## Results of Directional Survey

LATERAL

| | | | | |
|---|---|---|---|---|
| API number: | 30-025-29389 | | | |
| OGRID: | | Operator: | XTO ENERGY INC | |
| | | Property: | NORTH VACUUM ABO EAST UNIT | # 18 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| surface | ULSTR: | K | 18 | T | 17S | R | 35E |
| | | | 1870 | FSL | 2065 | FWL | |
| BH Loc | ULSTR: | M | 18 | T | 17S | R | 35E |
| | | | 1090 | FSL | 433 | FWL | |

| | MD | N/S | E/W | VD |
|---|---|---|---|---|
| | 8534 | 16.78 | -30.35 | 8531.67 |
| TOP PERFS/OH | **8529** | 16.92 | -30.00 | 8526.69 |
| | 8548 | 16.38 | -31.32 | 8545.62 |
| | 10383 | -760.15 | -1592.62 | 8675.91 |
| BOT PERFS/OH | **10427** | -779.98 | -1631.89 | 8686.14 |
| | 10427 | -779.98 | -1631.89 | 8686.14 |

| | | | | |
|---|---|---|---|---|
| NEXT TO LAST | 10383 | -760.15 | -1592.62 | 8675.91 |
| LAST READING | 10427 | -779.98 | -1631.89 | 8686.14 |
| TD | **10427** | -779.98 | -1631.89 | 8686.14 |

| | | | | |
|---|---|---|---|---|
| Surface Location | 1870 | FS | 2065 | FW |
| Projected BHL | 1090 | FS | 433 | FW |
| Location of | | | | |
| Top Perfs/OH | 1887 | FS | 2035 | FW |
| Bottom Perfs/OH | 1090 | FS | 433 | FW |

SUMMARY of Subsurface Locations

| | | | | | | |
|---|---|---|---|---|---|---|
| **Surface Location** | K-18-17S-35E | 1870 | FS | 2065 | FW | Vert. Depth |
| | | | | | | |
| **Top Perfs/OH** | K-18-17S-35E | 1887 | FS | 2035 | FW | 8526.69 |
| **Bottom Perfs/OH** | M-18-17S-35E | 1090 | FS | 433 | FW | 8686.14 |
| | | | | | | |
| **Projected TD** | M-18-17S-35E | 1090 | FS | 433 | FW | 8686.14 |

XTO ENERGY

SUR: K-18-17s-35e, 1870/S & 2065/W
BHL: M-18-17s-35e, 1090/S & 433/W
API # 30-025-29389

**XTO**
**North Vacuum Abo**
**NVAU #18H**
**NVAU #18H**
**OH**

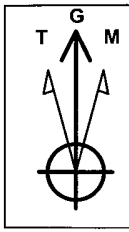
**Survey: MWD #1**

# Pathfinder X & Y Survey Report

**04 September, 2008**

PATHFINDER ENERGY SERVICES

XTO ENERGY




Azimuths to Grid North
True North: -0.45°
Magnetic North: 7.47°

Magnetic Field
Strength: 49297.3snT
Dip Angle: 60.85°
Date: 2008/08/13
Model: IGRF200510

PATHFINDER ENERGY SERVICES

**Project: North Vacuum Abo**
**Site: NVAU #18H**
**Well: NVAU #18H**
**Wellbore: OH**
**Plan: Plan #1 (NVAU #18H/OH)**

SECTION DETAILS

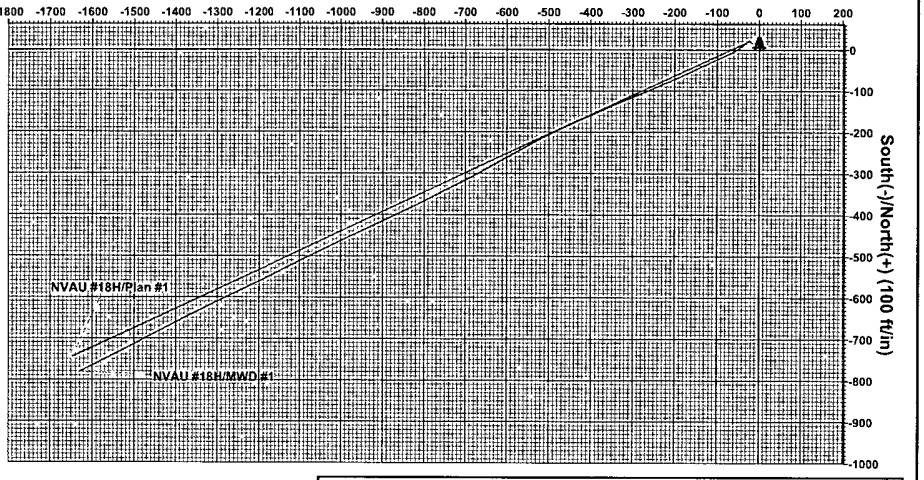
| Sec | MD | Inc | Azi | TVD | +N/-S | +E/-W | DLeg | TFace | VSec | Target |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 8534.00 | 0.87 | 245.99 | 8533.67 | 16.68 | -30.57 | 0.00 | 0.00 | 21.00 | |
| 2 | 8870.72 | 93.25 | 244.79 | 8739.00 | -77.24 | -230.23 | 27.44 | -1.20 | 241.62 | |
| 3 | 8967.06 | 93.25 | 244.83 | 8733.54 | -118.19 | -317.28 | 0.04 | 85.76 | 337.80 | |
| 4 | 9029.38 | 93.25 | 244.83 | 8730.00 | -144.65 | -373.58 | 0.00 | 0.00 | 400.00 | TGT-2 400'VS |
| 5 | 9085.72 | 92.13 | 244.78 | 8727.36 | -168.61 | -424.50 | 2.00 | -177.86 | 456.27 | |
| 6 | 9230.06 | 92.13 | 244.78 | 8722.00 | -230.06 | -555.00 | 0.00 | 0.00 | 600.50 | TGT-3 600'VS |
| 7 | 9238.67 | 92.30 | 244.79 | 8721.67 | -233.73 | -562.79 | 2.00 | 2.35 | 609.11 | |
| 8 | 9429.83 | 92.30 | 244.79 | 8714.00 | -315.08 | -735.60 | 0.00 | 0.00 | 800.09 | TGT-4 800'VS |
| 9 | 9430.23 | 92.29 | 244.79 | 8713.98 | -315.25 | -735.96 | 2.00 | -162.21 | 800.48 | |
| 10 | 9629.94 | 92.29 | 244.79 | 8706.00 | -400.25 | -916.50 | 0.00 | 0.00 | 1000.01 | TGT-5 1000'VS |
| 11 | 9660.04 | 92.29 | 244.79 | 8704.80 | -413.06 | -943.72 | 0.01 | 115.95 | 1030.09 | |
| 12 | 9830.13 | 92.29 | 244.79 | 8698.00 | -485.45 | -1097.48 | 0.00 | 0.00 | 1200.01 | TGT-6 1200'VS |
| 13 | 9844.95 | 92.59 | 244.79 | 8697.37 | -491.76 | -1110.88 | 2.00 | -0.09 | 1214.82 | |
| 14 | 10030.41 | 92.59 | 244.79 | 8689.00 | -570.67 | -1278.50 | 0.00 | 0.00 | 1400.07 | TGT-7 1400'VS |
| 15 | 10030.90 | 92.58 | 244.79 | 8688.98 | -570.88 | -1278.95 | 2.00 | 176.37 | 1400.56 | |
| 16 | 10230.60 | 92.58 | 244.79 | 8680.00 | -655.85 | -1459.44 | 0.00 | 0.00 | 1600.03 | TGT-8 1600'VS |
| 17 | 10250.38 | 92.18 | 244.82 | 8679.18 | -664.26 | -1477.32 | 2.00 | 175.34 | 1619.79 | |
| 18 | 10438.89 | 92.18 | 244.82 | 8672.00 | -744.40 | -1647.80 | 0.00 | 0.00 | 1808.14 | PBHL |

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

| Name | TVD | +N/-S | +E/-W | Northing | Easting | Shape |
|---|---|---|---|---|---|---|
| PBHL | 8672.00 | -744.40 | -1647.80 | 666987.900 | 754852.100 | Point |
| TGT-8 1600'VS | 8680.00 | -655.85 | -1459.44 | 667076.450 | 755040.460 | Point |
| TGT-7 1400'VS | 8689.00 | -570.67 | -1278.50 | 667161.630 | 755221.400 | Point |
| TGT-6 1200'VS | 8698.00 | -485.45 | -1097.48 | 667246.850 | 755402.420 | Point |
| TGT-5 1000'VS | 8706.00 | -400.25 | -916.50 | 667332.050 | 755583.400 | Point |
| TGT-4 800'VS | 8714.00 | -315.08 | -735.60 | 667417.220 | 755764.300 | Point |
| TGT-3 600'VS | 8722.00 | -230.06 | -555.00 | 667502.240 | 755944.900 | Point |
| TGT-2 400'VS | 8730.00 | -144.65 | -373.58 | 667587.650 | 756126.320 | Point |
| TGT-1 200'VS | 8739.00 | -59.45 | -192.60 | 667672.850 | 756307.300 | Point |

West(-)/East(+) (100 ft/in)

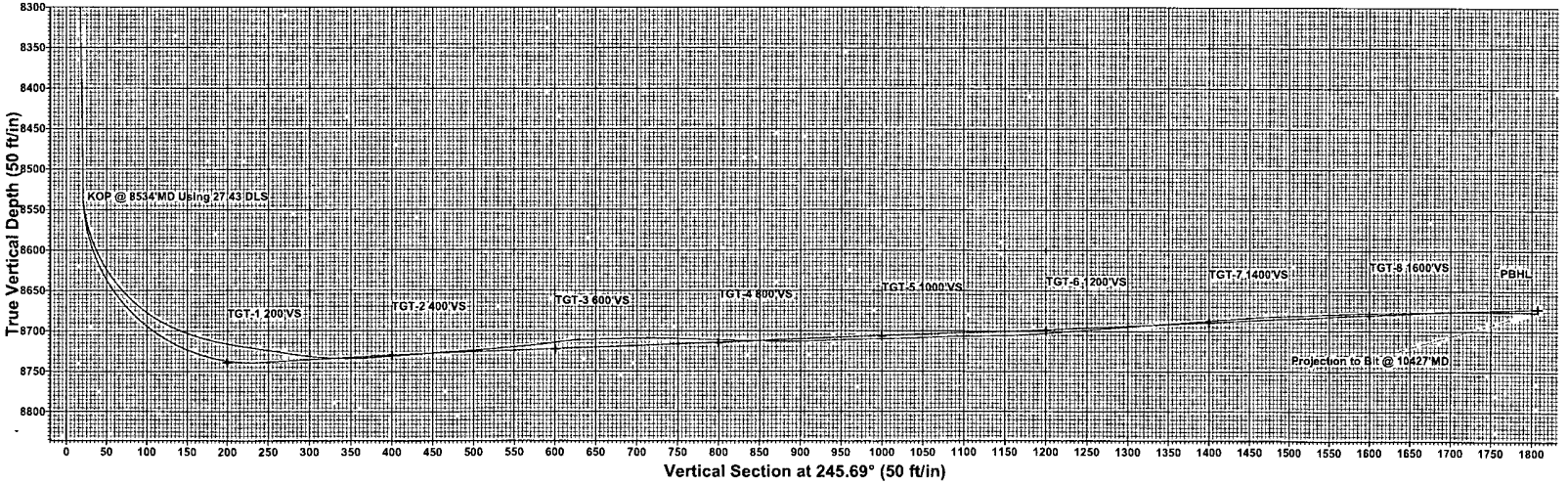
EOW




WELL DETAILS NVAU #18H

Ground Elevation 4002.00
RKB Elevation WELL #1 @ 4018.00ft (C C Forbes #61)
Rig Name C C Forbes #61

| +N/-S | +E/-W | Northing | Easting | Latitude | Longitude | Slot |
|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 667732.300 | 756499.900 | 32° 49' 58.427 N | 103° 29' 53.793 W | |




PROJECT DETAILS: North Vacuum Abo
Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level
Local North: Grid

Plan: Plan #1 (NVAU #18H/OH)
Created By: Nate Bingham Date: 9:09, September 04 2008
Checked _____ Date _____

| | | | |
|---|---|---|---|
| **Company:** | XTO | **Local Co-ordinate Reference:** | Well NVAU #18H |
| **Project:** | North Vacuum Abo | **TVD Reference:** | WELL #1 @ 4018.00ft (C.C Forbes #61) |
| **Site:** | NVAU #18H | **MD Reference:** | WELL #1 @ 4018.00ft (C.C Forbes #61) |
| **Well:** | NVAU #18H | **North Reference:** | Grid |
| **Wellbore:** | OH | **Survey Calculation Method:** | Minimum Curvature |
| **Design:** | OH | **Database:** | EDM 2003.16 Single User Db |

**Project** North Vacuum Abo

| | | | |
|---|---|---|---|
| **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** NVAU #18H

| | | | | | |
|---|---|---|---|---|---|
| **Site Position:** | | **Northing:** | 667,732.300 ft | **Latitude:** | 32° 49' 58.427 N |
| **From:** | Map | **Easting:** | 756,499.900 ft | **Longitude:** | 103° 29' 53.793 W |
| **Position Uncertainty:** | 0.00 ft | **Slot Radius:** | " | **Grid Convergence:** | 0.45 ° |

**Well** NVAU #18H

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Well Position** | **+N/-S** | 0 00 ft | **Northing:** | 667,732 300 ft | **Latitude:** | 32° 49' 58 427 N |
| | **+E/-W** | 0.00 ft | **Easting:** | 756,499.900 ft | **Longitude:** | 103° 29' 53.793 W |
| **Position Uncertainty** | | 0.00 ft | **Wellhead Elevation:** | ft | **Ground Level:** | 4,002 00 ft |

**Wellbore** OH

| **Magnetics** | **Model Name** | **Sample Date** | **Declination (°)** | **Dip Angle (°)** | **Field Strength (nT)** |
|---|---|---|---|---|---|
| | IGRF200510 | 2008/08/13 | 7.93 | 60.85 | 49,297 |

**Design** OH

**Audit Notes:**

| | | | | | |
|---|---|---|---|---|---|
| **Version:** | 1 0 | **Phase:** | ACTUAL | **Tie On Depth:** | 0.00 |

| **Vertical Section:** | **Depth From (TVD) (ft)** | **+N/-S (ft)** | **+E/-W (ft)** | **Direction (°)** |
|---|---|---|---|---|
| | 0 00 | 0.00 | 0.00 | 245 69 |

| | | | |
|---|---|---|---|
| **Company:** | XTO | **Local Co-ordinate Reference:** | Well NVAU #18H |
| **Project:** | North Vacuum Abo | **TVD Reference:** | WELL #1 @ 4018.00ft (C.C. Forbes #61) |
| **Site:** | NVAU #18H | **MD Reference:** | WELL #1 @ 4018.00ft (C.C Forbes #61) |
| **Well:** | NVAU #18H | **North Reference:** | Grid |
| **Wellbore:** | OH | **Survey Calculation Method:** | Minimum Curvature |
| **Design:** | OH | **Database:** | EDM 2003.16 Single User Db |

**Survey Program** Date 2008/09/04

| From (ft) | To (ft) | Survey (Wellbore) | Tool Name | Description |
|---|---|---|---|---|
| 116.00 | 8,534 00 | GYRO (OH) | | |
| 8,547.00 | 10,427 00 | MWD #1 (OH) | | |

**Survey**

| MD (ft) | Inc (°) | Azi (°) | TVD (ft) | TVDSS (ft) | N/S (ft) | E/W (ft) | V. Sec (ft) | DLeg (°/100ft) | Northing (ft) | Easting (ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| 8,534.00 | 0.88 | 247.32 | 8,531.67 | 4,513.67 | 16 78 | -30 35 | 20.75 | 0.00 | 667,749 08 | 756,469.55 |
| 8,548 00 | 7 70 | 247.32 | 8,545 62 | 4,527.62 | 16 38 | -31.32 | 21.80 | 48.71 | 667,748.68 | 756,468.58 |
| 8,579 00 | 17.50 | 228.40 | 8,575.85 | 4,557.85 | 12.47 | -36 73 | 28 34 | 33 90 | 667,744 77 | 756,463 17 |
| 8,610.00 | 26.50 | 233.50 | 8,604 57 | 4,586 57 | 5 25 | -45 80 | 39.58 | 29.65 | 667,737.55 | 756,454.10 |
| 8,642 00 | 35 70 | 239.40 | 8,631.94 | 4,613 94 | -3.77 | -59.61 | 55.87 | 30 26 | 667,728 53 | 756,440.29 |
| 8,674.00 | 44 30 | 245.20 | 8,656.44 | 4,638.44 | -13.24 | -77.83 | 76.37 | 29 27 | 667,719.06 | 756,422.07 |
| 8,705 00 | 54 00 | 245.30 | 8,676.69 | 4,658 69 | -23.04 | -99 10 | 99 79 | 31.29 | 667,709 26 | 756,400 80 |
| 8,737 00 | 64.20 | 244.00 | 8,693 11 | 4,675.11 | -34.79 | -123.87 | 127.21 | 32 06 | 667,697.51 | 756,376 03 |
| 8,750 00 | 67.30 | 244.30 | 8,698.45 | 4,680.45 | -39.96 | -134 54 | 139 06 | 23.94 | 667,692 34 | 756,365 36 |
| 8,769 00 | 71.50 | 243 70 | 8,705.13 | 4,687 13 | -47.76 | -150 52 | 156.83 | 22.30 | 667,684 54 | 756,349 38 |
| 8,800.00 | 77.60 | 245 00 | 8,713.38 | 4,695 38 | -60.68 | -177 44 | 186.69 | 20.09 | 667,671 62 | 756,322 46 |
| 8,832.00 | 80 90 | 246.20 | 8,719 35 | 4,701.35 | -73.66 | -206.07 | 218.12 | 10 95 | 667,658.64 | 756,293.83 |
| 8,864.00 | 81.50 | 246.20 | 8,724.25 | 4,706.25 | -86.43 | -235.00 | 249.74 | 1 87 | 667,645.87 | 756,264.90 |
| 8,895.00 | 81.30 | 246.80 | 8,728 88 | 4,710 88 | -98.65 | -263.11 | 280 39 | 2.02 | 667,633.65 | 756,236.79 |
| 8,927 00 | 85.30 | 247 10 | 8,732.62 | 4,714.62 | -111 09 | -292.35 | 312.16 | 12.53 | 667,621 21 | 756,207 55 |
| 8,959.00 | 89.90 | 247.50 | 8,733.96 | 4,715.96 | -123.42 | -321.84 | 344.11 | 14.43 | 667,608 88 | 756,178 06 |
| 8,990.00 | 94 00 | 245 20 | 8,732.90 | 4,714.90 | -135.85 | -350.21 | 375 08 | 15.16 | 667,596 45 | 756,149.69 |
| 9,022.00 | 94 40 | 245.40 | 8,730.56 | 4,712.56 | -149.18 | -379.20 | 406.99 | 1.40 | 667,583 12 | 756,120 70 |
| 9,054 00 | 94 00 | 245.80 | 8,728.21 | 4,710 21 | -162 37 | -408.27 | 438 91 | 1.77 | 667,569 93 | 756,091.63 |
| 9,086.00 | 94 40 | 244.90 | 8,725 87 | 4,707.87 | -175.68 | -437.27 | 470 82 | 3.07 | 667,556.62 | 756,062.63 |
| 9,117.00 | 93.90 | 245 00 | 8,723 63 | 4,705 63 | -188 77 | -465 28 | 501.74 | 1.64 | 667,543 53 | 756,034.62 |

| | | | |
|---|---|---|---|
| **Company:** | XTO | **Local Co-ordinate Reference:** | Well NVAU #18H |
| **Project:** | North Vacuum Abo | **TVD Reference:** | WELL #1 @ 4018.00ft (C.C. Forbes #61) |
| **Site:** | NVAU #18H | **MD Reference:** | WELL #1 @ 4018 00ft (C.C. Forbes #61) |
| **Well:** | NVAU #18H | **North Reference:** | Grid |
| **Wellbore:** | OH | **Survey Calculation Method:** | Minimum Curvature |
| **Design:** | OH | **Database:** | EDM 2003.16 Single User Db |

**Survey**

| MD (ft) | Inc (°) | Azi (°) | TVD (ft) | TVDSS (ft) | N/S (ft) | E/W (ft) | V. Sec (ft) | DLeg (°/100ft) | Northing (ft) | Easting (ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| 9,149.00 | 95 70 | 243.80 | 8,720.95 | 4,702 95 | -202.55 | -494.04 | 533 62 | 6.75 | 667,529.75 | 756,005.86 |
| 9,180.00 | 95.20 | 241.20 | 8,718.00 | 4,700 00 | -216.79 | -521.41 | 564 42 | 8 50 | 667,515.51 | 755,978.49 |
| 9,212 00 | 98 20 | 241.20 | 8,714.27 | 4,696.27 | -232.10 | -549 26 | 596.10 | 9.37 | 667,500.20 | 755,950.64 |
| 9,227 00 | 96.90 | 240.50 | 8,712.30 | 4,694.30 | -239.35 | -562.24 | 610 92 | 9.82 | 667,492.95 | 755,937.66 |
| 9,244 00 | 93.50 | 240.60 | 8,710.76 | 4,692 76 | -247 67 | -576 98 | 627 78 | 20 01 | 667,484.63 | 755,922.92 |
| 9,259 00 | 91.70 | 240.70 | 8,710.08 | 4,692 08 | -255 01 | -590 04 | 642.71 | 12.02 | 667,477.29 | 755,909 86 |
| 9,276 00 | 91.90 | 240.30 | 8,709.55 | 4,691 55 | -263 38 | -604 83 | 659 63 | 2.63 | 667,468.92 | 755,895.07 |
| 9,291.00 | 91 60 | 240 30 | 8,709.09 | 4,691.09 | -270.81 | -617.85 | 674.56 | 2.00 | 667,461.49 | 755,882 05 |
| 9,308.00 | 91.90 | 240.30 | 8,708.57 | 4,690.57 | -279.23 | -632.61 | 691.47 | 1.76 | 667,453.07 | 755,867.29 |
| 9,339.00 | 89 70 | 241.40 | 8,708.14 | 4,690.14 | -294.33 | -659.68 | 722.36 | 7.93 | 667,437.97 | 755,840 22 |
| 9,371.00 | 88.00 | 242.50 | 8,708.78 | 4,690.78 | -309 37 | -687 92 | 754 28 | 6.33 | 667,422.93 | 755,811.98 |
| 9,403.00 | 88 10 | 243 30 | 8,709.87 | 4,691.87 | -323.94 | -716.39 | 786 22 | 2.52 | 667,408.36 | 755,783.51 |
| 9,435 00 | 87.70 | 243.40 | 8,711 04 | 4,693 04 | -338 28 | -744 97 | 818.17 | 1.29 | 667,394.02 | 755,754.93 |
| 9,466 00 | 88.90 | 242.20 | 8,711 96 | 4,693 96 | -352 44 | -772.53 | 849 12 | 5.47 | 667,379.86 | 755,727.37 |
| 9,498 00 | 89.20 | 243.10 | 8,712 49 | 4,694.49 | -367.14 | -800.95 | 881 07 | 2.96 | 667,365.16 | 755,698.95 |
| 9,530.00 | 92.20 | 244.30 | 8,712.10 | 4,694 10 | -381.32 | -829.63 | 913 05 | 10.10 | 667,350.98 | 755,670.27 |
| 9,562.00 | 91 90 | 244.60 | 8,710.95 | 4,692.95 | -395.11 | -858.48 | 945 02 | 1 33 | 667,337.19 | 755,641.42 |
| 9,593.00 | 91.50 | 244.40 | 8,710 03 | 4,692.03 | -408.45 | -886 45 | 976.00 | 1 44 | 667,323.85 | 755,613.45 |
| 9,625.00 | 91 10 | 244 30 | 8,709.31 | 4,691.31 | -422.30 | -915.29 | 1,007 98 | 1.29 | 667,310.00 | 755,584.61 |
| 9,657.00 | 92 60 | 245.10 | 8,708.27 | 4,690.27 | -435.97 | -944.20 | 1,039 96 | 5.31 | 667,296.33 | 755,555.70 |
| 9,689 00 | 92 30 | 245.10 | 8,706.91 | 4,688.91 | -449 43 | -973 20 | 1,071 93 | 0 94 | 667,282.87 | 755,526.70 |
| 9,720 00 | 91.70 | 244.20 | 8,705 82 | 4,687.82 | -462 69 | -1,001 20 | 1,102 90 | 3 49 | 667,269.61 | 755,498.70 |
| 9,752 00 | 91.00 | 243.90 | 8,705.07 | 4,687 07 | -476 69 | -1,029 96 | 1,134 88 | 2 38 | 667,255.61 | 755,469.94 |
| 9,784.00 | 92.70 | 244.00 | 8,704 04 | 4,686.04 | -490 74 | -1,058 70 | 1,166 85 | 5.32 | 667,241.56 | 755,441.20 |
| 9,815.00 | 94.60 | 244.00 | 8,702 06 | 4,684.06 | -504 30 | -1,086 50 | 1,197.77 | 6.13 | 667,228.00 | 755,413.40 |
| 9,847.00 | 94 70 | 243.60 | 8,699 47 | 4,681 47 | -518 38 | -1,115 12 | 1,229.65 | 1 28 | 667,213.92 | 755,384.78 |
| 9,878.00 | 94 40 | 243.40 | 8,697.01 | 4,679.01 | -532.17 | -1,142.77 | 1,260 53 | 1.16 | 667,200.13 | 755,357 13 |

| | | | |
|---|---|---|---|
| **Company:** | XTO | **Local Co-ordinate Reference:** | Well NVAU #18H |
| **Project:** | North Vacuum Abo | **TVD Reference:** | WELL #1 @ 4018 00ft (C.C. Forbes #61) |
| **Site:** | NVAU #18H | **MD Reference:** | WELL #1 @ 4018.00ft (C.C. Forbes #61) |
| **Well:** | NVAU #18H | **North Reference:** | Grid |
| **Wellbore:** | OH | **Survey Calculation Method:** | Minimum Curvature |
| **Design:** | OH | **Database:** | EDM 2003.16 Single User Db |

**Survey**

| MD (ft) | Inc (°) | Azi (°) | TVD (ft) | TVDSS (ft) | N/S (ft) | E/W (ft) | V. Sec (ft) | DLeg (°/100ft) | Northing (ft) | Easting (ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| 9,910 00 | 94.30 | 243 80 | 8,694.58 | 4,676.58 | -546 36 | -1,171.35 | 1,292.41 | 1 28 | 667,185 94 | 755,328.55 |
| 9,941 00 | 94.20 | 244 10 | 8,692.29 | 4,674.29 | -559 93 | -1,199.13 | 1,323.31 | 1.02 | 667,172 37 | 755,300.77 |
| 9,973 00 | 94.10 | 244.10 | 8,689 97 | 4,671.97 | -573.87 | -1,227.84 | 1,355.22 | 0.31 | 667,158 43 | 755,272.06 |
| 10,005.00 | 94.10 | 243 90 | 8,687.68 | 4,669.68 | -587.87 | -1,256.53 | 1,387.12 | 0.62 | 667,144 43 | 755,243.37 |
| 10,037.00 | 94 50 | 244.10 | 8,685.28 | 4,667.28 | -601.85 | -1,285.21 | 1,419.02 | 1.40 | 667,130 45 | 755,214.69 |
| 10,068.00 | 93.90 | 243.50 | 8,683 01 | 4,665.01 | -615.50 | -1,312 95 | 1,449.92 | 2.73 | 667,116.80 | 755,186 95 |
| 10,100 00 | 91.50 | 243.20 | 8,681.51 | 4,663 51 | -629.84 | -1,341 51 | 1,481.85 | 7.56 | 667,102.46 | 755,158.39 |
| 10,131 00 | 92 50 | 243.80 | 8,680 42 | 4,662.42 | -643 66 | -1,369 24 | 1,512.81 | 3.76 | 667,088.64 | 755,130 66 |
| 10,163 00 | 92.50 | 241 70 | 8,679 03 | 4,661.03 | -658 30 | -1,397 66 | 1,544.74 | 6 56 | 667,074.00 | 755,102.24 |
| 10,195 00 | 91.60 | 242.40 | 8,677 88 | 4,659.88 | -673 29 | -1,425 91 | 1,576.65 | 3.56 | 667,059.01 | 755,073 99 |
| 10,227.00 | 91 00 | 242.90 | 8,677.16 | 4,659.16 | -687 99 | -1,454 32 | 1,608.60 | 2.44 | 667,044.31 | 755,045.58 |
| 10,259.00 | 90 70 | 241.70 | 8,676.68 | 4,658.68 | -702.86 | -1,482.65 | 1,640 54 | 3 87 | 667,029.44 | 755,017.25 |
| 10,290.00 | 90 90 | 242 20 | 8,676.25 | 4,658.25 | -717.44 | -1,510 01 | 1,671 47 | 1.74 | 667,014.86 | 754,989 89 |
| 10,322 00 | 90 30 | 242 80 | 8,675.91 | 4,657 91 | -732.21 | -1,538.39 | 1,703 42 | 2.65 | 667,000.09 | 754,961.51 |
| 10,354 00 | 90.00 | 242 50 | 8,675.83 | 4,657 83 | -746.91 | -1,566.81 | 1,735 37 | 1 33 | 666,985.39 | 754,933.09 |
| 10,383.00 | 89.70 | 243.20 | 8,675.91 | 4,657.91 | -760.15 | -1,592 62 | 1,764.33 | 2.63 | 666,972 15 | 754,907 28 |
| 10,427.00 | 89.70 | 243.20 | 8,676 14 | 4,658.14 | -779 98 | -1,631 89 | 1,808.29 | 0.00 | 666,952 32 | 754,868 01 |
| **Projection to Bit @ 10427'MD** | | | | | | | | | | |

| | | | |
|---|---|---|---|
| **Company:** | XTO | **Local Co-ordinate Reference:** | Well NVAU #18H |
| **Project:** | North Vacuum Abo | **TVD Reference:** | WELL #1 @ 4018.00ft (C C. Forbes #61) |
| **Site:** | NVAU #18H | **MD Reference:** | WELL #1 @ 4018.00ft (C.C. Forbes #61) |
| **Well:** | NVAU #18H | **North Reference:** | Grid |
| **Wellbore:** | OH | **Survey Calculation Method:** | Minimum Curvature |
| **Design:** | OH | **Database:** | EDM 2003.16 Single User Db |

**Targets**

| Target Name - hit/miss target - Shape | Dip Angle (°) | Dip Dir. (°) | TVD (ft) | +N/-S (ft) | +E/-W (ft) | Northing (ft) | Easting (ft) | Latitude | Longitude |
|---|---|---|---|---|---|---|---|---|---|
| TGT-3 600'VS | 0.00 | 0.00 | 8,722.00 | -230.06 | -555.00 | 667,502.240 | 755,944 900 | 32° 49' 56 194 N | 103° 30' 0.319 W |
| - survey misses by 9.40ft at 9214.97ft MD (8713.85 TVD, -233 52 N, -551 83 E) | | | | | | | | | |
| - Point | | | | | | | | | |
| PBHL | 0 00 | 0.00 | 8,672 00 | -744.40 | -1,647.80 | 666,987 900 | 754,852 100 | 32° 49' 51.190 N | 103° 30' 13.172 W |
| - survey misses by 39.15ft at 10425.13ft MD (8676.13 TVD, -779 14 N, -1630.23 E) | | | | | | | | | |
| - Point | | | | | | | | | |
| TGT-7 1400'VS | 0 00 | 0.00 | 8,689.00 | -570.67 | -1,278.50 | 667,161.630 | 755,221 400 | 32° 49' 52.880 N | 103° 30' 8 829 W |
| - survey misses by 25 20ft at 10017.08ft MD (8686.80 TVD, -593.16 N, -1267 35 E) | | | | | | | | | |
| - Point | | | | | | | | | |
| TGT-5 1000'VS | 0.00 | 0.00 | 8,706 00 | -400 25 | -916 50 | 667,332.050 | 755,583.400 | 32° 49' 54.538 N | 103° 30' 4.571 W |
| - survey misses by 20.69ft at 9616.63ft MD (8709.48 TVD, -418.67 N, -907.74 E) | | | | | | | | | |
| - Point | | | | | | | | | |
| TGT-2 400'VS | 0 00 | 0.00 | 8,730 00 | -144.65 | -373 58 | 667,587.650 | 756,126.320 | 32° 49' 57.025 N | 103° 29' 58 185 W |
| - survey misses by 2 08ft at 9015.06ft MD (8731.08 TVD, -146 30 N, -372.91 E) | | | | | | | | | |
| - Point | | | | | | | | | |
| TGT-4 800'VS | 0.00 | 0 00 | 8,714 00 | -315.08 | -735 60 | 667,417.220 | 755,764.300 | 32° 49' 55.366 N | 103° 30' 2 443 W |
| - survey misses by 16.94ft at 9416.34ft MD (8710.33 TVD, -329.92 N, -728 30 E) | | | | | | | | | |
| - Point | | | | | | | | | |
| TGT-6 1200'VS | 0.00 | 0.00 | 8,698.00 | -485.45 | -1,097.48 | 667,246 850 | 755,402.420 | 32° 49' 53.709 N | 103° 30' 6.699 W |
| - survey misses by 22.11ft at 9816.85ft MD (8701.92 TVD, -505.11 N, -1088 16 E) | | | | | | | | | |
| - Point | | | | | | | | | |
| TGT-8 1600'VS | 0.00 | 0 00 | 8,680.00 | -655.85 | -1,459.44 | 667,076 450 | 755,040.460 | 32° 49' 52 051 N | 103° 30' 10 957 W |
| - survey misses by 31.04ft at 10216.72ft MD (8677.35 TVD, -683.29 N, -1445.18 E) | | | | | | | | | |
| - Point | | | | | | | | | |
| TGT-1 200'VS | 0.00 | 0.00 | 8,739 00 | -59 45 | -192.60 | 667,672.850 | 756,307 300 | 32° 49' 57.853 N | 103° 29' 56 056 W |
| - survey misses by 23 67ft at 8817.84ft MD (8716.94 TVD, -67.98 N, -193.33 E) | | | | | | | | | |
| - Point | | | | | | | | | |

| | | | |
|---|---|---|---|
| **Company:** | XTO | **Local Co-ordinate Reference:** | Well NVAU #18H |
| **Project:** | North Vacuum Abo | **TVD Reference:** | WELL #1 @ 4018 00ft (C.C. Forbes #61) |
| **Site:** | NVAU #18H | **MD Reference:** | WELL #1 @ 4018.00ft (C C Forbes #61) |
| **Well:** | NVAU #18H | **North Reference:** | Grid |
| **Wellbore:** | OH | **Survey Calculation Method:** | Minimum Curvature |
| **Design:** | OH | **Database:** | EDM 2003.16 Single User Db |

**Targets**

| Target Name - hit/miss target - Shape | Dip Angle (°) | Dip Dir. (°) | TVD (ft) | +N/-S (ft) | +E/-W (ft) | Northing (ft) | Easting (ft) | Latitude | Longitude |
|---|---|---|---|---|---|---|---|---|---|
| TGT-3 600'VS | 0.00 | 0 00 | 8,722.00 | -230.06 | -555 00 | 667,502.240 | 755,944 900 | 32° 49' 56 194 N | 103° 30' 0.319 W |
| - survey misses by 9.40ft at 9214.97ft MD (8713.85 TVD, -233.52 N, -551 83 E) | | | | | | | | | |
| - Point | | | | | | | | | |
| PBHL | 0.00 | 0 00 | 8,672.00 | -744.40 | -1,647 80 | 666,987.900 | 754,852 100 | 32° 49' 51.190 N | 103° 30' 13.172 W |
| - survey misses by 39.15ft at 10425.13ft MD (8676.13 TVD, -779.14 N, -1630.23 E) | | | | | | | | | |
| - Point | | | | | | | | | |
| TGT-7 1400'VS | 0.00 | 0.00 | 8,689 00 | -570 67 | -1,278.50 | 667,161.630 | 755,221.400 | 32° 49' 52 880 N | 103° 30' 8.829 W |
| - survey misses by 25.20ft at 10017.08ft MD (8686 80 TVD, -593.16 N, -1267 35 E) | | | | | | | | | |
| - Point | | | | | | | | | |
| TGT-5 1000'VS | 0.00 | 0 00 | 8,706.00 | -400.25 | -916.50 | 667,332.050 | 755,583 400 | 32° 49' 54.538 N | 103° 30' 4.571 W |
| - survey misses by 20.69ft at 9616.63ft MD (8709 48 TVD, -418.67 N, -907 74 E) | | | | | | | | | |
| - Point | | | | | | | | | |
| TGT-2 400'VS | 0 00 | 0.00 | 8,730 00 | -144.65 | -373.58 | 667,587 650 | 756,126.320 | 32° 49' 57 025 N | 103° 29' 58 185 W |
| - survey misses by 2 08ft at 9015.06ft MD (8731.08 TVD, -146.30 N, -372.91 E) | | | | | | | | | |
| - Point | | | | | | | | | |
| TGT-4 800'VS | 0 00 | 0.00 | 8,714 00 | -315.08 | -735.60 | 667,417 220 | 755,764 300 | 32° 49' 55 366 N | 103° 30' 2 443 W |
| - survey misses by 16 94ft at 9416 34ft MD (8710.33 TVD, -329 92 N, -728 30 E) | | | | | | | | | |
| - Point | | | | | | | | | |
| TGT-6 1200'VS | 0.00 | 0 00 | 8,698.00 | -485 45 | -1,097 48 | 667,246 850 | 755,402.420 | 32° 49' 53.709 N | 103° 30' 6.699 W |
| - survey misses by 22.11ft at 9816.85ft MD (8701.92 TVD, -505.11 N, -1088 16 E) | | | | | | | | | |
| - Point | | | | | | | | | |
| TGT-8 1600'VS | 0 00 | 0.00 | 8,680.00 | -655.85 | -1,459 44 | 667,076.450 | 755,040.460 | 32° 49' 52.051 N | 103° 30' 10.957 W |
| - survey misses by 31.04ft at 10216.72ft MD (8677 35 TVD, -683.29 N, -1445 18 E) | | | | | | | | | |
| - Point | | | | | | | | | |
| TGT-1 200'VS | 0.00 | 0.00 | 8,739.00 | -59.45 | -192 60 | 667,672.850 | 756,307.300 | 32° 49' 57.853 N | 103° 29' 56.056 W |
| - survey misses by 23.67ft at 8817.84ft MD (8716.94 TVD, -67 98 N, -193.33 E) | | | | | | | | | |
| - Point | | | | | | | | | |

**Survey Annotations**

| Measured Depth (ft) | Vertical Depth (ft) | Local Coordinates +N/-S (ft) | Local Coordinates +E/-W (ft) | Comment |
|---|---|---|---|---|
| 10,427.00 | 8,676 14 | -779.98 | -1,631 89 | Projection to Bit @ 10427'MD |

| | | | |
|---|---|---|---|
| **Company:** | XTO | **Local Co-ordinate Reference:** | Well NVAU #18H |
| **Project:** | North Vacuum Abo | **TVD Reference:** | WELL #1 @ 4018.00ft (C C. Forbes #61) |
| **Site:** | NVAU #18H | **MD Reference:** | WELL #1 @ 4018.00ft (C C. Forbes #61) |
| **Well:** | NVAU #18H | **North Reference:** | Grid |
| **Wellbore:** | OH | **Survey Calculation Method:** | Minimum Curvature |
| **Design:** | OH | **Database:** | EDM 2003.16 Single User Db |

**Targets**

| Target Name - hit/miss target - Shape | Dip Angle (°) | Dip Dir. (°) | TVD (ft) | +N/-S (ft) | +E/-W (ft) | Northing (ft) | Easting (ft) | Latitude | Longitude |
|---|---|---|---|---|---|---|---|---|---|
| TGT-3 600'VS | 0.00 | 0 00 | 8,722 00 | -230.06 | -555 00 | 667,502.240 | 755,944 900 | 32° 49' 56.194 N | 103° 30' 0 319 W |
| - survey misses by 9.40ft at 9214.97ft MD (8713.85 TVD, -233.52 N, -551.83 E) | | | | | | | | | |
| - Point | | | | | | | | | |
| PBHL | 0.00 | 0.00 | 8,672.00 | -744.40 | -1,647.80 | 666,987.900 | 754,852 100 | 32° 49' 51.190 N | 103° 30' 13.172 W |
| - survey misses by 39.15ft at 10425.13ft MD (8676.13 TVD, -779 14 N, -1630.23 E) | | | | | | | | | |
| - Point | | | | | | | | | |
| TGT-7 1400'VS | 0.00 | 0.00 | 8,689.00 | -570.67 | -1,278 50 | 667,161.630 | 755,221.400 | 32° 49' 52.880 N | 103° 30' 8.829 W |
| - survey misses by 25.20ft at 10017.08ft MD (8686.80 TVD, -593 16 N, -1267.35 E) | | | | | | | | | |
| - Point | | | | | | | | | |
| TGT-5 1000'VS | 0.00 | 0.00 | 8,706.00 | -400 25 | -916.50 | 667,332.050 | 755,583 400 | 32° 49' 54.538 N | 103° 30' 4.571 W |
| - survey misses by 20.69ft at 9616.63ft MD (8709.48 TVD, -418 67 N, -907 74 E) | | | | | | | | | |
| - Point | | | | | | | | | |
| TGT-2 400'VS | 0 00 | 0.00 | 8,730.00 | -144.65 | -373 58 | 667,587.650 | 756,126 320 | 32° 49' 57.025 N | 103° 29' 58.185 W |
| - survey misses by 2.08ft at 9015.06ft MD (8731.08 TVD, -146.30 N, -372.91 E) | | | | | | | | | |
| - Point | | | | | | | | | |
| TGT-4 800'VS | 0 00 | 0.00 | 8,714.00 | -315.08 | -735 60 | 667,417 220 | 755,764 300 | 32° 49' 55 366 N | 103° 30' 2.443 W |
| - survey misses by 16 94ft at 9416 34ft MD (8710.33 TVD, -329.92 N, -728.30 E) | | | | | | | | | |
| - Point | | | | | | | | | |
| TGT-6 1200'VS | 0.00 | 0.00 | 8,698 00 | -485.45 | -1,097.48 | 667,246.850 | 755,402.420 | 32° 49' 53.709 N | 103° 30' 6 699 W |
| - survey misses by 22.11ft at 9816.85ft MD (8701.92 TVD, -505.11 N, -1088 16 E) | | | | | | | | | |
| - Point | | | | | | | | | |
| TGT-8 1600'VS | 0.00 | 0 00 | 8,680.00 | -655.85 | -1,459.44 | 667,076 450 | 755,040.460 | 32° 49' 52 051 N | 103° 30' 10.957 W |
| - survey misses by 31.04ft at 10216.72ft MD (8677.35 TVD, -683 29 N, -1445 18 E) | | | | | | | | | |
| - Point | | | | | | | | | |
| TGT-1 200'VS | 0.00 | 0 00 | 8,739.00 | -59.45 | -192 60 | 667,672.850 | 756,307 300 | 32° 49' 57.853 N | 103° 29' 56 056 W |
| - survey misses by 23 67ft at 8817 84ft MD (8716.94 TVD, -67.98 N, -193.33 E) | | | | | | | | | |
| - Point | | | | | | | | | |

Checked By: _____ Approved By: _____ Date: _____