**WellPlan**TMReport

04. КМГ-Бурение

Well Name: 78

Wellbore: 78

Design: План №1

Case: 1524

Date: October 5, 2023 at 11:32 PM

Created By:

|  |  |
| --- | --- |
|  |  |
|  |  |

# General Information

* 1. **General Case Information**

|  |  |  |  |
| --- | --- | --- | --- |
| **Company** | 04. КМГ-Бурение | | |
| **Project** | Гран | **Site** | 78 new |
| **Well** | 78 | **Wellbore** | 78 |
| **Design** | План №1 | **Case** | 1524 |
| **Hole MD** | 1646.86 m | **Hole TVD** | 520.86 m |
| **Air Gap** | 0.00 m | **Ground Elevation** | 0.00 m |
| **Reference Point** | WELL (copy) (copy) @ 0m | **Well Type** | Onshore |

* 1. **Active Fluid**

### **Fluid Data**

|  |  |  |  |
| --- | --- | --- | --- |
| **Fluid** | KCl | **Type** | Mud |
| **Mud Base Type** | Water | **Base Fluid** | Water |
| **Rheology Model** | Bingham Plastic | **Foamed** | N |

### **Rheology Data**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Temperature  (°C) | Pressure  (atm) | Base Density  (kg/m³) | Ref Fluid Properties | PV (Mulnf)  (cp) | YP (Tau0)  (lbf/100ft²) | Fann Data | |
| **Speed**  **(rpm)** | **Dial**  **(°)** |
| 55 | 1 | 1210 | Yes | 25 | 14 |  |  |

* 1. **Hole Section**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Section**  **Type** | **Section Depth**  **(m)** | **Section Length**  **(m)** | **Shoe Depth**  **(m)** | **ID**  **(mm)** | **Drift**  **(mm)** | **Eff. Hole Diameter**  **(mm)** | **Coefficient**  **of**  **Friction** | **Linear Capacity**  **(L/m)** | **Volume**  **Excess**  **(%)** |
| **Casing** | **640** | **640** | **640** | **161.7** | **158.53** | **226.6** | **0.25** | **20.54** |  |
| **Open Hole** | **1646.86** | **1006.86** |  | **152.4** | **220.45** | **152.4** | **0.3** | **18.24** | **0** |

* 1. **String Details**

| **Type** | **Length**  **(**m**)** | **Depth**  **(**m**)** | **Body** | | **Stabilizer / Tool Joint** | | | | **Weight** | **Material** | **Grade** | **Class** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **OD**  **(**mm**)** | **ID**  **(**mm**)** | **Avg Joint Length**  **(**m**)** | **Length**  **(**m**)** | **OD**  **(**mm**)** | **ID**  **(**mm**)** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| Drill Pipe | 905.736 | 905.74 | 101.6 | 82.3 | 9.144 | 0.433 | 137.32 | 76.2 | 26.41 | CS\_API 5D/7 | G | 2 |
| Drill Collar | 30 | 935.74 | 120.65 | 57.15 | 9.14 |  |  |  | 69.6 | CS\_API 5D/7 | 4145H MOD |  |
| Jar | 10 | 945.74 | 120.65 | 50.8 | 10 |  |  |  | 73.84 | CS\_API 5D/7 | 4145H MOD |  |
| Drill Collar | 30 | 975.74 | 120.65 | 57.15 | 9.14 |  |  |  | 69.6 | CS\_API 5D/7 | 4145H MOD |  |
| Drill Pipe | 640 | 1615.74 | 88.9 | 66.09 | 9.144 | 0.469 | 117.48 | 53.98 | 25.12 | CS\_API 5D/7 | G | 2 |
| Sub | 1.5 | 1617.24 | 120.65 | 31.75 | 1.5 |  |  |  | 71.6 | CS\_API 5D/7 | 4145H MOD |  |
| MWD | 10.5 | 1627.74 | 120.65 | 40.64 | 10.5 |  |  |  | 85.87 | SAE 4145 | SAE 4145 |  |
| MWD | 9.5 | 1637.24 | 120.65 | 40.64 | 9.5 |  |  |  | 85.87 | SAE 4145 | SAE 4145 |  |
| Stabilizer | 1.524 | 1638.76 | 120.65 | 44.45 | 1.524 |  |  |  | 43.75 | CS\_API 5D/7 | 4145H MOD |  |
| Sub | 0.91 | 1639.67 | 120.65 | 28 | 0.91 |  |  |  | 64.63 | CS\_API 5D/7 | 4145H MOD |  |
| Mud Motor | 7 | 1646.67 | 120.65 | 63.5 | 7 |  |  |  | 57.37 | CS\_API 5D/7 | 4145H MOD |  |
| Bit | 0.19 | 1646.86 | 152.4 |  | 0.19 |  |  |  | 81.85 |  |  |  |

### **Grade in Use**

| Grade | Minimum Yield Stress (psi) |
| --- | --- |
| 4145H MOD | 110,000 |
| G | 105,000 |
| SAE 4145 | 110,000 |

### **String Nozzles**

| Component | MD  (m) | Port Open | Diverted Flow | Amount Diverted  (%) | Nozzle  (32nd") | TFA  (in²) |
| --- | --- | --- | --- | --- | --- | --- |
| Polycrystalline Diamond Bit | 1,647 | NA | NA | NA | 5.0X12.0 | 0.552 |

### **Mud Motors**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Component | Length (m) | Steering tool | | | Kick pad | | | Pressure loss @ Flow rate ( @ ) | Lobe config | Eccentricity () | Rotor mass () | Rev. per Volume () |
| **Bend angle (°)** | **Ref angle (°)** | **Offset (m)** | **Length (m)** | **OD (mm)** | **Offset (m)** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  | @  @  @  @ |  |  |  |  |

* 1. **Tortuosity (Random Inc and Az)**

|  |  |
| --- | --- |
| **Tortuosity Period** | 30.00 m |
| **Interpolation Interval** | 9.14 m |

|  |  |
| --- | --- |
| Measured Depth Top  (m) | Magnitude  (°) |
| 0.00 | 0.50 |
| 200.00 | 1.00 |
| 647.00 | 1.50 |

* 1. **Wellpath - Calculation Method: Minimum Curvature**

| MD  (m) | INC  (°) | AZ  (°) | TVD  (m) | DLS  (°/30m) | AbsTort  (°/30m) | RelTort  (°/30m) | VSect  (m) | NS  (m) | EW  (m) | Build  (°/30m) | Walk  (°/30m) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0.00 | 0.00 | 359.98 | 0.00 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 |
| 30.00 | 0.00 | 359.98 | 30.00 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 |
| 60.00 | 0.00 | 359.98 | 60.00 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 |
| 90.00 | 0.00 | 359.98 | 90.00 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 |
| 120.00 | 0.00 | 359.98 | 120.00 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 |
| 150.00 | 0.00 | 359.98 | 150.00 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 |
| 180.00 | 0.00 | 359.98 | 180.00 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 |
| 200.00 | 0.00 | 359.98 | 200.00 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 |
| 210.00 | 1.75 | 312.56 | 210.00 | 5.236 | 0.249 | 0.000 | 0.15 | 0.10 | -0.11 | 5.236 | 0.000 |
| 240.00 | 6.98 | 312.56 | 239.90 | 5.236 | 0.873 | 0.000 | 2.42 | 1.65 | -1.79 | 5.236 | 0.000 |
| 270.00 | 12.22 | 312.56 | 269.47 | 5.236 | 1.357 | 0.000 | 7.39 | 5.03 | -5.47 | 5.236 | 0.000 |
| 300.00 | 17.45 | 312.56 | 298.46 | 5.236 | 1.745 | 0.000 | 15.01 | 10.23 | -11.13 | 5.236 | 0.000 |
| 330.00 | 22.69 | 312.56 | 326.63 | 5.236 | 2.063 | 0.000 | 25.24 | 17.19 | -18.71 | 5.236 | 0.000 |
| 360.00 | 27.92 | 312.56 | 353.74 | 5.236 | 2.327 | 0.000 | 37.97 | 25.86 | -28.14 | 5.236 | 0.000 |
| 390.00 | 33.16 | 312.56 | 379.57 | 5.236 | 2.551 | 0.000 | 53.11 | 36.17 | -39.37 | 5.236 | 0.000 |
| 420.00 | 38.39 | 312.56 | 403.90 | 5.236 | 2.742 | 0.000 | 70.53 | 48.04 | -52.28 | 5.236 | 0.000 |
| 430.00 | 40.14 | 312.56 | 411.64 | 5.236 | 2.800 | 0.000 | 76.82 | 52.32 | -56.94 | 5.236 | 0.000 |
| 450.40 | 41.50 | 312.56 | 427.08 | 2.000 | 2.764 | 0.000 | 90.07 | 61.34 | -66.76 | 2.000 | 0.000 |
| 465.00 | 45.03 | 312.56 | 437.71 | 7.262 | 2.905 | 0.000 | 100.01 | 68.11 | -74.12 | 7.262 | -0.003 |
| 480.00 | 48.67 | 312.56 | 447.97 | 7.262 | 3.042 | 0.000 | 110.88 | 75.51 | -82.18 | 7.262 | -0.002 |
| 495.00 | 52.30 | 312.56 | 457.51 | 7.262 | 3.169 | 0.000 | 122.37 | 83.34 | -90.70 | 7.262 | -0.002 |
| 510.00 | 55.93 | 312.56 | 466.30 | 7.262 | 3.290 | 0.000 | 134.44 | 91.56 | -99.65 | 7.262 | -0.002 |
| 525.00 | 59.56 | 312.55 | 474.31 | 7.262 | 3.403 | 0.000 | 147.04 | 100.14 | -108.99 | 7.262 | -0.002 |
| 540.00 | 63.19 | 312.55 | 481.49 | 7.262 | 3.511 | 0.000 | 160.12 | 109.05 | -118.68 | 7.262 | -0.002 |
| 555.00 | 66.82 | 312.55 | 487.83 | 7.262 | 3.612 | 0.000 | 173.62 | 118.25 | -128.69 | 7.262 | -0.001 |
| 570.00 | 70.45 | 312.55 | 493.29 | 7.262 | 3.708 | 0.000 | 187.50 | 127.69 | -138.97 | 7.262 | -0.001 |
| 585.00 | 74.08 | 312.55 | 497.86 | 7.262 | 3.799 | 0.000 | 201.69 | 137.36 | -149.49 | 7.262 | -0.001 |
| 600.00 | 77.71 | 312.55 | 501.51 | 7.262 | 3.886 | 0.000 | 216.14 | 147.20 | -160.21 | 7.262 | -0.001 |
| 615.00 | 81.34 | 312.55 | 504.24 | 7.262 | 3.968 | 0.000 | 230.79 | 157.18 | -171.07 | 7.262 | -0.001 |
| 630.00 | 84.98 | 312.55 | 506.03 | 7.262 | 4.046 | 0.000 | 245.58 | 167.25 | -182.03 | 7.262 | -0.001 |
| 645.00 | 88.61 | 312.55 | 506.87 | 7.262 | 4.121 | 0.000 | 260.46 | 177.38 | -193.06 | 7.262 | -0.001 |
| 647.45 | 89.20 | 312.55 | 506.91 | 7.262 | 4.133 | 0.000 | 262.89 | 179.04 | -194.87 | 7.262 | -0.001 |
| 660.00 | 89.20 | 313.80 | 507.09 | 3.000 | 4.112 | 0.000 | 275.37 | 187.63 | -204.01 | -0.003 | 3.000 |
| 690.00 | 89.20 | 316.80 | 507.51 | 3.000 | 4.063 | 0.000 | 305.30 | 208.95 | -225.10 | -0.001 | 3.000 |
| 720.00 | 89.20 | 319.80 | 507.93 | 3.000 | 4.019 | 0.000 | 335.29 | 231.36 | -245.04 | 0.001 | 3.000 |
| 734.25 | 89.20 | 321.23 | 508.13 | 3.000 | 3.999 | 0.000 | 349.53 | 242.36 | -254.10 | 0.003 | 3.000 |
| 750.00 | 89.20 | 321.23 | 508.35 | 0.000 | 3.915 | 0.000 | 365.27 | 254.64 | -263.96 | 0.000 | 0.000 |
| 780.00 | 89.20 | 321.23 | 508.77 | 0.000 | 3.765 | 0.000 | 395.25 | 278.03 | -282.73 | 0.000 | 0.000 |
| 810.00 | 89.20 | 321.23 | 509.18 | 0.000 | 3.625 | 0.000 | 425.22 | 301.43 | -301.51 | 0.000 | 0.000 |
| 840.00 | 89.20 | 321.23 | 509.60 | 0.000 | 3.496 | 0.000 | 455.20 | 324.82 | -320.28 | 0.000 | 0.000 |
| 870.00 | 89.20 | 321.23 | 510.02 | 0.000 | 3.375 | 0.000 | 485.18 | 348.22 | -339.06 | 0.000 | 0.000 |
| 900.00 | 89.20 | 321.23 | 510.44 | 0.000 | 3.263 | 0.000 | 515.15 | 371.61 | -357.84 | 0.000 | 0.000 |
| 930.00 | 89.20 | 321.23 | 510.86 | 0.000 | 3.157 | 0.000 | 545.13 | 395.01 | -376.61 | 0.000 | 0.000 |
| 960.00 | 89.20 | 321.23 | 511.28 | 0.000 | 3.059 | 0.000 | 575.11 | 418.40 | -395.39 | 0.000 | 0.000 |
| 990.00 | 89.20 | 321.23 | 511.70 | 0.000 | 2.966 | 0.000 | 605.09 | 441.79 | -414.16 | 0.000 | 0.000 |
| 1020.00 | 89.20 | 321.23 | 512.12 | 0.000 | 2.879 | 0.000 | 635.06 | 465.19 | -432.94 | 0.000 | 0.000 |
| 1050.00 | 89.20 | 321.23 | 512.54 | 0.000 | 2.797 | 0.000 | 665.04 | 488.58 | -451.72 | 0.000 | 0.000 |
| 1080.00 | 89.20 | 321.23 | 512.95 | 0.000 | 2.719 | 0.000 | 695.02 | 511.98 | -470.49 | 0.000 | 0.000 |
| 1110.00 | 89.20 | 321.23 | 513.37 | 0.000 | 2.645 | 0.000 | 724.99 | 535.37 | -489.27 | 0.000 | 0.000 |
| 1140.00 | 89.20 | 321.23 | 513.79 | 0.000 | 2.576 | 0.000 | 754.97 | 558.76 | -508.04 | 0.000 | 0.000 |
| 1170.00 | 89.20 | 321.23 | 514.21 | 0.000 | 2.510 | 0.000 | 784.95 | 582.16 | -526.82 | 0.000 | 0.000 |
| 1200.00 | 89.20 | 321.23 | 514.63 | 0.000 | 2.447 | 0.000 | 814.92 | 605.55 | -545.60 | 0.000 | 0.000 |
| 1230.00 | 89.20 | 321.23 | 515.05 | 0.000 | 2.387 | 0.000 | 844.90 | 628.95 | -564.37 | 0.000 | 0.000 |
| 1260.00 | 89.20 | 321.23 | 515.47 | 0.000 | 2.330 | 0.000 | 874.88 | 652.34 | -583.15 | 0.000 | 0.000 |
| 1290.00 | 89.20 | 321.23 | 515.89 | 0.000 | 2.276 | 0.000 | 904.85 | 675.74 | -601.92 | 0.000 | 0.000 |
| 1320.00 | 89.20 | 321.23 | 516.31 | 0.000 | 2.225 | 0.000 | 934.83 | 699.13 | -620.70 | 0.000 | 0.000 |
| 1350.00 | 89.20 | 321.23 | 516.72 | 0.000 | 2.175 | 0.000 | 964.81 | 722.52 | -639.47 | 0.000 | 0.000 |
| 1380.00 | 89.20 | 321.23 | 517.14 | 0.000 | 2.128 | 0.000 | 994.78 | 745.92 | -658.25 | 0.000 | 0.000 |
| 1410.00 | 89.20 | 321.23 | 517.56 | 0.000 | 2.083 | 0.000 | 1024.76 | 769.31 | -677.03 | 0.000 | 0.000 |
| 1440.00 | 89.20 | 321.23 | 517.98 | 0.000 | 2.039 | 0.000 | 1054.74 | 792.71 | -695.80 | 0.000 | 0.000 |
| 1470.00 | 89.20 | 321.23 | 518.40 | 0.000 | 1.998 | 0.000 | 1084.71 | 816.10 | -714.58 | 0.000 | 0.000 |
| 1500.00 | 89.20 | 321.23 | 518.82 | 0.000 | 1.958 | 0.000 | 1114.69 | 839.50 | -733.35 | 0.000 | 0.000 |
| 1530.00 | 89.20 | 321.23 | 519.24 | 0.000 | 1.919 | 0.000 | 1144.67 | 862.89 | -752.13 | 0.000 | 0.000 |
| 1560.00 | 89.20 | 321.23 | 519.66 | 0.000 | 1.882 | 0.000 | 1174.64 | 886.28 | -770.91 | 0.000 | 0.000 |
| 1590.00 | 89.20 | 321.23 | 520.07 | 0.000 | 1.847 | 0.000 | 1204.62 | 909.68 | -789.68 | 0.000 | 0.000 |
| 1620.00 | 89.20 | 321.23 | 520.49 | 0.000 | 1.813 | 0.000 | 1234.60 | 933.07 | -808.46 | 0.000 | 0.000 |
| 1646.86 | 89.20 | 321.23 | 520.87 | 0.000 | 1.783 | 0.000 | 1261.44 | 954.02 | -825.27 | 0.000 | 0.000 |

* 1. **Geothermal Gradient Data**

|  |  |  |  |
| --- | --- | --- | --- |
| **Ambient Temperature** | 26.000 °C | **Mudline Temperature** | °C |
| **Temperature @ Depth** | 35.000 °C @ 520.86 m | **Gradient** | 1.73 °C/100m |

# Schematics

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Well:** | 78 | **Wellbore:** | 78 | **Case:** | 1524 | **String Name:** | 152,4 |
|  |  |  |  |  |  |  |  |
| Schematic | | | | | | | |

# Torque & Drag Setup Data

* 1. **Settings**

|  |  |  |  |
| --- | --- | --- | --- |
| **Measured Depth of Bit** | 1646.86 m | **Bending Stress Magnification** | Yes |
| **Block Weight** | 17.00 tonne | **Stiff String Analysis** | No |
| **Enable Sheave Friction Correction** | No | **Viscous Torque and Drag** | No |
| **Pump Rate** | 15.000 L/sec | **Contact Force Normalization Length** | 9.30 m |
| **Mechanical Efficiency (Single Sheave)** | 97.00 | **Lines Strung** | 12 |
|  |  | **Side Force** | 0.00 kgf |
| **Offset from Wellhead** | m | **Angle at Wellhead** | ° |
| **Buckling limit factor** | 1 |  |  |

* 1. **Run Parameters**

|  |  |  |  |
| --- | --- | --- | --- |
| **Start MD** | 647.45 m | **End MD** | 1646.86 m |
| **Step Size** | 9.30 m |  |  |

* 1. **Normal Analysis Operational Parameters**

|  |  |  |  |
| --- | --- | --- | --- |
| Drilling | WOB/Overpull  (tonne) | Torque at Bit  (kN-m) | Include Pump Rate |
| Rotating On Bottom | 7.00 | 1.3700 | NA |
| Slide Drilling | 1.00 | 0.0000 | NA |
| Backreaming | 5.00 | 0.0000 | NA |
| Rotating Off Bottom |  |  | NA |
| Tripping | **Speed**  **(m/min)** | **RPM**  **(rpm)** | **Include Pump Rate** |
| Tripping In | 10.00 | 1 | NA |
| Tripping Out | 10.00 | 1 | NA |

* 1. **Friction Factors**

| Section Type | Coefficient of Friction |
| --- | --- |
| Open Hole | 0.30 |
| Casing | 0.25 |

* 1. **String Fill Up**

|  |  |  |  |
| --- | --- | --- | --- |
| **Use String Fill Up (Tripping In only)** | No | **Period** | m |

# Torque and Drag Results

* 1. **Mechanical Limitations**

|  |  |  |  |
| --- | --- | --- | --- |
| **Overpull Margin during a Tripping Out operation** | 58.15 tonne | using | 80.00% of yield |
| **Minimum Weight on Bit to Sinusoidal Buckle during a rotating on bottom operation** | 8.70 tonne | at | 153.98 m |
| **Minimum Weight on Bit to Helical Buckle during a rotating on bottom operation** | 8.85 tonne | at | 153.98 m |
| **Pick-Up Drag** | 10.98 tonne | | |
| **Slack-Off Drag** | 12.29 tonne | | |
| **Block Rating (Hoisting System)** | 225.00 tonne | | |
| **Torque Rating (Rotating Equipment)** | kN-m | | |

* 1. **Load Summary**

| Load Condition | Stress Failure | | | Buckling Limits | | | Torque Failure | Torque at the Rotary Table  (kN-m) | Total Windup with Bit Torque  (revs) | Total Windup without Bit Torque  (revs) | Measured Weight  (tonne) | Total Stretch  (m) | Axial Stress = 0 | | Neutral Point Distance from surface  (m) | Neutral Point Distance from Bit  (m) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Fatigue | 90% Yield | 100% Yield | Sinusoidal | Helical | Lockup | Distance from Surface  (m) | Distance from Bit  (m) |
| Спуск |  |  |  | X | X |  |  | 0.3127 | 0.1 | 0.1 | 16.53 | 0.01 | 0.00 | 1646.86 | 1646.86 | 0.00 |
| Подъём |  |  |  |  |  |  |  | 0.2746 | 0.1 | 0.1 | 39.80 | 0.35 | 1423.74 | 223.12 | 1646.86 | 0.00 |
| Бурение ротором |  |  |  |  |  |  |  | 8.2457 | 3.0 | 2.2 | 21.82 | 0.01 | 182.53 | 1464.33 | 212.98 | 1433.88 |
| Бурение ГЗД |  |  |  | X | X |  |  | 0.0000 | 0.0 | 0.0 | 14.97 | -0.02 | 0.00 | 1646.86 | 0.00 | 1646.86 |
| Обратная проработка |  |  |  |  |  |  |  | 5.8048 | 1.9 | 1.9 | 33.83 | 0.32 | 1615.74 | 31.12 | 1646.86 | 0.00 |
| Вращение над забоем |  |  |  |  |  |  |  | 5.6028 | 1.9 | 1.9 | 28.82 | 0.19 | 479.34 | 1167.52 | 1646.86 | 0.00 |

# Torque and Drag Plots

|  |
| --- |
|  |
| * 1. **Эффективное натяжение** |
| * 1. **Вес на крюке** |
| * 1. **Момент** |
| * 1. **Мин. вес на долоте** |

# Hydraulics Setup Data

* 1. **Calculation Engine**

|  |  |  |
| --- | --- | --- |
| Model Used | WellPlan |  |

* 1. **Cuttings Loading Calculation Option**

|  |  |  |  |
| --- | --- | --- | --- |
| Rate of Penetration | 8.00 m/hr | **Rotary Speed** | 40 rpm |
| Cuttings Diameter | 3.18 mm | **Cuttings Density** | 2.500 sg |
| Bed Porosity | 36.00 % | **MD Calculation Interval** | 30.48 m |

* 1. **Surface Equipment Information**

|  |  |  |  |
| --- | --- | --- | --- |
| Pressure Loss Calculation | Specify Pressure loss | **Maximum Working Pressure** | 340.0000 atm |
| Equipment Mode | NA | **Surface Pressure Loss** | 6.8046 atm |
| Equipment Type | NA |  |  |

* 1. **Pump Pressure Information**

|  |  |  |  |
| --- | --- | --- | --- |
| Maximum Surface Pressure | 340.0000 atm | **Pump Rate** | 15.000 L/sec |
| Maximum Pump Power | hp | **Maximum Allowable Pump Rate** | L/sec |
| Use Roughness | N |  |  |
| Pipe Roughness | NA | **Annulus Roughness** | NA |
| Booster Pump |  | **Injection Depth** |  |
| Injection Temperature |  | **Injection Rate** |  |
| Include Tool Joint Pressure Losses | N |  |  |
| Include Back Pressure |  | **Back Pressure** | 0.0000 atm |
| Sea Floor Returns | N | **Sea Water Density** | NA |

* 1. **Run Parameters**

|  |  |  |  |
| --- | --- | --- | --- |
| Start MD | 647.45 m | **End MD** | 1646.86 m |
| Step Size | 9.30 m |  |  |

* 1. **Flow Rate (Q= 15.000 L/sec)**

### **Bit Parameters**

|  |  |  |  |
| --- | --- | --- | --- |
| **Pump Rate** | 15.000 L/sec | **Stand Pipe Pressure** | 281.9527 atm |
| **Bit Pressure Loss** | 11.7273 atm | **Percent Power at Bit** | 4.16 % |
| **Bit Hydraulic Power / Area (HSI)** | 0.8 hp/in² | **Bit Nozzle Velocity** | 42.10 m/s |
| **Bit Hydraulic Power** | 23.90 hp | **Bit Impact Force** | 77.92 kgf |
| **Surface Equip. Pressure Loss** | 6.8046 atm | **Total Bit Flow Area** | 0.552 in² |

* 1. **Gel Strength**

|  |  |  |  |
| --- | --- | --- | --- |
| 0 Second | 5.000 lbf/100ft² | **10 Second** | 9.000 lbf/100ft² |
| 10 Minute | 18.000 lbf/100ft² | **30 Minute** | 25.000 lbf/100ft² |
| Maximum | lbf/100ft² |  | |

* 1. **Mud Temperature Information**

|  |  |  |  |
| --- | --- | --- | --- |
| Include Mud Temperature Effects | N | **Circulation Time** | NA |

# Hydraulics Plots

|  |
| --- |
|  |
| * 1. **Потери давления на долоте** |
| * 1. **Мин. расход по глубине** |
| * 1. **Высота шламовой подушки по глубине** |
| * 1. **Потери мощности компонента** |
| * 1. **Потери давления компонента** |