



# Actual Wellpath Report

PEN-20G-HS AWP Proj: 11615'

Page 1 of 8



| REFERENCE WELLPATH IDENTIFICATION |                    |          |                |
|-----------------------------------|--------------------|----------|----------------|
| Operator                          | NOBLE ENERGY       | Slot     | Slot G         |
| Area                              | Ritchie County, WV | Well     | PEN-20G-HS     |
| Field                             | Ritchie            | Wellbore | PEN-20G-HS AWB |
| Facility                          | PEN-20 Pad         |          |                |

| REPORT SETUP INFORMATION |   |                      |   |
|--------------------------|---|----------------------|---|
| Projection System        | NAD27 / Lambert West Virginia SP, Northern Zone (4701), US feet | Software System      | WellArchitect® 4.0.1                      |
| North Reference          | Grid  | User                 | Edsaryar                                  |
| Scale                    | 0.999954  | Report Generated     | 27/Jan/2015 at 10:59                      |
| Convergence at slot      | 0.97° West  | Database/Source file | WellArchitectEasternDB/PEN-20G-HS_AWB.xml |

| WELLPATH LOCATION     |                   |          |                  |                 |                        |                |
|-----------------------|-------------------|----------|------------------|-----------------|------------------------|----------------|
|                       | Local coordinates |          | Grid coordinates |                 | Geographic coordinates |                |
|                       | North[ft]         | East[ft] | Easting[US ft]   | Northing[US ft] | Latitude               | Longitude      |
| Slot Location         | -81.63            | 88.02    | 1568293.82       | 305193.95       | 39°19'40.332"N         | 81°01'34.169"W |
| Facility Reference Pt |                   |          | 1568205.80       | 305275.58       | 39°19'41.124"N         | 81°01'35.306"W |
| Field Reference Pt    |                   |          | 0.00             | 0.00            | 38°17'12.460"N         | 86°28'23.077"W |

| WELLPATH DATUM           |                   |   |                   |
|--------------------------|-------------------|---|-------------------|
| Calculation method       | Minimum curvature | Nomac 78 (RKB) to Facility Vertical Datum   | 1055.00ft         |
| Horizontal Reference Pt  | Slot              | Nomac 78 (RKB) to Mean Sea Level            | 1055.00ft         |
| Vertical Reference Pt    | Nomac 78 (RKB)    | Nomac 78 (RKB) to Mud Line at Slot (Slot G) | 26.00ft           |
| MD Reference Pt          | Nomac 78 (RKB)    | Section Origin                              | N 0.00, E 0.00 ft |
| Field Vertical Reference | Mean Sea Level    | Section Azimuth                             | 320.00°           |

RECEIVED  
 Office of Oil and Gas  
 JAN 17 2017  
 WV Department of Environmental Protection



# Actual Wellpath Report

PEN-20G-HS AWP Proj: 11615'  
Page 2 of 8



| REFERENCE WELLPATH IDENTIFICATION |                    |          |                |
|-----------------------------------|--------------------|----------|----------------|
| Operator                          | NOBLE ENERGY       | Slot     | Slot G         |
| Area                              | Ritchie County, WV | Well     | PEN-20G-HS     |
| Field                             | Ritchie            | Wellbore | PEN-20G-HS AWB |
| Facility                          | PEN-20 Pad         |          |                |

| WELLPATH DATA (124 stations) † = interpolated/extrapolated station |                 |             |          |                |            |           |                   |                    |                |                |                   |                 |               |                      |                     |
|--|-----------------|-------------|----------|----------------|------------|-----------|-------------------|--------------------|----------------|----------------|-------------------|-----------------|---------------|----------------------|---------------------|
| MD [ft]  | Inclination [°] | Azimuth [°] | TVD [ft] | Vert Sect [ft] | North [ft] | East [ft] | Grid East [US ft] | Grid North [US ft] | Latitude       | Longitude      | Closure Dist [ft] | Closure Dir [°] | DLS [°/100ft] | Build Rate [°/100ft] | Turn Rate [°/100ft] |
| 0.00†  | 0.000           | 303.550     | 0.00     | 0.00           | 0.00       | 0.00      | 1568293.82        | 305193.95          | 39°19'40.332"N | 81°01'34.169"W | 0.00              | 0.000           | 0.00          | 0.00                 | 0.00                |
| 26.00  | 0.000           | 303.550     | 26.00    | 0.00           | 0.00       | 0.00      | 1568293.82        | 305193.95          | 39°19'40.332"N | 81°01'34.169"W | 0.00              | 0.000           | 0.00          | 0.00                 | 0.00                |
| 100.00   | 0.240           | 303.550     | 100.00   | 0.15           | 0.09       | -0.13     | 1568293.69        | 305194.04          | 39°19'40.333"N | 81°01'34.170"W | 0.15              | 303.550         | 0.32          | 0.32                 | 0.00                |
| 200.00   | 0.060           | 4.900       | 200.00   | 0.39           | 0.25       | -0.30     | 1568293.52        | 305194.20          | 39°19'40.334"N | 81°01'34.173"W | 0.39              | 310.278         | 0.22          | -0.18                | 61.35               |
| 300.00   | 0.120           | 224.880     | 300.00   | 0.41           | 0.23       | -0.37     | 1568293.45        | 305194.18          | 39°19'40.334"N | 81°01'34.174"W | 0.44              | 302.131         | 0.17          | 0.06                 | -140.02             |
| 400.00   | 0.170           | 295.200     | 400.00   | 0.54           | 0.22       | -0.58     | 1568293.24        | 305194.17          | 39°19'40.334"N | 81°01'34.176"W | 0.62              | 290.921         | 0.17          | 0.05                 | 70.32               |
| 500.00   | 0.150           | 323.950     | 500.00   | 0.80           | 0.39       | -0.79     | 1568293.03        | 305194.34          | 39°19'40.336"N | 81°01'34.179"W | 0.88              | 296.301         | 0.08          | -0.02                | 28.75               |
| 600.00   | 0.080           | 177.190     | 600.00   | 0.88           | 0.43       | -0.86     | 1568292.96        | 305194.38          | 39°19'40.336"N | 81°01'34.180"W | 0.96              | 296.286         | 0.22          | -0.07                | -146.76             |
| 700.00   | 0.160           | 253.430     | 700.00   | 0.88           | 0.32       | -0.99     | 1568292.83        | 305194.27          | 39°19'40.335"N | 81°01'34.181"W | 1.04              | 287.671         | 0.16          | 0.08                 | 76.24               |
| 800.00   | 0.160           | 308.540     | 800.00   | 1.07           | 0.36       | -1.24     | 1568292.58        | 305194.31          | 39°19'40.335"N | 81°01'34.185"W | 1.29              | 286.388         | 0.15          | 0.00                 | 55.11               |
| 900.00   | 0.070           | 182.880     | 900.00   | 1.16           | 0.39       | -1.35     | 1568292.47        | 305194.34          | 39°19'40.336"N | 81°01'34.186"W | 1.40              | 286.112         | 0.21          | -0.09                | -125.66             |
| 1000.00  | 0.140           | 254.900     | 1000.00  | 1.17           | 0.30       | -1.47     | 1568292.35        | 305194.25          | 39°19'40.335"N | 81°01'34.188"W | 1.50              | 281.411         | 0.14          | 0.07                 | 72.02               |
| 1100.00  | 0.130           | 7.180       | 1100.00  | 1.30           | 0.38       | -1.57     | 1568292.25        | 305194.33          | 39°19'40.336"N | 81°01'34.189"W | 1.62              | 283.488         | 0.22          | -0.01                | 112.28              |
| 1200.00  | 0.100           | 77.890      | 1200.00  | 1.34           | 0.51       | -1.47     | 1568292.35        | 305194.46          | 39°19'40.337"N | 81°01'34.188"W | 1.56              | 289.031         | 0.14          | -0.03                | 70.71               |
| 1300.00  | 0.180           | 333.250     | 1300.00  | 1.45           | 0.67       | -1.46     | 1568292.36        | 305194.62          | 39°19'40.338"N | 81°01'34.187"W | 1.60              | 294.567         | 0.23          | 0.08                 | -104.64             |
| 1400.00  | 0.070           | 75.190      | 1400.00  | 1.57           | 0.82       | -1.47     | 1568292.35        | 305194.77          | 39°19'40.340"N | 81°01'34.188"W | 1.68              | 299.231         | 0.21          | -0.11                | 101.94              |
| 1500.00  | 0.200           | 51.200      | 1500.00  | 1.55           | 0.95       | -1.27     | 1568292.55        | 305194.90          | 39°19'40.341"N | 81°01'34.185"W | 1.59              | 306.623         | 0.14          | 0.13                 | -23.99              |
| 1600.00  | 0.180           | 338.120     | 1600.00  | 1.69           | 1.20       | -1.20     | 1568292.62        | 305195.15          | 39°19'40.344"N | 81°01'34.184"W | 1.70              | 315.129         | 0.23          | -0.02                | -73.08              |
| 1700.00  | 0.240           | 1.980       | 1700.00  | 2.00           | 1.56       | -1.25     | 1568292.57        | 305195.51          | 39°19'40.347"N | 81°01'34.185"W | 2.00              | 321.287         | 0.10          | 0.06                 | 23.86               |
| 1800.00  | 0.230           | 56.260      | 1800.00  | 2.20           | 1.93       | -1.12     | 1568292.70        | 305195.88          | 39°19'40.351"N | 81°01'34.183"W | 2.23              | 329.802         | 0.14          | -0.01                | 34.28               |
| 1900.00  | 0.120           | 66.900      | 1899.99  | 2.23           | 2.15       | -0.92     | 1568292.90        | 305196.10          | 39°19'40.353"N | 81°01'34.181"W | 2.34              | 336.901         | 0.13          | -0.11                | 20.64               |
| 2000.00  | 0.120           | 70.810      | 1999.99  | 2.32           | 2.30       | -0.88     | 1568292.94        | 305196.25          | 39°19'40.355"N | 81°01'34.180"W | 2.46              | 339.046         | 0.16          | 0.00                 | -86.09              |
| 2100.00  | 0.170           | 44.700      | 2099.99  | 2.51           | 2.53       | -0.89     | 1568292.93        | 305196.48          | 39°19'40.357"N | 81°01'34.181"W | 2.68              | 340.584         | 0.12          | 0.05                 | 44.16               |
| 2200.00  | 0.230           | 58.800      | 2199.99  | 2.53           | 2.75       | -0.67     | 1568293.15        | 305196.70          | 39°19'40.359"N | 81°01'34.178"W | 2.83              | 346.358         | 0.19          | 0.06                 | 53.83               |
| 2300.00  | 0.160           | 55.000      | 2299.99  | 2.41           | 2.86       | -0.34     | 1568293.48        | 305196.81          | 39°19'40.360"N | 81°01'34.174"W | 2.88              | 353.117         | 0.07          | -0.07                | 6.20                |
| 2400.00  | 0.080           | 90.000      | 2399.99  | 2.31           | 2.82       | -0.22     | 1568293.60        | 305196.77          | 39°19'40.360"N | 81°01'34.172"W | 2.83              | 355.497         | 0.21          | -0.08                | 115.30              |
| 2500.00  | 0.110           | 101.700     | 2499.99  | 2.22           | 2.67       | -0.27     | 1568293.55        | 305196.62          | 39°19'40.358"N | 81°01'34.173"W | 2.68              | 354.160         | 0.04          | 0.03                 | 12.97               |
| 2600.00  | 0.090           | 148.890     | 2599.99  | 2.20           | 2.55       | -0.38     | 1568293.44        | 305196.50          | 39°19'40.357"N | 81°01'34.174"W | 2.58              | 351.437         | 0.08          | -0.02                | 45.62               |
| 2700.00  | 0.090           | 87.470      | 2699.99  | 2.18           | 2.53       | -0.38     | 1568293.44        | 305196.47          | 39°19'40.357"N | 81°01'34.174"W | 2.55              | 351.470         | 0.18          | 0.00                 | -161.42             |
| 2800.00  | 0.120           | 57.640      | 2799.99  | 2.12           | 2.58       | -0.21     | 1568293.61        | 305196.53          | 39°19'40.358"N | 81°01'34.172"W | 2.59              | 355.315         | 0.06          | 0.03                 | -29.83              |



# Actual Wellpath Report

PEN-20G-HS AWP Proj: 11615'

Page 3 of 8



| REFERENCE WELLPATH IDENTIFICATION |                    |  |  |          |                |
|-----------------------------------|--------------------|--|--|----------|----------------|
| Operator                          | NOBLE ENERGY       |  |  | Slot     | Slot G         |
| Area                              | Ritchie County, WV |  |  | Well     | PEN-20G-HS     |
| Field                             | Ritchie            |  |  | Wellbore | PEN-20G-HS AWB |
| Facility                          | PEN-20 Pad         |  |  |          |                |

## WELLPATH DATA (124 stations)

| MD [ft] | Inclination [°] | Azimuth [°] | TVD [ft] | Vert Sect [ft] | North [ft] | East [ft] | Grid East [US ft] | Grid North [US ft] | Latitude       | Longitude      | Closure Dist [ft] | Closure Dir [°] | DLS [°/100ft] | Build Rate [°/100ft] | Turn Rate [°/100ft] |
|---------|-----------------|-------------|----------|----------------|------------|-----------|-------------------|--------------------|----------------|----------------|-------------------|-----------------|---------------|----------------------|---------------------|
| 2900.00 | 0.130           | 28.550      | 2899.99  | 2.14           | 2.74       | -0.07     | 1568293.75        | 305196.69          | 39°19'40.359"N | 81°01'34.170"W | 2.74              | 358.555         | 0.06          | 0.01                 | -29.09              |
| 3000.00 | 0.120           | 320.880     | 2999.99  | 2.29           | 2.92       | -0.08     | 1568293.74        | 305196.87          | 39°19'40.361"N | 81°01'34.170"W | 2.92              | 358.412         | 0.14          | -0.01                | -67.67              |
| 3100.00 | 0.130           | 102.780     | 3099.99  | 2.30           | 2.98       | -0.04     | 1568293.78        | 305196.93          | 39°19'40.361"N | 81°01'34.170"W | 2.98              | 359.299         | 0.24          | 0.01                 | 141.90              |
| 3200.00 | 0.090           | 359.220     | 3199.99  | 2.27           | 3.03       | 0.07      | 1568293.89        | 305196.98          | 39°19'40.362"N | 81°01'34.168"W | 3.03              | 1.382           | 0.17          | -0.04                | -103.56             |
| 3300.00 | 0.140           | 142.480     | 3299.99  | 2.21           | 3.01       | 0.15      | 1568293.97        | 305196.96          | 39°19'40.362"N | 81°01'34.168"W | 3.02              | 2.784           | 0.22          | 0.05                 | 143.26              |
| 3400.00 | 0.020           | 251.300     | 3399.99  | 2.10           | 2.91       | 0.20      | 1568294.02        | 305196.86          | 39°19'40.361"N | 81°01'34.167"W | 2.92              | 4.017           | 0.15          | -0.12                | 108.82              |
| 3500.00 | 0.190           | 67.720      | 3499.99  | 2.05           | 2.97       | 0.34      | 1568294.16        | 305196.92          | 39°19'40.361"N | 81°01'34.165"W | 2.99              | 6.561           | 0.21          | 0.17                 | 176.42              |
| 3600.00 | 0.170           | 39.770      | 3599.99  | 2.03           | 3.14       | 0.59      | 1568294.41        | 305197.09          | 39°19'40.363"N | 81°01'34.162"W | 3.20              | 10.621          | 0.09          | -0.02                | -27.95              |
| 3700.00 | 0.310           | 51.300      | 3699.99  | 2.05           | 3.43       | 0.90      | 1568294.72        | 305197.38          | 39°19'40.366"N | 81°01'34.158"W | 3.54              | 14.645          | 0.15          | 0.14                 | 11.53               |
| 3800.00 | 0.360           | 43.280      | 3799.99  | 2.08           | 3.83       | 1.32      | 1568295.14        | 305197.77          | 39°19'40.370"N | 81°01'34.153"W | 4.05              | 19.067          | 0.07          | 0.05                 | -8.02               |
| 3900.00 | 0.140           | 60.650      | 3899.99  | 2.09           | 4.11       | 1.64      | 1568295.46        | 305198.06          | 39°19'40.373"N | 81°01'34.149"W | 4.43              | 21.783          | 0.23          | -0.22                | 17.37               |
| 4000.00 | 0.420           | 58.010      | 3999.99  | 2.02           | 4.37       | 2.06      | 1568295.88        | 305198.32          | 39°19'40.376"N | 81°01'34.143"W | 4.83              | 25.265          | 0.28          | 0.28                 | -2.64               |
| 4100.00 | 0.380           | 64.140      | 4099.98  | 1.89           | 4.71       | 2.67      | 1568296.49        | 305198.66          | 39°19'40.379"N | 81°01'34.136"W | 5.41              | 29.571          | 0.06          | -0.04                | 6.13                |
| 4200.00 | 0.420           | 52.890      | 4199.98  | 1.79           | 5.07       | 3.26      | 1568297.08        | 305199.02          | 39°19'40.383"N | 81°01'34.128"W | 6.03              | 32.739          | 0.09          | 0.04                 | -11.25              |
| 4300.00 | 0.410           | 65.390      | 4299.98  | 1.68           | 5.44       | 3.88      | 1568297.70        | 305199.39          | 39°19'40.386"N | 81°01'34.121"W | 6.68              | 35.478          | 0.09          | -0.01                | 12.50               |
| 4366.00 | 2.110           | 74.010      | 4365.96  | 1.12           | 5.88       | 5.26      | 1568299.08        | 305199.83          | 39°19'40.391"N | 81°01'34.103"W | 7.89              | 41.845          | 2.58          | 2.58                 | 13.06               |
| 4461.00 | 7.170           | 69.410      | 4460.62  | -1.56          | 8.44       | 12.50     | 1568306.32        | 305202.39          | 39°19'40.418"N | 81°01'34.012"W | 15.08             | 55.955          | 5.34          | 5.33                 | -4.84               |
| 4556.00 | 14.160          | 67.090      | 4553.92  | -6.96          | 15.06      | 28.77     | 1568322.59        | 305209.01          | 39°19'40.486"N | 81°01'33.806"W | 32.47             | 62.370          | 7.37          | 7.36                 | -2.44               |
| 4651.00 | 20.480          | 67.670      | 4644.57  | -15.70         | 25.64      | 54.98     | 1568348.80        | 305219.59          | 39°19'40.595"N | 81°01'33.475"W | 60.67             | 64.999          | 6.67          | 6.65                 | 1.66                |
| 4745.00 | 24.360          | 67.740      | 4731.45  | -27.52         | 38.34      | 88.50     | 1568382.32        | 305232.29          | 39°19'40.726"N | 81°01'33.051"W | 96.45             | 66.577          | 4.15          | 4.13                 | 1.14                |
| 4841.00 | 27.220          | 67.800      | 4819.29  | -39.79         | 52.54      | 124.52    | 1568418.33        | 305246.49          | 39°19'40.872"N | 81°01'32.596"W | 135.15            | 67.122          | 1.61          | -1.19                | -2.69               |
| 4935.00 | 27.770          | 67.360      | 4904.33  | -51.31         | 68.35      | 161.27    | 1568455.08        | 305262.29          | 39°19'41.035"N | 81°01'32.132"W | 175.15            | 67.032          | 4.22          | 4.20                 | -0.85               |
| 5030.00 | 30.580          | 66.190      | 4987.51  | -64.25         | 86.72      | 203.30    | 1568497.11        | 305280.67          | 39°19'41.223"N | 81°01'31.601"W | 221.02            | 66.898          | 3.59          | 3.59                 | 0.05                |
| 5125.00 | 29.340          | 63.890      | 5069.73  | -76.69         | 106.70     | 246.47    | 1568540.28        | 305300.64          | 39°19'41.428"N | 81°01'31.056"W | 268.58            | 66.592          | 1.72          | -1.09                | -2.65               |
| 5219.00 | 28.870          | 60.340      | 5152.06  | -86.36         | 127.78     | 286.63    | 1568580.43        | 305321.72          | 39°19'41.643"N | 81°01'30.549"W | 313.82            | 65.973          | 2.21          | -1.46                | -3.46               |
| 5258.00 | 28.350          | 61.110      | 5186.33  | -89.87         | 136.84     | 302.89    | 1568596.69        | 305330.78          | 39°19'41.735"N | 81°01'30.345"W | 332.36            | 65.688          | 1.84          | 1.74                 | 1.21                |
| 5350.00 | 31.840          | 62.990      | 5268.31  | -99.92         | 159.30     | 345.29    | 1568639.09        | 305353.24          | 39°19'41.964"N | 81°01'29.810"W | 380.26            | 65.234          | 3.30          | 3.15                 | 1.98                |
| 5440.00 | 34.770          | 65.260      | 5347.71  | -109.91        | 184.53     | 390.91    | 1568684.71        | 305378.47          | 39°19'42.221"N | 81°01'29.235"W | 432.28            | 64.730          | 3.76          | 3.08                 | -3.93               |
| 5550.00 | 29.020          | 58.250      | 5428.33  | -117.59        | 210.52     | 433.83    | 1568727.63        | 305404.46          | 39°19'42.485"N | 81°01'28.694"W | 482.21            | 64.114          | 6.08          | -6.05                | -1.06               |
| 5638.00 | 29.730          | 61.960      | 5511.12  | -125.78        | 233.73     | 474.22    | 1568768.01        | 305427.66          | 39°19'42.721"N | 81°01'28.186"W | 528.69            | 63.763          | 2.06          | 0.75                 | 3.91                |





**BAKER  
HUGHES**

# Actual Wellpath Report

PEN-20G-HS AWP Proj: 11615

Page 4 of 8

## REFERENCE WELLPATH IDENTIFICATION

|          |                    |
|----------|--------------------|
| Operator | NOBLE ENERGY       |
| Area     | Ritchie County, WV |
| Field    | Ritchie            |
| Facility | PEN-20 Pad         |
| Slot     | Slot G             |
| Well     | PEN-20G-HS         |
| Wellbore | PEN-20G-HS AWB     |

| WELLPATH DATA (124 stations) |             |         |         |           |         |        |            |            |                |                |              |             |           |            |           |
|------------------------------|-------------|---------|---------|-----------|---------|--------|------------|------------|----------------|----------------|--------------|-------------|-----------|------------|-----------|
| MD                           | Inclination | Azimuth | TVD     | Vert Sect | North   | East   | Grid East  | Grid North | Latitude       | Longitude      | Closure Dist | Closure Dir | DLS       | Build Rate | Turn Rate |
| [ft]                         | [°]         | [°]     | [ft]    | [ft]      | [ft]    | [ft]   | [US ft]    | [US ft]    |                |                | [ft]         | [°]         | [°/100ft] | [°/100ft]  | [°/100ft] |
| 5732.00                      | 29.800      | 60.950  | 5592.72 | -135.04   | 256.02  | 553.21 | 1568809.00 | 305449.96  | 39°19'42.949"N | 81°01'27.669"W | 575.31       | 63.576      | 0.54      | 0.07       | -1.07     |
| 5827.00                      | 28.840      | 58.240  | 5758.89 | -135.49   | 314.50  | 585.60 | 1568847.42 | 305475.92  | 39°19'43.212"N | 81°01'27.186"W | 621.30       | 63.008      | 5.32      | -1.01      | -10.68    |
| 5922.00                      | 28.860      | 38.240  | 5840.64 | -118.27   | 356.61  | 608.98 | 1568902.77 | 305550.55  | 39°19'43.958"N | 81°01'26.786"W | 664.71       | 61.761      | 6.37      | 0.02       | -13.22    |
| 6017.00                      | 32.730      | 20.840  | 5840.64 | -118.27   | 356.61  | 608.98 | 1568902.77 | 305550.55  | 39°19'43.958"N | 81°01'26.497"W | 705.72       | 59.647      | 10.18     | 4.07       | -18.32    |
| 6112.00                      | 36.800      | 3.410   | 5918.87 | -84.98    | 409.17  | 619.84 | 1568913.63 | 305603.10  | 39°19'44.480"N | 81°01'26.370"W | 742.72       | 56.570      | 11.27     | 4.28       | -18.35    |
| 6207.00                      | 43.630      | 355.270 | 5991.42 | -37.47    | 470.35  | 618.83 | 1568912.62 | 305664.28  | 39°19'45.084"N | 81°01'26.397"W | 777.29       | 52.763      | 9.06      | 7.19       | -8.57     |
| 6302.00                      | 50.700      | 354.380 | 6055.97 | 19.70     | 539.69  | 612.52 | 1568906.31 | 305733.61  | 39°19'45.768"N | 81°01'26.492"W | 816.36       | 48.617      | 7.47      | 7.44       | -0.94     |
| 6397.00                      | 59.680      | 353.430 | 6110.14 | 84.39     | 617.16  | 604.21 | 1568898.00 | 305811.08  | 39°19'46.532"N | 81°01'26.614"W | 863.69       | 44.393      | 9.49      | 9.45       | -1.00     |
| 6490.00                      | 67.150      | 346.750 | 6151.77 | 156.32    | 698.94  | 589.77 | 1568883.56 | 305892.85  | 39°19'47.338"N | 81°01'26.816"W | 914.51       | 40.158      | 10.28     | 8.03       | -7.18     |
| 6585.00                      | 69.400      | 337.070 | 6187.01 | 238.09    | 782.68  | 562.35 | 1568856.14 | 305976.59  | 39°19'48.161"N | 81°01'27.183"W | 963.75       | 35.697      | 9.76      | 2.37       | -10.19    |
| 6680.00                      | 75.350      | 332.420 | 6215.77 | 325.60    | 864.47  | 523.70 | 1568817.49 | 306058.38  | 39°19'48.963"N | 81°01'27.692"W | 1010.73      | 31.207      | 7.81      | 6.26       | -4.89     |
| 6775.00                      | 86.240      | 331.080 | 6230.95 | 417.27    | 946.95  | 479.36 | 1568773.16 | 306140.85  | 39°19'49.770"N | 81°01'28.274"W | 1061.37      | 26.849      | 11.55     | 11.46      | -1.41     |
| 6870.00                      | 92.060      | 331.540 | 6230.32 | 510.09    | 1030.89 | 435.01 | 1568728.80 | 306224.79  | 39°19'50.593"N | 81°01'28.857"W | 1118.91      | 22.878      | 3.36      | 0.55       | -3.32     |
| 6968.00                      | 90.740      | 323.560 | 6227.92 | 607.13    | 1113.49 | 382.48 | 1568676.28 | 306307.39  | 39°19'51.400"N | 81°01'29.543"W | 1177.35      | 18.957      | 8.25      | -1.35      | -8.14     |
| 9061.00                      | 90.950      | 321.190 | 6226.55 | 700.04    | 1187.14 | 325.71 | 1568619.52 | 306381.03  | 39°19'52.118"N | 81°01'30.281"W | 1231.01      | 15.343      | 2.56      | 0.23       | -2.55     |
| 1570.00                      | 91.850      | 318.220 | 6224.20 | 795.99    | 1260.33 | 263.66 | 1568557.46 | 306454.22  | 39°19'52.831"N | 81°01'31.086"W | 1287.61      | 11.816      | 3.23      | 0.94       | -3.09     |
| 2200.00                      | 90.600      | 311.840 | 6222.36 | 893.55    | 1329.61 | 194.44 | 1568488.26 | 306523.50  | 39°19'53.504"N | 81°01'31.982"W | 1343.75      | 8.320       | 6.70      | -1.57      | -6.51     |
| 7300.00                      | 89.000      | 311.440 | 6222.48 | 985.57    | 1391.40 | 124.94 | 1568418.76 | 306585.29  | 39°19'54.103"N | 81°01'32.880"W | 1397.00      | 5.131       | 0.93      | -0.83      | -0.43     |
| 7900.00                      | 89.000      | 313.400 | 6223.20 | 1080.72   | 1456.16 | 54.08  | 1568347.90 | 306650.04  | 39°19'54.731"N | 81°01'33.795"W | 1457.16      | 2.127       | 2.04      | 0.06       | 2.04      |
| 8900.00                      | 89.000      | 313.400 | 6223.22 | 1175.23   | 1522.36 | -14.05 | 1568279.77 | 306716.23  | 39°19'55.374"N | 81°01'34.677"W | 1522.42      | 359.471     | 1.82      | 0.81       | 1.63      |
| 9079.00                      | 90.770      | 314.950 | 6223.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.29 | 306783.10  | 39°19'56.023"N | 81°01'35.550"W | 1591.31      | 357.063     | 0.57      | -0.36      | -0.44     |
| 9080.00                      | 90.730      | 314.530 | 6222.89 | 1269.82   | 1589.22 | -81.53 | 1568212.2  |            |                |                |              |             |           |            |           |



# Actual Wellpath Report

PEN-20G-HS AWP Proj: 11615'

Page 5 of 8



## REFERENCE WELLPATH IDENTIFICATION

|          |                    |          |                |
|----------|--------------------|----------|----------------|
| Operator | NOBLE ENERGY       | Slot     | Slot G         |
| Area     | Ritchie County, WV | Well     | PEN-20G-HS     |
| Field    | Ritchie            | Wellbore | PEN-20G-HS AWB |
| Facility | PEN-20 Pad         |          |                |

## WELLPATH DATA (124 stations)

| MD [ft]  | Inclination [°] | Azimuth [°] | TVD [ft] | Vert Sect [ft] | North [ft] | East [ft] | Grid East [US ft] | Grid North [US ft] | Latitude       | Longitude      | Closure Dist [ft] | Closure Dir [°] | DLS [%/100ft] | Build Rate [%/100ft] | Turn Rate [%/100ft] |
|----------|-----------------|-------------|----------|----------------|------------|-----------|-------------------|--------------------|----------------|----------------|-------------------|-----------------|---------------|----------------------|---------------------|
| 8495.00  | 89.420          | 321.100     | 6217.88  | 2128.96        | 2214.56    | -672.86   | 1567620.99        | 307408.41          | 39°20'02.104"N | 81°01'43.209"W | 2314.52           | 343.099         | 4.36          | 0.04                 | 4.36                |
| 8590.00  | 90.340          | 321.460     | 6218.08  | 2223.93        | 2288.68    | -732.28   | 1567561.57        | 307482.52          | 39°20'02.826"N | 81°01'43.982"W | 2402.98           | 342.257         | 1.04          | 0.97                 | 0.38                |
| 8686.00  | 90.120          | 319.720     | 6217.70  | 2319.92        | 2362.85    | -793.23   | 1567500.63        | 307556.69          | 39°20'03.549"N | 81°01'44.773"W | 2492.44           | 341.443         | 1.83          | -0.23                | -1.81               |
| 8781.00  | 90.150          | 318.430     | 6217.47  | 2414.91        | 2434.63    | -855.46   | 1567438.40        | 307628.46          | 39°20'04.248"N | 81°01'45.581"W | 2580.54           | 340.640         | 1.36          | 0.03                 | -1.36               |
| 8876.00  | 89.510          | 318.530     | 6217.75  | 2509.87        | 2505.75    | -918.43   | 1567375.43        | 307699.58          | 39°20'04.940"N | 81°01'46.397"W | 2668.77           | 339.871         | 0.68          | -0.67                | 0.11                |
| 8971.00  | 90.120          | 318.080     | 6218.06  | 2604.83        | 2576.69    | -981.62   | 1567312.25        | 307770.52          | 39°20'05.630"N | 81°01'47.217"W | 2757.34           | 339.145         | 0.80          | 0.64                 | -0.47               |
| 9067.00  | 89.780          | 319.720     | 6218.14  | 2700.81        | 2649.03    | -1044.73  | 1567249.14        | 307842.85          | 39°20'06.335"N | 81°01'48.035"W | 2847.60           | 338.477         | 1.74          | -0.35                | 1.71                |
| 9163.00  | 89.750          | 321.710     | 6218.54  | 2796.80        | 2723.33    | -1105.51  | 1567188.37        | 307917.15          | 39°20'07.059"N | 81°01'48.825"W | 2939.16           | 337.906         | 2.07          | -0.03                | 2.07                |
| 9258.00  | 90.370          | 322.880     | 6218.44  | 2891.72        | 2798.49    | -1163.61  | 1567130.27        | 307992.30          | 39°20'07.792"N | 81°01'49.581"W | 3030.76           | 337.423         | 1.39          | 0.65                 | 1.23                |
| 9354.00  | 90.800          | 319.350     | 6217.46  | 2987.68        | 2873.20    | -1223.86  | 1567070.02        | 308067.01          | 39°20'08.520"N | 81°01'50.364"W | 3123.00           | 336.928         | 3.70          | 0.45                 | -3.68               |
| 9450.00  | 90.370          | 317.120     | 6216.48  | 3083.62        | 2944.80    | -1287.80  | 1567006.09        | 308138.61          | 39°20'09.217"N | 81°01'51.193"W | 3214.07           | 336.380         | 2.37          | -0.45                | -2.32               |
| 9545.00  | 90.120          | 316.920     | 6216.07  | 3178.49        | 3014.30    | -1352.56  | 1566941.32        | 308208.10          | 39°20'09.893"N | 81°01'52.032"W | 3303.85           | 335.834         | 0.34          | -0.26                | -0.21               |
| 9641.00  | 90.340          | 319.900     | 6215.69  | 3274.45        | 3086.09    | -1416.28  | 1566877.61        | 308279.89          | 39°20'10.591"N | 81°01'52.858"W | 3395.55           | 335.349         | 3.11          | 0.23                 | 3.10                |
| 9736.00  | 90.650          | 323.710     | 6214.87  | 3369.38        | 3160.73    | -1475.01  | 1566818.88        | 308354.53          | 39°20'11.319"N | 81°01'53.622"W | 3487.96           | 334.983         | 4.02          | 0.33                 | 4.01                |
| 9832.00  | 90.520          | 321.130     | 6213.88  | 3465.28        | 3236.80    | -1533.55  | 1566760.35        | 308430.60          | 39°20'12.061"N | 81°01'54.383"W | 3581.71           | 334.649         | 2.69          | -0.14                | -2.69               |
| 9927.00  | 90.650          | 319.640     | 6212.91  | 3560.27        | 3309.98    | -1594.12  | 1566699.78        | 308503.77          | 39°20'12.774"N | 81°01'55.170"W | 3673.85           | 334.284         | 1.57          | 0.14                 | -1.57               |
| 10022.00 | 89.750          | 322.080     | 6212.58  | 3655.25        | 3383.65    | -1654.08  | 1566639.82        | 308577.44          | 39°20'13.492"N | 81°01'55.949"W | 3766.31           | 333.949         | 2.74          | -0.95                | 2.57                |
| 10118.00 | 91.140          | 323.600     | 6211.84  | 3751.16        | 3459.65    | -1712.73  | 1566581.18        | 308653.43          | 39°20'14.233"N | 81°01'56.712"W | 3860.39           | 333.662         | 1.55          | 1.45                 | 0.54                |
| 10214.00 | 90.920          | 323.850     | 6210.13  | 3846.12        | 3533.16    | -1772.84  | 1566521.06        | 308726.95          | 39°20'14.949"N | 81°01'57.493"W | 3953.00           | 333.354         | 3.95          | -0.23                | -3.95               |
| 10310.00 | 90.400          | 327.110     | 6209.02  | 3942.05        | 3604.48    | -1837.10  | 1566456.81        | 308798.25          | 39°20'15.643"N | 81°01'58.326"W | 4045.64           | 332.993         | 1.89          | -0.54                | -1.81               |
| 10406.00 | 90.180          | 328.740     | 6208.54  | 4037.98        | 3675.56    | -1901.61  | 1566392.30        | 308869.34          | 39°20'16.335"N | 81°01'59.162"W | 4138.34           | 332.644         | 1.40          | -0.23                | 1.39                |
| 10502.00 | 90.090          | 320.710     | 6208.31  | 4132.97        | 3747.56    | -1963.59  | 1566330.32        | 308941.33          | 39°20'17.036"N | 81°01'59.967"W | 4230.82           | 332.347         | 1.76          | -0.09                | 1.76                |
| 10598.00 | 90.370          | 322.710     | 6207.93  | 4228.93        | 3822.59    | -2023.46  | 1566270.45        | 309016.35          | 39°20'17.767"N | 81°02'00.745"W | 4325.11           | 332.106         | 2.72          | 0.29                 | 2.71                |
| 10694.00 | 90.370          | 322.750     | 6207.31  | 4323.83        | 3898.03    | -2081.19  | 1566212.73        | 309091.80          | 39°20'18.503"N | 81°02'01.496"W | 4418.83           | 331.902         | 0.27          | 0.00                 | -0.27               |
| 10790.00 | 90.580          | 323.600     | 6206.52  | 4419.80        | 3972.12    | -2142.21  | 1566151.71        | 309165.88          | 39°20'19.225"N | 81°02'02.288"W | 4512.96           | 331.662         | 4.02          | 0.22                 | -4.01               |
| 10886.00 | 90.220          | 326.480     | 6205.86  | 4514.71        | 4042.20    | -2206.33  | 1566087.59        | 309235.96          | 39°20'19.907"N | 81°02'03.120"W | 4605.14           | 331.373         | 2.26          | -0.38                | -2.23               |
| 10982.00 | 90.250          | 318.030     | 6205.46  | 4610.60        | 4112.70    | -2271.49  | 1566022.44        | 309306.45          | 39°20'20.592"N | 81°02'03.964"W | 4698.29           | 331.088         | 1.61          | 0.03                 | 1.61                |
| 11078.00 | 90.300          | 320.160     | 6204.95  | 4705.58        | 4184.49    | -2333.69  | 1565960.24        | 309378.24          | 39°20'21.291"N | 81°02'04.771"W | 4791.25           | 330.852         | 2.25          | 0.13                 | 2.24                |
| 11174.00 | 90.090          | 321.300     | 6204.56  | 4801.57        | 4258.81    | -2394.46  | 1565899.48        | 309452.56          | 39°20'22.015"N | 81°02'05.561"W | 4885.79           | 330.654         | 1.22          | -0.29                | 1.19                |
| 11270.00 | 90.280          | 321.780     | 6204.26  | 4896.53        | 4333.20    | -2453.54  | 1565840.39        | 309526.94          | 39°20'22.741"N | 81°02'06.329"W | 4979.61           | 330.481         | 0.54          | 0.20                 | 0.51                |



# Actual Wellpath Report

PEN-20G-HS AWP Proj: 11615'

Page 6 of 8



## REFERENCE WELLPATH IDENTIFICATION

|          |                    |          |                |
|----------|--------------------|----------|----------------|
| Operator | NOBLE ENERGY       | Slot     | Slot G         |
| Area     | Ritchie County, WV | Well     | PEN-20G-HS     |
| Field    | Ritchie            | Wellbore | PEN-20G-HS AWB |
| Facility | PEN-20 Pad         |          |                |

## WELLPATH DATA (124 stations)

| MD [ft]  | Inclination [°] | Azimuth [°] | TVD [ft] | Vert Sect [ft] | North [ft] | East [ft] | Grid East [US ft] | Grid North [US ft] | Latitude       | Longitude      | Closure Dist [ft] | Closure Dir [°] | DLS [°/100ft] | Build Rate [°/100ft] | Turn Rate [°/100ft] |
|----------|-----------------|-------------|----------|----------------|------------|-----------|-------------------|--------------------|----------------|----------------|-------------------|-----------------|---------------|----------------------|---------------------|
| 11360.00 | 90.310          | 322.540     | 6203.76  | 4992.46        | 4409.01    | -2512.43  | 1565781.51        | 309602.75          | 39°20'23.480"N | 81°02'07.095"W | 5074.61           | 330.324         | 0.79          | 0.03                 | 0.79                |
| 11455.00 | 90.250          | 321.640     | 6203.30  | 5087.40        | 4483.96    | -2570.80  | 1565723.14        | 309677.70          | 39°20'24.211"N | 81°02'07.854"W | 5168.65           | 330.173         | 0.95          | -0.06                | -0.95               |
| 11551.00 | 90.250          | 321.330     | 6202.88  | 5183.36        | 4559.08    | -2630.58  | 1565663.36        | 309752.81          | 39°20'24.943"N | 81°02'08.631"W | 5263.57           | 330.015         | 0.32          | 0.00                 | -0.32               |
| 11615.00 | 90.250          | 321.330     | 6202.60  | 5247.34        | 4609.05    | -2670.57  | 1565623.37        | 309802.77          | 39°20'25.430"N | 81°02'09.151"W | 5326.84           | 329.911         | 0.00          | 0.00                 | 0.00                |

**RECEIVED**  
 Office of Oil and Gas  
 JAN 17 2017  
 WV Department of  
 Environmental Protection







**Actual Wellpath Report**  
 PEN-20G-HS AWP Proj: 11615'  
 Page 8 of 8



**REFERENCE WELLPATH IDENTIFICATION**

| Operator | NOBLE ENERGY       | Slot     | Slot G         |
|----------|--------------------|----------|----------------|
| Area     | Ritchie County, WV | Well     | PEN-20G-HS     |
| Field    | Ritchie            | Wellbore | PEN-20G-HS AWB |
| Facility | PEN-20 Pad         |          |                |

**COMMENTS**

Wellpath general comments  
 API: 47-085-10129-0000  
 BHI Job #: 6697452  
 Rig: Nomac 78  
 Duration: 1/21/2015-1/23/2015  
 MS Gyro <12-1/4"> (100'-4300')  
 Scientific EM <12-1/4"> (4300')(4366'-5258')  
 BHI AT Curve <8-3/4"> (5258')(5353'-11551')  
 Projected MD at TD: 11615'

RECEIVED  
 Office of Oil and Gas  
 JAN 17 2017  
 WV Department of  
 Environmental Protection  
 02/03/2017

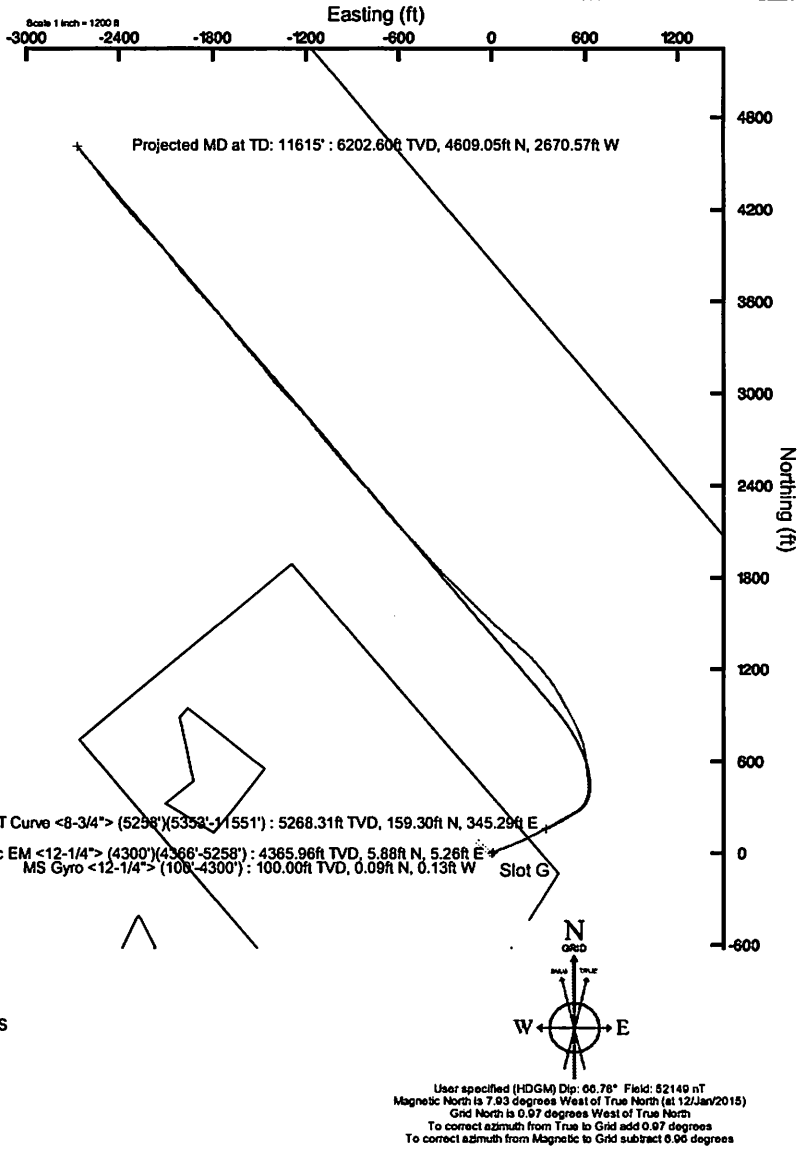
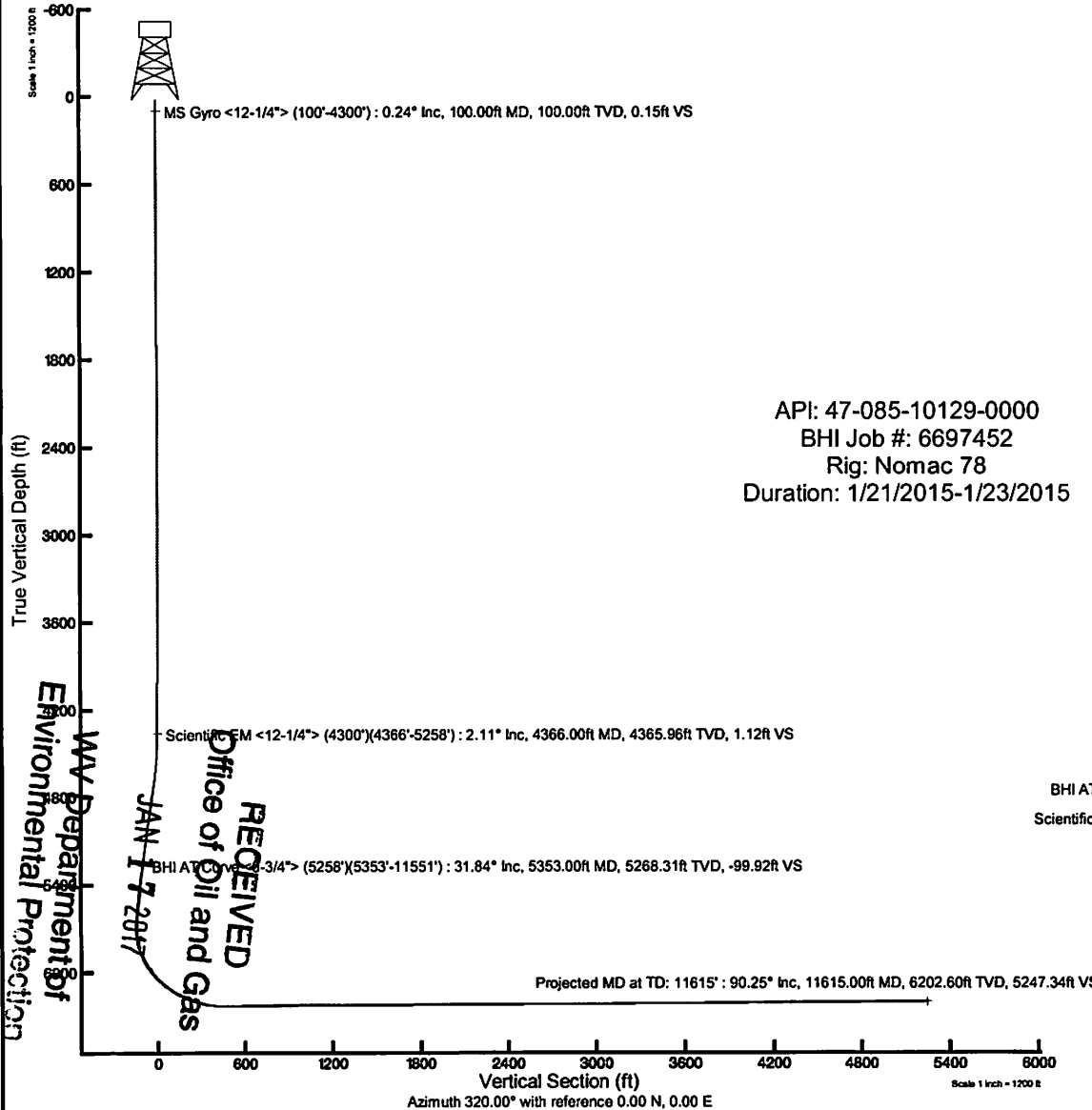


Location: Ritchie County, WV  
 Field: Ritchie  
 Facility: PEN-20 Pad

Slot: Slot G  
 Well: PEN-20G-HS  
 Wellbore: PEN-20G-HS PWB

|  |  |
|--|--|
| Plot reference wellbore is PEN-20G-HS PWB Rev-C-0      |  |
| True vertical depths are referenced to Normac 78 (RKB) | Grid System: NAD83 / Lambert West Virginia SP, Northern Zone (4701), US feet |
| Measured depths are referenced to Normac 78 (RKB)      | North Reference: Grid north  |
| Normac 78 (RKB) to Mean Sea Level: 1066 feet           | Scale: True distance   |
| Mean Sea Level to Mud line (At Slot: Slot G): -1029ft  | Depths are in feet   |
| Coordinates are in feet referenced to Slot             | Created by: adukey on 27/Jan/2015  |

| Location Information                          |              |                   |                    |                    |                |                |
|---|--------------|-------------------|--------------------|--------------------|----------------|----------------|
| Facility Name                                 |              | Grid East (US ft) | Grid North (US ft) | Latitude           | Longitude      |                |
| PEN-20 Pad                                    |              | 1568205.800       | 305275.580         | 39°19'41.124"N     | 81°01'35.306"W |                |
| Slot  | Local N (ft) | Local E (ft)      | Grid East (US ft)  | Grid North (US ft) | Latitude       | Longitude      |
| Slot G  | -81.63       | 88.02             | 1568293.820        | 305193.960         | 39°19'40.332"N | 81°01'34.169"W |
| Normac 78 (RKB) to Mud line (At Slot: Slot G) |              |                   |                    |                    |                | 26ft           |
| Mean Sea Level to Mud line (At Slot: Slot G)  |              |                   |                    |                    |                | -1029ft        |
| Normac 78 (RKB) to Mean Sea Level             |              |                   |                    |                    |                | 1055ft         |



API: 47-085-10129-0000  
 BHI Job #: 6697452  
 Rig: Nomac 78  
 Duration: 1/21/2015-1/23/2015

WV Department of Environmental Protection  
 RECEIVED  
 Office of Oil and Gas  
 JAN 17 2017

User specified (HDGM) Dip: 06.78° Field: 52149 nT  
 Magnetic North is 7.93 degrees West of True North (at 12/Jan/2015)  
 Grid North is 0.07 degrees West of True North  
 To correct azimuth from True to Grid add 0.97 degrees  
 To correct azimuth from Magnetic to Grid subtract 0.96 degrees