480 | 756,255.91 | 1,076,109.15 | | |
| 2,464.00 | 1.40 | 69.700 | 2,463.14 | 10.73 | 24.40 | 45.24 | 51.40 | 61.660 | 756,257.40 | 1,076,112.24 | | |
| 2,644.00 | 1.50 | 74.100 | 2,643.09 | 10.87 | 25.81 | 49.57 | 55.88 | 62.496 | 756,258.81 | 1,076,116.57 | | |
| 2,825.00 | 1.60 | 83.000 | 2,824.02 | 10.44 | 26.76 | 54.35 | 60.58 | 63.783 | 756,259.76 | 1,076,121.35 | | |
| 3,005.00 | 1.60 | 70.400 | 3,003.95 | 10.18 | 27.91 | 59.21 | 65.46 | 64.761 | 756,260.91 | 1,076,126.21 | | |
| 3,185.00 | 1.20 | 66.600 | 3,183.90 | 10.56 | 29.50 | 63.31 | 69.85 | 65.013 | 756,262.50 | 1,076,130.31 | | |
| 3,365.00 | 0.90 | 40.500 | 3,363.87 | 11.57 | 31.33 | 65.96 | 73.02 | 64.594 | 756,264.33 | 1,076,132.96 | | |
| 3,545.00 | 1.20 | 290.500 | 3,543.85 | 13.47 | 33.06 | 65.11 | 73.03 | 63.079 | 756,266.06 | 1,076,132.11 | | |
| 3,725.00 | 1.20 | 281.200 | 3,723.81 | 15.47 | 34.09 | 61.50 | 70.31 | 60.999 | 756,267.09 | 1,076,128.50 | | |
| 3,905.00 | 0.70 | 130.900 | 3,903.80 | 15.42 | 33.74 | 60.48 | 69.25 | 60.847 | 756,266.74 | 1,076,127.48 | | |
| 4,085.00 | 1.10 | 111.500 | 4,083.78 | 13.43 | 32.38 | 62.92 | 70.76 | 62.766 | 756,265.38 | 1,076,129.92 | | |
| 4,265.00 | 0.80 | 77.700 | 4,263.75 | 12.29 | 32.02 | 65.75 | 73.13 | 64.037 | 756,265.02 | 1,076,132.75 | | |



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Wellbore: OH
Design: OH

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North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

| Survey | | | | | | | | | | | | |
|----------------------------|---------|-------------------|------------|---------------|------------|------------|-------------------------|---------------------|-----------------|----------------|--|--|
| MD (usft) | Inc (°) | Azi (azimuth) (°) | TVD (usft) | V. Sec (usft) | N/S (usft) | E/W (usft) | Closure Distance (usft) | Closure Azimuth (°) | Northing (usft) | Easting (usft) | | |
| 4,445.00 | 1.10 | 60.200 | 4,443.73 | 12.60 | 33.14 | 68.48 | 76.08 | 64.174 | 756,266.14 | 1,076,135.48 | | |
| 4,626.00 | 0.80 | 56.900 | 4,624.70 | 13.38 | 34.70 | 71.05 | 79.07 | 63.970 | 756,267.70 | 1,076,138.05 | | |
| 4,806.00 | 1.60 | 79.600 | 4,804.66 | 13.48 | 35.84 | 74.57 | 82.74 | 64.332 | 756,268.84 | 1,076,141.57 | | |
| 4,983.00 | 1.40 | 66.700 | 4,981.60 | 13.49 | 37.14 | 78.99 | 87.28 | 64.818 | 756,270.14 | 1,076,145.99 | | |
| 5,170.00 | 1.30 | 64.300 | 5,168.55 | 14.12 | 38.96 | 83.00 | 91.69 | 64.853 | 756,271.96 | 1,076,150.00 | | |
| 5,351.00 | 3.60 | 282.500 | 5,349.45 | 17.19 | 41.08 | 79.30 | 89.31 | 62.612 | 756,274.08 | 1,076,146.30 | | |
| 5,531.00 | 3.30 | 278.000 | 5,529.12 | 22.04 | 43.03 | 68.65 | 81.02 | 57.922 | 756,276.03 | 1,076,135.65 | | |
| 5,711.00 | 5.00 | 242.500 | 5,708.67 | 22.65 | 40.13 | 56.56 | 69.35 | 54.646 | 756,273.13 | 1,076,123.56 | | |
| 5,890.00 | 4.40 | 240.800 | 5,887.07 | 19.60 | 33.17 | 43.65 | 54.82 | 52.762 | 756,266.17 | 1,076,110.65 | | |
| 6,071.00 | 4.20 | 239.300 | 6,067.56 | 16.40 | 26.40 | 31.89 | 41.40 | 50.373 | 756,259.40 | 1,076,098.89 | | |
| 6,251.00 | 3.90 | 236.700 | 6,247.11 | 12.97 | 19.68 | 21.10 | 28.85 | 47.001 | 756,252.68 | 1,076,088.10 | | |
| 6,431.00 | 3.90 | 233.000 | 6,426.70 | 9.01 | 12.63 | 11.10 | 16.81 | 41.297 | 756,245.63 | 1,076,078.10 | | |
| 6,611.00 | 2.50 | 222.200 | 6,606.41 | 4.80 | 6.04 | 3.57 | 7.02 | 30.589 | 756,239.04 | 1,076,070.57 | | |
| 6,792.00 | 0.90 | 147.000 | 6,787.34 | 1.37 | 1.92 | 1.69 | 2.56 | 41.361 | 756,234.92 | 1,076,068.69 | | |
| 6,972.00 | 0.90 | 173.400 | 6,967.32 | -1.38 | -0.67 | 2.63 | 2.71 | 104.263 | 756,232.33 | 1,076,069.63 | | |
| 7,151.00 | 1.50 | 170.600 | 7,146.28 | -5.09 | -4.38 | 3.17 | 5.40 | 144.081 | 756,228.62 | 1,076,070.17 | | |
| 7,332.00 | 1.30 | 169.900 | 7,327.23 | -9.48 | -8.73 | 3.92 | 9.57 | 155.848 | 756,224.27 | 1,076,070.92 | | |
| 7,511.00 | 1.50 | 146.800 | 7,506.17 | -13.74 | -12.69 | 5.56 | 13.86 | 156.363 | 756,220.31 | 1,076,072.56 | | |
| 7,691.00 | 1.20 | 272.900 | 7,686.15 | -15.38 | -14.57 | 4.96 | 15.39 | 161.190 | 756,218.43 | 1,076,071.96 | | |
| 7,871.00 | 2.20 | 323.300 | 7,866.08 | -11.52 | -11.70 | 1.02 | 11.75 | 175.042 | 756,221.30 | 1,076,068.02 | | |
| 8,025.00 | 2.20 | 323.300 | 8,019.96 | -5.98 | -6.96 | -2.52 | 7.41 | 199.876 | 756,226.04 | 1,076,064.48 | | |
| Survey projected OH | | | | | | | | | | | | |



Completion Report

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Site: University 20-15
Well: University 20-15 WNK E #1H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well University 20-15 WNK E #1H
TVD Reference: RKB @ 2804.50usft (Original Well Elev)
MD Reference: RKB @ 2804.50usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Design Annotations

| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates | | Comment |
|-----------------------|-----------------------|-------------------|--------------|--|
| | | +N/-S (usft) | +E/-W (usft) | |
| 177.00 | 176.99 | 1.46 | 1.14 | Professional Directional Ltd MWD surveys |
| 8,025.00 | 8,019.96 | -6.96 | -2.52 | Survey projected OH |

Checked By: Mike Court Approved By: [Signature] Date: 10-10-12