

# Noble Energy

Weld County, CO (NAD 83)  
Sec. 1-T9N-R58W (Nalen State 1 PAD)  
Nalen State LD12-76-1AHN  
05-123-39758  
Original Wellbore

Design: Actual Surveys

## Sperry Drilling Services

### Final Report

23 December, 2014

Surface UWI : 05-123-39758

Well Coordinates: 1,529,233.29 N, 3,466,285.22 E (40° 46' 26.33" N, 103° 48' 59.04" W)  
Ground Level: 4,647.00 usft

|                          |   |
|--------------------------|---|
| Local Coordinate Origin: | Centered on Well Nalen State LD12-76-1AHN |
| Viewing Datum:           | KB=24 @ 4671.00usft (H&P 273)             |
| TVDs to System:          | N   |
| North Reference:         | Grid                                      |
| Unit System:             | Dec-Deg - API - US Survey Feet - Custom   |

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

**HALLIBURTON**

Project: Weld County, CO (NAD 83)  
 Site: Sec. 1-T9N-R58W (Nalen State 1 PAD)  
 Well: Nalen State LD12-76-1AHN  
 Wellbore: Original Wellbore  
 Design: Actual Surveys



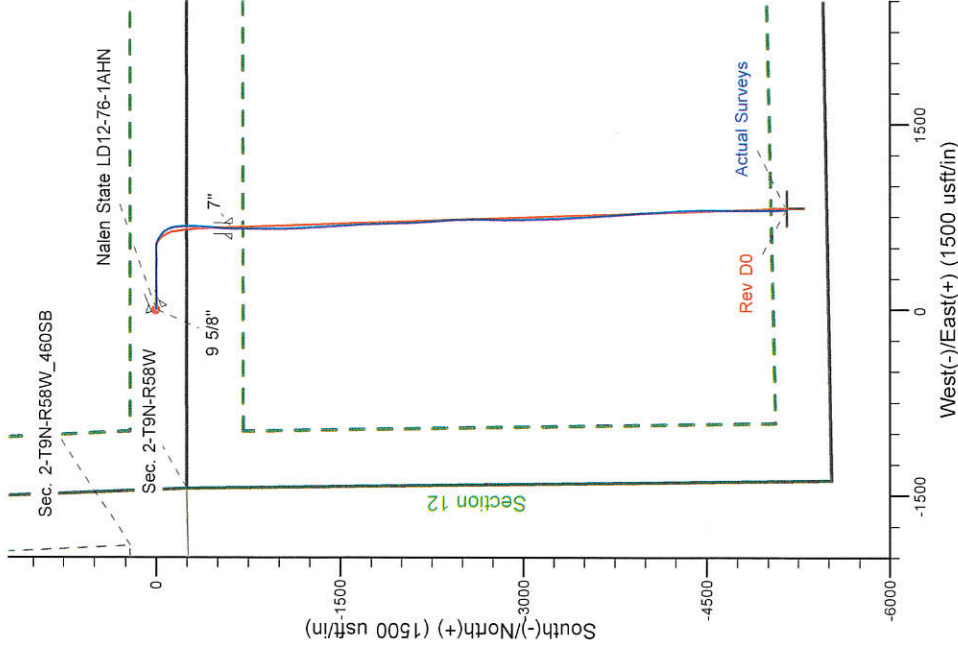
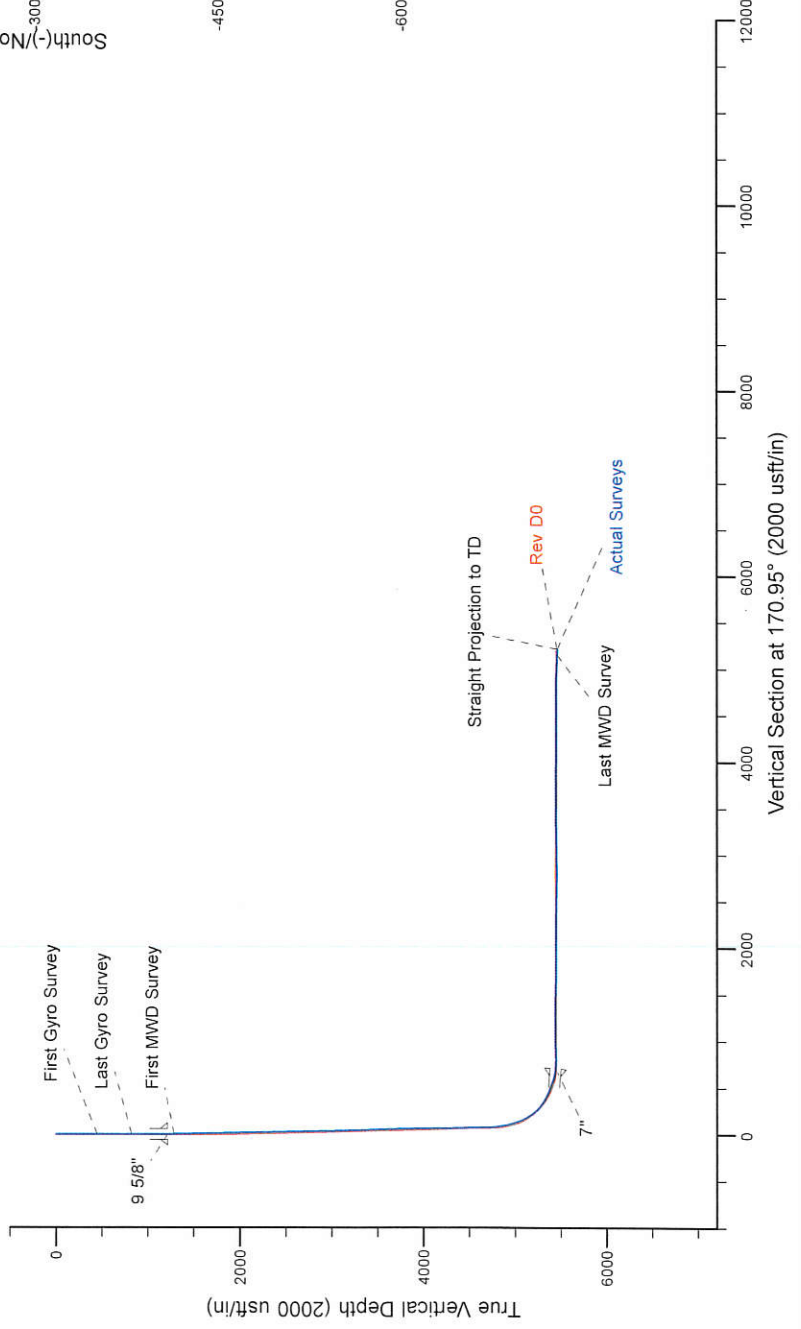
Platted SHL: 250' FSL, 1450' FWL  
 Platted Lat/Long: 40.77398 N, 103.8164 W  
 Location: Sec. 1-T9N-R58W

~7" Casing: 374' FNL, 2082' FWL  
 Lat/Long: 40.772262N, 103.814088W  
 State Planes - CO Northern: 1528619.57N, 3466937.23E  
 Location: Sec. 12-T9N-R58W

Platted BHL: 330' FSL, 2200' FWL  
 Lat/Long: 40.759790N, 103.813790W  
 State Planes - CO Northern: 1524078.09N, 3467106.29E  
 Location: Sec. 12-T9N-R58W

LEGEND

- Nalen State LD12-76-1AHN, Original Wellbore, Rev D0 V0
- Actual Surveys



WELL DETAILS: Nalen State LD12-76-1AHN  
 Ground Level: 4647.00  
 KB=24 @ -4671.00usft. (H&P 273)

Created By: Gordy Roth  
 Created On: 12/23/2014

## Design Report for Nalen State LD12-76-1AHN - Actual Surveys

| Measured Depth (usft)    | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) |
|--------------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|
| 0.00                     | 0.00            | 0.00        | 0.00                  | 0.00         | 0.00         | 0.00                    | 0.00                    |
| 450.00                   | 0.30            | 43.41       | 450.00                | 0.86         | 0.81         | -0.72                   | 0.07                    |
| <b>First Gyro Survey</b> |                 |             |                       |              |              |                         |                         |
| 825.00                   | 0.60            | 185.51      | 824.99                | -0.39        | 1.30         | 0.58                    | 0.23                    |
| <b>Last Gyro Survey</b>  |                 |             |                       |              |              |                         |                         |
| 1,289.00                 | 0.11            | 304.45      | 1,288.98              | -2.55        | 0.70         | 2.63                    | 0.14                    |
| <b>First MWD Survey</b>  |                 |             |                       |              |              |                         |                         |
| 1,381.00                 | 3.52            | 115.01      | 1,380.93              | -3.70        | 3.18         | 4.15                    | 3.94                    |
| 1,473.00                 | 4.72            | 99.41       | 1,472.69              | -5.51        | 9.48         | 6.93                    | 1.77                    |
| 1,566.00                 | 6.04            | 102.65      | 1,565.28              | -7.21        | 18.03        | 9.95                    | 1.46                    |
| 1,658.00                 | 6.65            | 88.51       | 1,656.72              | -8.13        | 28.07        | 12.44                   | 1.82                    |
| 1,750.00                 | 6.23            | 84.24       | 1,748.14              | -7.49        | 38.37        | 13.43                   | 0.69                    |
| 1,843.00                 | 7.81            | 90.88       | 1,840.44              | -7.08        | 49.71        | 14.81                   | 1.91                    |
| 1,935.00                 | 7.57            | 88.88       | 1,931.62              | -7.06        | 62.02        | 16.72                   | 0.39                    |
| 2,028.00                 | 9.22            | 90.91       | 2,023.62              | -7.06        | 75.59        | 18.86                   | 1.80                    |
| 2,213.00                 | 8.72            | 89.90       | 2,206.35              | -7.27        | 104.43       | 23.60                   | 0.28                    |
| 2,306.00                 | 9.48            | 88.51       | 2,298.18              | -7.05        | 119.14       | 25.71                   | 0.85                    |
| 2,490.00                 | 9.42            | 86.77       | 2,479.69              | -5.81        | 149.32       | 29.23                   | 0.16                    |
| 2,582.00                 | 9.04            | 86.15       | 2,570.49              | -4.90        | 164.05       | 30.64                   | 0.43                    |
| 2,675.00                 | 8.76            | 84.12       | 2,662.37              | -3.69        | 178.38       | 31.70                   | 0.45                    |
| 2,768.00                 | 8.80            | 83.67       | 2,754.28              | -2.18        | 192.50       | 32.43                   | 0.09                    |
| 2,863.00                 | 9.76            | 91.24       | 2,848.04              | -1.55        | 207.77       | 34.21                   | 1.63                    |
| 2,958.00                 | 9.62            | 88.80       | 2,941.69              | -1.56        | 223.76       | 36.73                   | 0.46                    |
| 3,052.00                 | 9.72            | 88.40       | 3,034.35              | -1.17        | 239.54       | 38.83                   | 0.13                    |
| 3,242.00                 | 9.67            | 87.81       | 3,221.64              | -0.11        | 271.52       | 42.82                   | 0.06                    |
| 3,336.00                 | 9.80            | 88.05       | 3,314.29              | 0.46         | 287.41       | 44.75                   | 0.14                    |
| 3,431.00                 | 10.19           | 93.01       | 3,407.85              | 0.29         | 303.88       | 47.51                   | 0.99                    |
| 3,526.00                 | 9.14            | 97.12       | 3,501.50              | -1.08        | 319.76       | 51.36                   | 1.32                    |
| 3,621.00                 | 8.79            | 95.47       | 3,595.34              | -2.71        | 334.47       | 55.28                   | 0.46                    |
| 3,716.00                 | 8.37            | 93.89       | 3,689.27              | -3.87        | 348.59       | 58.65                   | 0.51                    |
| 3,810.00                 | 8.39            | 91.63       | 3,782.27              | -4.53        | 362.28       | 61.46                   | 0.35                    |
| 3,905.00                 | 8.39            | 90.41       | 3,876.25              | -4.78        | 376.13       | 63.88                   | 0.19                    |
| 4,000.00                 | 8.10            | 88.95       | 3,970.27              | -4.70        | 389.76       | 65.95                   | 0.38                    |
| 4,095.00                 | 9.18            | 88.21       | 4,064.19              | -4.34        | 404.02       | 67.84                   | 1.14                    |
| 4,190.00                 | 8.73            | 86.00       | 4,158.03              | -3.60        | 418.79       | 69.43                   | 0.60                    |
| 4,285.00                 | 8.60            | 83.44       | 4,251.95              | -2.29        | 433.04       | 70.37                   | 0.43                    |
| 4,380.00                 | 8.43            | 80.88       | 4,345.90              | -0.38        | 446.97       | 70.67                   | 0.44                    |
| 4,474.00                 | 7.93            | 87.35       | 4,438.95              | 1.02         | 460.25       | 71.39                   | 1.11                    |
| 4,569.00                 | 6.89            | 85.26       | 4,533.15              | 1.79         | 472.48       | 72.55                   | 1.13                    |
| 4,664.00                 | 10.56           | 94.53       | 4,627.04              | 1.57         | 486.84       | 75.02                   | 4.12                    |
| 4,759.00                 | 10.26           | 94.83       | 4,720.48              | 0.17         | 503.95       | 79.09                   | 0.32                    |
| 4,853.00                 | 15.54           | 102.78      | 4,812.08              | -3.32        | 524.58       | 85.79                   | 5.91                    |
| 4,948.00                 | 22.93           | 112.41      | 4,901.74              | -13.21       | 554.15       | 100.20                  | 8.44                    |
| 5,043.00                 | 25.43           | 124.23      | 4,988.45              | -31.75       | 588.15       | 123.86                  | 5.72                    |
| 5,138.00                 | 26.55           | 135.39      | 5,073.89              | -58.35       | 619.94       | 155.14                  | 5.27                    |
| 5,232.00                 | 33.74           | 152.93      | 5,155.28              | -96.68       | 646.66       | 197.19                  | 12.03                   |
| 5,327.00                 | 43.01           | 168.11      | 5,229.84              | -152.12      | 665.43       | 254.89                  | 13.86                   |
| 5,422.00                 | 53.99           | 179.42      | 5,292.81              | -222.59      | 672.53       | 325.60                  | 14.57                   |
| 5,516.00                 | 62.48           | 181.91      | 5,342.26              | -302.42      | 671.52       | 404.28                  | 9.31                    |
| 5,611.00                 | 69.97           | 184.71      | 5,380.53              | -389.14      | 666.45       | 489.12                  | 8.33                    |

**Design Report for Nalen State LD12-76-1AHN - Actual Surveys**

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|
| 5,706.00              | 70.04           | 184.99      | 5,413.02              | -478.09      | 658.90       | 575.78                  | 0.29                    |
| 5,795.00              | 81.68           | 182.12      | 5,434.73              | -564.08      | 653.61       | 659.86                  | 13.45                   |
| 5,900.00              | 89.20           | 180.97      | 5,443.07              | -668.63      | 650.80       | 762.67                  | 7.24                    |
| 5,992.00              | 90.55           | 180.25      | 5,443.27              | -760.62      | 649.82       | 853.36                  | 1.66                    |
| 6,084.00              | 91.91           | 180.22      | 5,441.29              | -852.60      | 649.44       | 944.13                  | 1.48                    |
| 6,177.00              | 90.83           | 178.64      | 5,439.07              | -945.56      | 650.37       | 1,036.09                | 2.06                    |
| 6,270.00              | 90.62           | 178.19      | 5,437.89              | -1,038.52    | 652.94       | 1,128.29                | 0.53                    |
| 6,362.00              | 89.35           | 177.47      | 5,437.92              | -1,130.45    | 656.42       | 1,219.62                | 1.59                    |
| 6,455.00              | 90.37           | 177.74      | 5,438.15              | -1,223.37    | 660.31       | 1,312.00                | 1.13                    |
| 6,548.00              | 89.23           | 177.95      | 5,438.47              | -1,316.30    | 663.80       | 1,404.32                | 1.25                    |
| 6,639.00              | 86.95           | 176.40      | 5,441.50              | -1,407.13    | 668.29       | 1,494.73                | 3.03                    |
| 6,732.00              | 88.03           | 176.22      | 5,445.58              | -1,499.84    | 674.26       | 1,587.23                | 1.18                    |
| 6,824.00              | 88.92           | 176.13      | 5,448.02              | -1,591.61    | 680.40       | 1,678.81                | 0.97                    |
| 6,917.00              | 90.34           | 175.46      | 5,448.62              | -1,684.35    | 687.22       | 1,771.48                | 1.69                    |
| 7,010.00              | 90.03           | 179.12      | 5,448.32              | -1,777.23    | 691.62       | 1,863.89                | 3.95                    |
| 7,105.00              | 90.43           | 179.16      | 5,447.94              | -1,872.22    | 693.04       | 1,957.92                | 0.42                    |
| 7,199.00              | 89.38           | 177.75      | 5,448.10              | -1,966.18    | 695.58       | 2,051.11                | 1.87                    |
| 7,293.00              | 91.11           | 178.02      | 5,447.70              | -2,060.11    | 699.04       | 2,144.42                | 1.86                    |
| 7,388.00              | 89.42           | 176.29      | 5,447.26              | -2,154.99    | 703.76       | 2,238.86                | 2.55                    |
| 7,483.00              | 89.78           | 176.05      | 5,447.92              | -2,249.77    | 710.10       | 2,333.46                | 0.46                    |
| 7,578.00              | 90.18           | 175.21      | 5,447.95              | -2,344.50    | 717.34       | 2,428.14                | 0.98                    |
| 7,673.00              | 87.84           | 176.65      | 5,449.60              | -2,439.23    | 724.08       | 2,522.76                | 2.89                    |
| 7,767.00              | 88.68           | 180.51      | 5,452.45              | -2,533.14    | 726.41       | 2,615.87                | 4.20                    |
| 7,862.00              | 89.72           | 181.01      | 5,453.78              | -2,628.12    | 725.15       | 2,709.47                | 1.21                    |
| 7,956.00              | 89.94           | 180.99      | 5,454.06              | -2,722.11    | 723.51       | 2,802.02                | 0.24                    |
| 8,051.00              | 90.80           | 181.21      | 5,453.44              | -2,817.09    | 721.69       | 2,895.54                | 0.93                    |
| 8,146.00              | 91.51           | 178.22      | 5,451.53              | -2,912.06    | 722.16       | 2,989.40                | 3.23                    |
| 8,241.00              | 89.91           | 178.30      | 5,450.35              | -3,007.00    | 725.04       | 3,083.61                | 1.69                    |
| 8,335.00              | 90.40           | 178.37      | 5,450.10              | -3,100.96    | 727.78       | 3,176.83                | 0.53                    |
| 8,430.00              | 89.66           | 177.86      | 5,450.05              | -3,195.91    | 730.90       | 3,271.09                | 0.95                    |
| 8,525.00              | 91.57           | 178.07      | 5,449.03              | -3,290.84    | 734.27       | 3,365.37                | 2.02                    |
| 8,620.00              | 90.18           | 176.80      | 5,447.58              | -3,385.73    | 738.52       | 3,459.75                | 1.98                    |
| 8,715.00              | 90.25           | 176.59      | 5,447.22              | -3,480.57    | 744.00       | 3,554.27                | 0.23                    |
| 8,810.00              | 91.32           | 176.90      | 5,445.92              | -3,575.41    | 749.39       | 3,648.77                | 1.17                    |
| 8,904.00              | 89.38           | 175.48      | 5,445.34              | -3,669.19    | 755.64       | 3,742.37                | 2.56                    |
| 8,998.00              | 88.37           | 175.81      | 5,447.19              | -3,762.90    | 762.78       | 3,836.04                | 1.13                    |
| 9,093.00              | 88.98           | 175.98      | 5,449.39              | -3,857.63    | 769.58       | 3,930.66                | 0.67                    |
| 9,188.00              | 89.48           | 176.20      | 5,450.66              | -3,952.40    | 776.05       | 4,025.27                | 0.58                    |
| 9,282.00              | 89.75           | 176.14      | 5,451.29              | -4,046.19    | 782.33       | 4,118.87                | 0.29                    |
| 9,377.00              | 90.22           | 175.89      | 5,451.32              | -4,140.96    | 788.93       | 4,213.50                | 0.56                    |
| 9,472.00              | 89.17           | 177.22      | 5,451.82              | -4,235.78    | 794.64       | 4,308.04                | 1.78                    |
| 9,566.00              | 89.38           | 179.17      | 5,453.01              | -4,329.72    | 797.60       | 4,401.28                | 2.09                    |
| 9,661.00              | 89.97           | 179.00      | 5,453.55              | -4,424.71    | 799.12       | 4,495.32                | 0.65                    |
| 9,755.00              | 90.06           | 179.16      | 5,453.53              | -4,518.70    | 800.63       | 4,588.38                | 0.20                    |
| 9,850.00              | 91.36           | 180.37      | 5,452.35              | -4,613.68    | 801.02       | 4,682.25                | 1.87                    |
| 9,945.00              | 92.34           | 180.77      | 5,449.28              | -4,708.63    | 800.07       | 4,775.86                | 1.11                    |
| 10,039.00             | 87.47           | 179.65      | 5,449.44              | -4,802.60    | 799.73       | 4,868.61                | 5.32                    |
| 10,134.00             | 87.56           | 179.25      | 5,453.56              | -4,897.50    | 800.64       | 4,962.47                | 0.43                    |
| 10,229.00             | 87.94           | 179.24      | 5,457.29              | -4,992.42    | 801.89       | 5,056.41                | 0.40                    |
| 10,323.00             | 88.24           | 179.13      | 5,460.42              | -5,086.36    | 803.23       | 5,149.39                | 0.34                    |

Last MWD Survey

**Design Report for Nalen State LD12-76-1AHN - Actual Surveys**

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|
| 10,388.00             | 88.24           | 179.13      | 5,462.42              | -5,151.32    | 804.21       | 5,213.70                | 0.00                    |

Straight Projection to TD

**Design Annotations**

| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates |              | Comment                   |
|-----------------------|-----------------------|-------------------|--------------|---------------------------|
|                       |                       | +N/-S (usft)      | +E/-W (usft) |                           |
| 450.00                | 450.00                | 0.86              | 0.81         | First Gyro Survey         |
| 825.00                | 824.99                | -0.39             | 1.30         | Last Gyro Survey          |
| 1,289.00              | 1,288.98              | -2.55             | 0.70         | First MWD Survey          |
| 10,323.00             | 5,460.42              | -5,086.36         | 803.23       | Last MWD Survey           |
| 10,388.00             | 5,462.42              | -5,151.32         | 804.21       | Straight Projection to TD |

**Vertical Section Information**

| Angle Type | Target                       | Azimuth (°) | Origin Type | Origin +N/_S (usft) | Origin +E/-W (usft) | Start TVD (usft) |
|------------|------------------------------|-------------|-------------|---------------------|---------------------|------------------|
| Target     | Nalen State LD12-76-1AHN_BHL | 170.95      | Slot        | 0.00                | 0.00                | 0.00             |

**Survey tool program**

| From (usft) | To (usft) | Survey/Plan         | Survey Tool |
|-------------|-----------|---------------------|-------------|
| 450.00      | 825.00    | Surface Surveys     | Flexi-Shot  |
| 1,289.00    | 5,795.00  | Intermediate Survey | MWD         |
| 5,900.00    | 10,388.00 | Production Surveys  | MWD         |

**Casing Details**

| Measured Depth (usft) | Vertical Depth (usft) | Name   | Casing Diameter (") | Hole Diameter (") |
|-----------------------|-----------------------|--------|---------------------|-------------------|
| 1,221.00              | 1,220.98              | 9 5/8" | 9-5/8               | 13-3/4            |
| 5,845.00              | 5,440.41              | 7"     | 7                   | 8-3/4             |

**Wellbore Targets**

| Target Name  | Dip Angle (°) | Dip Dir. (°) | TVD (usft) | +N/-S (usft) | +E/-W (usft) | Northing (usft) | Easting (usft) | Latitude  | Longitude   |
|--|---------------|--------------|------------|--------------|--------------|-----------------|----------------|-----------|-------------|
| Nalen State LD12-76-1  | 0.00          | 0.00         | 5,456.06   | -5,155.20    | 821.08       | 1,524,078.09    | 3,467,106.29   | 40.759790 | -103.813790 |
| - hit/miss target  |               |              |            |              |              |                 |                |           |             |
| - Shape  |               |              |            |              |              |                 |                |           |             |
| - actual wellpath misses target center by 18.43usft at 10388.00usft MD (5462.42 TVD, -5151.32 N, 804.21 E) |               |              |            |              |              |                 |                |           |             |
| - Point  |               |              |            |              |              |                 |                |           |             |

**Directional Difficulty Index**

|                                     |                |                               |                                  |
|-------------------------------------|----------------|-------------------------------|----------------------------------|
| Average Dogleg over Survey:         | 1.89 °/100usft | Maximum Dogleg over Survey:   | 14.57 °/100usft at 5,422.00 usft |
| Net Tortousity applicable to Plans: | 0.87 °/100usft | Directional Difficulty Index: | 6.333                            |

**Audit Info**