**WellPlan**TMReport

04. КМГ-Бурение

Well Name: 120

Wellbore: 120

Design: План после авар. №1

Case: 152,4мм

Date: October 5, 2023 at 4:58 PM

Created By:

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

# General Information

* 1. **General Case Information**

|  |  |  |  |
| --- | --- | --- | --- |
| **Company** | 04. КМГ-Бурение | | |
| **Project** | Актобе | **Site** | 120 с альт. |
| **Well** | 120 | **Wellbore** | 120 |
| **Design** | План после авар. №1 | **Case** | 152,4мм |
| **Hole MD** | 2928.00 m | **Hole TVD** | 2218.91 m |
| **Air Gap** | 0.00 m | **Ground Elevation** | -24.87 m |
| **Reference Point** | WELL (copy) (copy) @ -17.37m | **Well Type** | Platform |

* 1. **Active Fluid**

### **Fluid Data**

|  |  |  |  |
| --- | --- | --- | --- |
| **Fluid** | Полимер | **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**  **(°)** |
| 70 | 1 | 1150 | Yes | 20 | 20 |  |  |

* 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** | **2359** | **2359** | **2359** | **161.7** | **158.53** | **226.6** | **0.25** | **20.54** |  |
| **Open Hole** | **2928** | **569** |  | **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 | 776.718 | 776.72 | 101.6 | 82.3 | 9.144 | 0.433 | 138.91 | 76.2 | 26.41 | CS\_API 5D/7 | G | P |
| Drill Pipe | 1150 | 1926.72 | 88.9 | 66.09 | 9.144 | 0.469 | 119.86 | 53.98 | 25.12 | CS\_API 5D/7 | G | P |
| Heavy Weight | 27 | 1953.72 | 88.9 | 57.15 | 9.144 | 1.219 | 120.65 | 58.75 | 34.53 | CS\_1340 MOD | 1340 MOD |  |
| Drill Collar | 54 | 2007.72 | 120.65 | 50.8 | 9.144 |  |  |  | 73.83 | CS\_API 5D/7 | 4145H MOD |  |
| Heavy Weight | 27 | 2034.72 | 88.9 | 57.15 | 9.144 | 1.219 | 120.65 | 58.75 | 34.53 | CS\_1340 MOD | 1340 MOD |  |
| Drill Pipe | 200 | 2234.72 | 88.9 | 66.09 | 9.144 | 0.469 | 119.86 | 53.98 | 25.12 | CS\_API 5D/7 | G | P |
| Heavy Weight | 27 | 2261.72 | 88.9 | 57.2 | 9.45 | 1.219 | 127 | 57.2 | 40.21 | CS\_1340 MOD | 1340 MOD |  |
| Jar | 10.058 | 2271.78 | 120.65 | 50.8 | 10.058 |  |  |  | 73.84 | CS\_API 5D/7 | 4145H MOD |  |
| Heavy Weight | 27 | 2298.78 | 88.9 | 57.15 | 9.14 | 1.219 | 120.65 | 58.75 | 34.53 | CS\_1340 MOD | 1340 MOD |  |
| Drill Pipe | 600 | 2898.78 | 88.9 | 66.09 | 9.144 | 0.469 | 119.86 | 53.98 | 25.12 | CS\_API 5D/7 | G | P |
| MWD | 10.44 | 2909.22 | 120.65 | 40.64 | 10.44 |  |  |  | 85.87 | SAE 4145 | SAE 4145 |  |
| MWD | 9.1 | 2918.32 | 120.65 | 40.64 | 9.1 |  |  |  | 85.87 | SAE 4145 | SAE 4145 |  |
| Stabilizer | 1.524 | 2919.84 | 120.65 | 44.45 | 1.524 |  |  |  | 43.75 | CS\_API 5D/7 | 4145H MOD |  |
| Sub | 0.91 | 2920.75 | 120.65 | 28 | 0.91 |  |  |  | 64.63 | CS\_API 5D/7 | 4145H MOD |  |
| Mud Motor | 7 | 2927.75 | 120.65 | 63.5 | 7 |  |  |  | 57.37 | CS\_API 5D/7 | 4145H MOD |  |
| Bit | 0.25 | 2928 | 152.4 |  | 0.25 |  |  |  | 50 |  |  |  |

### **Grade in Use**

| Grade | Minimum Yield Stress (psi) |
| --- | --- |
| 1340 MOD | 55,000 |
| 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 | 2,928 | 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 | 1.00 |
| 2350.00 | 0.50 |

* 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 | 0.30 | 109.95 | 0.00 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 |
| 92.50 | 0.30 | 109.95 | 92.50 | 0.000 | 0.000 | 0.000 | 0.02 | -0.15 | 0.46 | 0.000 | 0.000 |
| 102.50 | 0.41 | 93.90 | 102.50 | 0.445 | 0.043 | 0.000 | 0.03 | -0.16 | 0.52 | 0.333 | -48.173 |
| 112.50 | 0.36 | 90.12 | 112.50 | 0.171 | 0.055 | 0.000 | 0.05 | -0.16 | 0.59 | -0.153 | -11.325 |
| 122.50 | 0.27 | 95.58 | 122.50 | 0.275 | 0.073 | 0.000 | 0.07 | -0.16 | 0.64 | -0.260 | 16.387 |
| 132.50 | 0.26 | 106.00 | 132.50 | 0.149 | 0.078 | 0.000 | 0.08 | -0.17 | 0.69 | -0.030 | 31.237 |
| 142.50 | 0.30 | 113.86 | 142.50 | 0.160 | 0.084 | 0.000 | 0.08 | -0.18 | 0.74 | 0.110 | 23.592 |
| 152.50 | 0.36 | 132.87 | 152.50 | 0.378 | 0.103 | 0.000 | 0.07 | -0.22 | 0.78 | 0.190 | 57.018 |
| 162.50 | 0.41 | 129.71 | 162.50 | 0.145 | 0.106 | 0.000 | 0.04 | -0.26 | 0.84 | 0.130 | -9.468 |
| 172.50 | 0.58 | 124.94 | 172.50 | 0.524 | 0.130 | 0.000 | 0.02 | -0.31 | 0.91 | 0.510 | -14.299 |
| 182.50 | 0.49 | 126.90 | 182.50 | 0.275 | 0.138 | 0.000 | 0.00 | -0.36 | 0.98 | -0.270 | 5.869 |
| 192.50 | 0.48 | 120.01 | 192.50 | 0.175 | 0.140 | 0.000 | -0.02 | -0.40 | 1.05 | -0.010 | -20.659 |
| 202.50 | 0.42 | 115.46 | 202.50 | 0.210 | 0.144 | 0.000 | -0.03 | -0.44 | 1.13 | -0.180 | -13.657 |
| 212.50 | 0.39 | 107.30 | 212.50 | 0.205 | 0.146 | 0.000 | -0.03 | -0.46 | 1.19 | -0.110 | -24.493 |
| 222.50 | 0.37 | 103.22 | 222.50 | 0.100 | 0.144 | 0.000 | -0.02 | -0.48 | 1.26 | -0.060 | -12.237 |
| 232.50 | 0.23 | 113.56 | 232.50 | 0.430 | 0.157 | 0.000 | -0.01 | -0.49 | 1.31 | -0.400 | 31.030 |
| 242.50 | 0.25 | 137.01 | 242.50 | 0.299 | 0.163 | 0.000 | -0.02 | -0.51 | 1.34 | 0.050 | 70.335 |
| 252.50 | 0.40 | 142.23 | 252.50 | 0.458 | 0.174 | 0.000 | -0.05 | -0.56 | 1.38 | 0.450 | 15.688 |
| 262.50 | 0.40 | 146.38 | 262.49 | 0.087 | 0.171 | 0.000 | -0.09 | -0.61 | 1.42 | 0.000 | 12.437 |
| 272.50 | 0.48 | 131.02 | 272.49 | 0.419 | 0.180 | 0.000 | -0.12 | -0.67 | 1.47 | 0.230 | -46.072 |
| 282.50 | 0.43 | 120.95 | 282.49 | 0.272 | 0.183 | 0.000 | -0.14 | -0.71 | 1.54 | -0.130 | -30.217 |
| 292.50 | 0.37 | 108.07 | 292.49 | 0.325 | 0.188 | 0.000 | -0.15 | -0.74 | 1.60 | -0.180 | -38.654 |
| 302.50 | 0.30 | 93.63 | 302.49 | 0.335 | 0.193 | 0.000 | -0.14 | -0.75 | 1.66 | -0.220 | -43.306 |
| 312.50 | 0.19 | 84.69 | 312.49 | 0.339 | 0.198 | 0.000 | -0.12 | -0.75 | 1.70 | -0.320 | -26.821 |
| 322.50 | 0.05 | 106.04 | 322.49 | 0.435 | 0.205 | 0.000 | -0.11 | -0.75 | 1.72 | -0.420 | 64.065 |
| 332.50 | 0.10 | 198.09 | 332.49 | 0.354 | 0.209 | 0.000 | -0.12 | -0.76 | 1.73 | 0.150 | 276.125 |
| 342.50 | 0.36 | 146.63 | 342.49 | 0.923 | 0.230 | 0.000 | -0.15 | -0.79 | 1.74 | 0.773 | -154.355 |
| 352.50 | 0.38 | 144.90 | 352.49 | 0.058 | 0.225 | 0.000 | -0.18 | -0.84 | 1.78 | 0.047 | -5.196 |
| 362.50 | 0.55 | 134.37 | 362.49 | 0.577 | 0.235 | 0.000 | -0.22 | -0.90 | 1.83 | 0.520 | -31.590 |
| 372.50 | 0.42 | 119.62 | 372.49 | 0.544 | 0.243 | 0.000 | -0.24 | -0.95 | 1.90 | -0.400 | -44.261 |
| 382.50 | 0.54 | 121.57 | 382.49 | 0.373 | 0.247 | 0.000 | -0.26 | -0.99 | 1.98 | 0.370 | 5.839 |
| 392.50 | 0.47 | 108.98 | 392.49 | 0.392 | 0.250 | 0.000 | -0.26 | -1.03 | 2.06 | -0.210 | -37.762 |
| 402.50 | 0.22 | 69.89 | 402.49 | 0.989 | 0.269 | 0.000 | -0.25 | -1.03 | 2.11 | -0.750 | -117.250 |
| 412.50 | 0.11 | 131.96 | 412.49 | 0.583 | 0.276 | 0.000 | -0.24 | -1.03 | 2.14 | -0.340 | 186.210 |
| 422.50 | 0.31 | 157.78 | 422.49 | 0.657 | 0.285 | 0.000 | -0.26 | -1.06 | 2.16 | 0.610 | 77.447 |
| 432.50 | 0.33 | 162.71 | 432.49 | 0.102 | 0.281 | 0.000 | -0.30 | -1.11 | 2.18 | 0.060 | 14.798 |
| 442.50 | 0.18 | 177.95 | 442.49 | 0.490 | 0.286 | 0.000 | -0.34 | -1.16 | 2.19 | -0.450 | 45.705 |
| 452.50 | 0.61 | 143.32 | 452.49 | 1.429 | 0.311 | 0.000 | -0.38 | -1.21 | 2.22 | 1.300 | -103.882 |
| 462.50 | 0.59 | 134.92 | 462.49 | 0.273 | 0.310 | 0.000 | -0.43 | -1.29 | 2.29 | -0.070 | -25.192 |
| 472.50 | 0.26 | 114.20 | 472.49 | 1.076 | 0.327 | 0.000 | -0.45 | -1.34 | 2.35 | -0.990 | -62.182 |
| 482.50 | 0.14 | 47.44 | 482.49 | 0.725 | 0.335 | 0.000 | -0.44 | -1.34 | 2.38 | -0.360 | -200.273 |
| 492.50 | 0.39 | 177.00 | 492.49 | 1.473 | 0.358 | 0.000 | -0.46 | -1.36 | 2.39 | 0.750 | 388.672 |
| 502.50 | 0.19 | 204.00 | 502.49 | 0.718 | 0.365 | 0.000 | -0.51 | -1.41 | 2.39 | -0.610 | 81.013 |
| 512.50 | 0.17 | 266.28 | 512.49 | 0.551 | 0.369 | 0.000 | -0.53 | -1.43 | 2.37 | -0.060 | 186.842 |
| 522.50 | 0.29 | 213.89 | 522.49 | 0.682 | 0.375 | 0.000 | -0.56 | -1.45 | 2.34 | 0.360 | -157.167 |
| 532.50 | 0.30 | 198.44 | 532.49 | 0.243 | 0.372 | 0.000 | -0.61 | -1.50 | 2.32 | 0.050 | -46.360 |
| 542.50 | 0.37 | 186.39 | 542.49 | 0.283 | 0.371 | 0.000 | -0.67 | -1.55 | 2.31 | 0.190 | -36.149 |
| 552.50 | 0.27 | 174.04 | 552.49 | 0.362 | 0.370 | 0.000 | -0.72 | -1.61 | 2.31 | -0.300 | -37.051 |
| 562.50 | 0.24 | 167.73 | 562.49 | 0.126 | 0.366 | 0.000 | -0.76 | -1.65 | 2.32 | -0.095 | -18.924 |
| 572.50 | 0.17 | 146.42 | 572.49 | 0.300 | 0.365 | 0.000 | -0.78 | -1.68 | 2.33 | -0.205 | -63.928 |
| 582.50 | 0.09 | 139.84 | 582.49 | 0.234 | 0.363 | 0.000 | -0.80 | -1.70 | 2.34 | -0.230 | -19.754 |
| 592.50 | 0.09 | 190.79 | 592.49 | 0.228 | 0.360 | 0.000 | -0.81 | -1.71 | 2.35 | -0.010 | 152.872 |
| 602.50 | 0.14 | 241.58 | 602.49 | 0.333 | 0.360 | 0.000 | -0.82 | -1.73 | 2.34 | 0.170 | 152.347 |
| 612.50 | 0.21 | 242.56 | 612.49 | 0.190 | 0.357 | 0.000 | -0.85 | -1.74 | 2.31 | 0.190 | 2.956 |
| 622.50 | 0.28 | 229.95 | 622.49 | 0.280 | 0.356 | 0.000 | -0.88 | -1.77 | 2.28 | 0.230 | -37.847 |
| 632.50 | 0.35 | 215.38 | 632.49 | 0.319 | 0.355 | 0.000 | -0.93 | -1.81 | 2.24 | 0.210 | -43.710 |
| 642.50 | 0.33 | 204.55 | 642.49 | 0.208 | 0.353 | 0.000 | -0.99 | -1.86 | 2.21 | -0.080 | -32.491 |
| 652.50 | 0.38 | 190.34 | 652.49 | 0.313 | 0.353 | 0.000 | -1.05 | -1.92 | 2.20 | 0.170 | -42.622 |
| 662.50 | 0.25 | 183.44 | 662.49 | 0.415 | 0.353 | 0.000 | -1.11 | -1.98 | 2.19 | -0.400 | -20.708 |
| 672.50 | 0.12 | 110.53 | 672.49 | 0.729 | 0.359 | 0.000 | -1.13 | -2.00 | 2.20 | -0.400 | -218.722 |
| 682.50 | 0.14 | 355.68 | 682.49 | 0.663 | 0.363 | 0.000 | -1.12 | -1.99 | 2.21 | 0.085 | -344.541 |
| 692.50 | 0.14 | 19.21 | 692.49 | 0.175 | 0.361 | 0.000 | -1.09 | -1.97 | 2.21 | -0.015 | 70.582 |
| 702.50 | 0.15 | 340.83 | 702.49 | 0.292 | 0.360 | 0.000 | -1.07 | -1.94 | 2.21 | 0.040 | -115.130 |
| 712.50 | 0.12 | 321.54 | 712.49 | 0.165 | 0.357 | 0.000 | -1.05 | -1.92 | 2.20 | -0.090 | -57.870 |
| 722.50 | 0.12 | 265.91 | 722.49 | 0.341 | 0.357 | 0.000 | -1.05 | -1.92 | 2.18 | -0.010 | -166.894 |
| 732.50 | 0.11 | 221.66 | 732.49 | 0.260 | 0.356 | 0.000 | -1.07 | -1.92 | 2.16 | -0.035 | -132.750 |
| 742.50 | 0.16 | 187.81 | 742.49 | 0.281 | 0.355 | 0.000 | -1.09 | -1.95 | 2.16 | 0.160 | -101.543 |
| 752.50 | 0.14 | 152.84 | 752.49 | 0.279 | 0.353 | 0.000 | -1.11 | -1.97 | 2.16 | -0.065 | -104.911 |
| 762.50 | 0.14 | 133.25 | 762.49 | 0.142 | 0.351 | 0.000 | -1.12 | -1.99 | 2.17 | -0.010 | -58.788 |
| 772.50 | 0.15 | 114.23 | 772.49 | 0.147 | 0.348 | 0.000 | -1.13 | -2.00 | 2.20 | 0.040 | -57.040 |
| 782.50 | 0.14 | 93.61 | 782.49 | 0.159 | 0.346 | 0.000 | -1.13 | -2.01 | 2.22 | -0.030 | -61.873 |
| 792.50 | 0.12 | 61.08 | 792.49 | 0.226 | 0.344 | 0.000 | -1.11 | -2.00 | 2.24 | -0.065 | -97.600 |
| 802.50 | 0.09 | 29.48 | 802.49 | 0.191 | 0.342 | 0.000 | -1.10 | -1.99 | 2.25 | -0.095 | -94.801 |
| 812.50 | 0.10 | 324.60 | 812.49 | 0.302 | 0.342 | 0.000 | -1.09 | -1.98 | 2.25 | 0.040 | -194.639 |
| 822.50 | 0.08 | 210.54 | 822.49 | 0.462 | 0.343 | 0.000 | -1.09 | -1.98 | 2.24 | -0.050 | -342.180 |
| 832.50 | 0.14 | 193.90 | 832.49 | 0.203 | 0.342 | 0.000 | -1.11 | -1.99 | 2.24 | 0.180 | -49.901 |
| 842.50 | 0.21 | 171.74 | 842.49 | 0.283 | 0.341 | 0.000 | -1.14 | -2.02 | 2.24 | 0.200 | -66.491 |
| 852.50 | 0.25 | 155.17 | 852.49 | 0.225 | 0.339 | 0.000 | -1.17 | -2.06 | 2.25 | 0.110 | -49.695 |
| 862.50 | 0.18 | 145.76 | 862.49 | 0.217 | 0.338 | 0.000 | -1.19 | -2.09 | 2.27 | -0.190 | -28.252 |
| 872.50 | 0.20 | 126.74 | 872.49 | 0.196 | 0.336 | 0.000 | -1.20 | -2.12 | 2.29 | 0.050 | -57.060 |
| 882.50 | 0.26 | 111.32 | 882.49 | 0.249 | 0.335 | 0.000 | -1.21 | -2.13 | 2.33 | 0.170 | -46.238 |
| 892.50 | 0.21 | 96.09 | 892.49 | 0.237 | 0.334 | 0.000 | -1.20 | -2.14 | 2.37 | -0.150 | -45.712 |
| 902.50 | 0.16 | 87.89 | 902.49 | 0.169 | 0.333 | 0.000 | -1.19 | -2.14 | 2.40 | -0.150 | -24.585 |
| 912.50 | 0.13 | 85.07 | 912.49 | 0.089 | 0.330 | 0.000 | -1.18 | -2.14 | 2.42 | -0.087 | -8.451 |
| 922.50 | 0.23 | 182.88 | 922.49 | 0.834 | 0.335 | 0.000 | -1.20 | -2.16 | 2.43 | 0.307 | 293.425 |
| 932.50 | 0.08 | 279.10 | 932.49 | 0.755 | 0.340 | 0.000 | -1.22 | -2.18 | 2.43 | -0.450 | 288.644 |
| 942.50 | 0.12 | 193.26 | 942.49 | 0.426 | 0.341 | 0.000 | -1.23 | -2.19 | 2.42 | 0.130 | -257.497 |
| 952.50 | 0.31 | 143.05 | 952.49 | 0.749 | 0.345 | 0.000 | -1.25 | -2.22 | 2.43 | 0.560 | -150.657 |
| 962.50 | 0.34 | 133.17 | 962.49 | 0.190 | 0.343 | 0.000 | -1.28 | -2.26 | 2.47 | 0.090 | -29.625 |
| 972.50 | 0.09 | 148.90 | 972.49 | 0.773 | 0.348 | 0.000 | -1.29 | -2.29 | 2.50 | -0.760 | 47.191 |
| 982.50 | 0.45 | 162.55 | 982.49 | 1.109 | 0.356 | 0.000 | -1.33 | -2.33 | 2.52 | 1.100 | 40.933 |
| 992.50 | 0.62 | 98.14 | 992.49 | 1.775 | 0.370 | 0.000 | -1.35 | -2.37 | 2.58 | 0.510 | -193.224 |
| 1004.24 | 0.49 | 185.38 | 1004.23 | 1.978 | 0.389 | 0.000 | -1.38 | -2.43 | 2.64 | -0.341 | 222.945 |
| 1116.24 | 0.50 | 192.93 | 1116.22 | 0.018 | 0.351 | 0.000 | -2.32 | -3.39 | 2.52 | 0.003 | 2.022 |
| 1232.24 | 0.30 | 168.63 | 1232.22 | 0.067 | 0.325 | 0.000 | -3.08 | -4.18 | 2.49 | -0.052 | -6.284 |
| 1346.24 | 0.30 | 233.13 | 1346.22 | 0.084 | 0.304 | 0.000 | -3.58 | -4.66 | 2.32 | 0.000 | 16.974 |
| 1461.24 | 0.20 | 299.13 | 1461.22 | 0.074 | 0.286 | 0.000 | -3.81 | -4.75 | 1.91 | -0.026 | 17.217 |
| 1575.24 | 0.10 | 75.93 | 1575.22 | 0.074 | 0.271 | 0.000 | -3.73 | -4.64 | 1.83 | -0.026 | 36.000 |
| 1687.30 | 0.20 | 45.83 | 1687.28 | 0.033 | 0.255 | 0.000 | -3.49 | -4.47 | 2.06 | 0.027 | -8.058 |
| 1828.24 | 0.12 | 46.09 | 1828.22 | 0.017 | 0.237 | 0.000 | -3.13 | -4.19 | 2.33 | -0.017 | 0.055 |
| 1833.40 | 0.13 | 45.49 | 1833.38 | 0.059 | 0.236 | 0.000 | -3.12 | -4.18 | 2.34 | 0.058 | -3.488 |
| 1843.00 | 0.07 | 45.40 | 1842.98 | 0.188 | 0.236 | 0.000 | -3.11 | -4.17 | 2.35 | -0.187 | -0.281 |
| 1852.60 | 0.15 | 122.46 | 1852.58 | 0.471 | 0.237 | 0.000 | -3.11 | -4.17 | 2.37 | 0.250 | 240.812 |
| 1862.10 | 0.21 | 46.38 | 1862.08 | 0.716 | 0.240 | 0.000 | -3.09 | -4.16 | 2.39 | 0.189 | -240.253 |
| 1867.50 | 1.24 | 26.51 | 1867.48 | 5.802 | 0.256 | 0.000 | -3.02 | -4.10 | 2.42 | 5.719 | -110.421 |
| 1871.80 | 2.07 | 24.93 | 1871.77 | 5.802 | 0.268 | 0.000 | -2.90 | -3.99 | 2.47 | 5.794 | -10.983 |
| 1881.40 | 4.00 | 23.51 | 1881.36 | 6.035 | 0.298 | 0.000 | -2.39 | -3.52 | 2.66 | 6.031 | -4.437 |
| 1882.50 | 4.21 | 23.55 | 1882.46 | 5.809 | 0.301 | 0.000 | -2.31 | -3.44 | 2.69 | 5.808 | 1.013 |
| 1890.80 | 5.82 | 23.74 | 1890.72 | 5.809 | 0.325 | 0.000 | -1.59 | -2.77 | 2.96 | 5.809 | 0.697 |
| 1900.40 | 6.27 | 21.43 | 1900.27 | 1.598 | 0.332 | 0.000 | -0.58 | -1.83 | 3.32 | 1.406 | -7.219 |
| 1909.80 | 7.06 | 24.10 | 1909.61 | 2.708 | 0.343 | 0.000 | 0.51 | -0.81 | 3.72 | 2.521 | 8.521 |
| 1912.50 | 7.43 | 24.21 | 1912.29 | 4.159 | 0.349 | 0.000 | 0.85 | -0.49 | 3.85 | 4.156 | 1.234 |
| 1919.40 | 8.39 | 24.45 | 1919.12 | 4.159 | 0.362 | 0.000 | 1.80 | 0.38 | 4.21 | 4.156 | 1.039 |
| 1929.10 | 9.92 | 23.18 | 1928.70 | 4.773 | 0.385 | 0.000 | 3.34 | 1.81 | 4.79 | 4.732 | -3.928 |
| 1938.50 | 11.60 | 24.35 | 1937.93 | 5.407 | 0.409 | 0.000 | 5.10 | 3.44 | 5.45 | 5.362 | 3.734 |
| 1942.50 | 12.30 | 23.72 | 1941.84 | 5.326 | 0.419 | 0.000 | 5.93 | 4.21 | 5.76 | 5.236 | -4.727 |
| 1948.00 | 13.26 | 22.96 | 1947.21 | 5.326 | 0.433 | 0.000 | 7.14 | 5.34 | 6.21 | 5.247 | -4.144 |
| 1957.60 | 14.54 | 24.14 | 1956.53 | 4.097 | 0.451 | 0.000 | 9.45 | 7.48 | 7.06 | 4.000 | 3.687 |
| 1967.10 | 15.83 | 23.52 | 1965.69 | 4.106 | 0.469 | 0.000 | 11.93 | 9.79 | 8.00 | 4.074 | -1.958 |
| 1972.50 | 16.69 | 23.90 | 1970.88 | 4.828 | 0.481 | 0.000 | 13.44 | 11.19 | 8.56 | 4.792 | 2.091 |
| 1976.80 | 17.38 | 24.17 | 1974.99 | 4.828 | 0.490 | 0.000 | 14.70 | 12.35 | 9.04 | 4.796 | 1.909 |
| 1986.40 | 19.19 | 22.48 | 1984.10 | 5.893 | 0.516 | 0.000 | 17.71 | 15.16 | 10.14 | 5.656 | -5.281 |
| 1987.50 | 19.41 | 22.33 | 1985.14 | 6.109 | 0.519 | 0.000 | 18.08 | 15.50 | 10.27 | 5.956 | -4.107 |
| 1995.80 | 21.06 | 21.29 | 1992.93 | 6.109 | 0.542 | 0.000 | 20.95 | 18.19 | 11.25 | 5.970 | -3.757 |
| 2002.50 | 22.51 | 21.72 | 1999.15 | 6.511 | 0.562 | 0.000 | 23.43 | 20.53 | 12.09 | 6.473 | 1.911 |
| 2005.30 | 23.11 | 21.88 | 2001.73 | 6.511 | 0.571 | 0.000 | 24.52 | 21.55 | 12.47 | 6.476 | 1.749 |
| 2015.00 | 24.50 | 21.59 | 2010.61 | 4.314 | 0.589 | 0.000 | 28.43 | 25.23 | 13.80 | 4.299 | -0.897 |
| 2017.50 | 25.06 | 21.51 | 2012.88 | 6.769 | 0.596 | 0.000 | 29.48 | 26.22 | 14.16 | 6.757 | -0.936 |
| 2024.50 | 26.64 | 21.31 | 2019.18 | 6.769 | 0.618 | 0.000 | 32.53 | 29.09 | 15.18 | 6.758 | -0.866 |
| 2034.00 | 28.19 | 20.21 | 2027.61 | 5.149 | 0.639 | 0.000 | 36.91 | 33.23 | 16.61 | 4.895 | -3.474 |
| 2043.30 | 29.32 | 20.71 | 2035.76 | 3.727 | 0.653 | 0.000 | 41.38 | 37.47 | 18.04 | 3.645 | 1.613 |
| 2052.90 | 30.87 | 20.80 | 2044.07 | 4.846 | 0.673 | 0.000 | 46.19 | 42.02 | 19.61 | 4.844 | 0.281 |
| 2062.50 | 32.51 | 21.82 | 2052.24 | 5.391 | 0.695 | 0.000 | 51.24 | 46.77 | 21.29 | 5.125 | 3.187 |
| 2072.10 | 34.39 | 22.03 | 2060.25 | 5.886 | 0.719 | 0.000 | 56.53 | 51.74 | 23.12 | 5.875 | 0.656 |
| 2081.50 | 36.06 | 21.19 | 2067.92 | 5.549 | 0.740 | 0.000 | 61.95 | 56.84 | 24.96 | 5.330 | -2.681 |
| 2091.10 | 36.87 | 21.00 | 2075.65 | 2.556 | 0.749 | 0.000 | 67.65 | 62.22 | 26.84 | 2.531 | -0.594 |
| 2092.50 | 36.94 | 21.08 | 2076.76 | 1.809 | 0.749 | 0.000 | 68.49 | 63.02 | 27.12 | 1.529 | 1.611 |
| 2100.50 | 37.35 | 21.50 | 2083.14 | 1.809 | 0.753 | 0.000 | 73.32 | 67.57 | 28.74 | 1.532 | 1.593 |
| 2119.50 | 40.06 | 19.94 | 2097.97 | 4.547 | 0.787 | 0.000 | 85.20 | 78.81 | 32.59 | 4.279 | -2.463 |
| 2122.50 | 40.58 | 19.37 | 2100.26 | 6.363 | 0.795 | 0.000 | 87.14 | 80.65 | 33.18 | 5.189 | -5.692 |
| 2129.10 | 41.73 | 18.16 | 2105.22 | 6.363 | 0.813 | 0.000 | 91.48 | 84.81 | 34.45 | 5.232 | -5.504 |
| 2138.60 | 43.70 | 18.27 | 2112.20 | 6.226 | 0.837 | 0.000 | 97.91 | 90.99 | 36.28 | 6.221 | 0.347 |
| 2148.20 | 45.77 | 18.68 | 2119.02 | 6.531 | 0.862 | 0.000 | 104.65 | 97.46 | 38.22 | 6.469 | 1.281 |
| 2152.50 | 46.71 | 19.21 | 2122.00 | 7.103 | 0.875 | 0.000 | 107.76 | 100.43 | 39.14 | 6.590 | 3.668 |
| 2157.70 | 47.86 | 19.82 | 2125.52 | 7.103 | 0.890 | 0.000 | 111.57 | 104.06 | 40.30 | 6.608 | 3.544 |
| 2167.10 | 49.60 | 19.59 | 2131.72 | 5.581 | 0.910 | 0.000 | 118.63 | 110.79 | 42.48 | 5.553 | -0.734 |
| 2176.80 | 51.02 | 20.43 | 2137.92 | 4.825 | 0.927 | 0.000 | 126.09 | 117.88 | 44.81 | 4.392 | 2.598 |
| 2182.50 | 51.84 | 20.01 | 2141.47 | 4.653 | 0.937 | 0.000 | 130.55 | 122.10 | 46.22 | 4.320 | -2.209 |
| 2186.10 | 52.36 | 19.75 | 2143.68 | 4.653 | 0.943 | 0.000 | 133.39 | 124.80 | 47.11 | 4.326 | -2.169 |
| 2195.60 | 53.26 | 21.13 | 2149.43 | 4.487 | 0.959 | 0.000 | 140.95 | 131.97 | 49.53 | 2.842 | 4.358 |
| 2205.00 | 53.77 | 22.29 | 2155.02 | 3.392 | 0.969 | 0.000 | 148.51 | 139.08 | 52.11 | 1.628 | 3.702 |
| 2214.60 | 55.01 | 22.64 | 2160.61 | 3.976 | 0.982 | 0.000 | 156.32 | 146.38 | 54.87 | 3.875 | 1.094 |
| 2224.20 | 57.04 | 23.21 | 2165.97 | 6.513 | 1.006 | 0.000 | 164.27 | 153.80 | 57.74 | 6.344 | 1.781 |
| 2227.50 | 57.72 | 23.08 | 2167.75 | 6.272 | 1.014 | 0.000 | 167.05 | 156.39 | 58.75 | 6.190 | -1.197 |
| 2233.60 | 58.98 | 22.84 | 2170.95 | 6.272 | 1.028 | 0.000 | 172.24 | 161.23 | 60.63 | 6.192 | -1.172 |
| 2243.20 | 60.49 | 23.31 | 2175.79 | 4.886 | 1.045 | 0.000 | 180.53 | 168.96 | 63.64 | 4.719 | 1.469 |
| 2252.60 | 61.94 | 22.99 | 2180.31 | 4.713 | 1.060 | 0.000 | 188.77 | 176.63 | 66.65 | 4.628 | -1.021 |
| 2257.50 | 62.93 | 23.11 | 2182.58 | 6.062 | 1.071 | 0.000 | 193.11 | 180.67 | 68.22 | 6.031 | 0.693 |
| 2262.20 | 63.87 | 23.21 | 2184.69 | 6.062 | 1.081 | 0.000 | 197.31 | 184.59 | 69.75 | 6.032 | 0.681 |
| 2271.80 | 65.79 | 23.43 | 2188.77 | 6.032 | 1.102 | 0.000 | 206.00 | 192.67 | 72.95 | 6.000 | 0.687 |
| 2272.50 | 65.94 | 23.44 | 2189.06 | 6.538 | 1.104 | 0.000 | 206.64 | 193.26 | 73.18 | 6.537 | 0.128 |
| 2281.30 | 67.86 | 23.47 | 2192.51 | 6.538 | 1.125 | 0.000 | 214.73 | 200.78 | 76.17 | 6.537 | 0.126 |
| 2287.50 | 69.01 | 22.92 | 2194.79 | 6.100 | 1.138 | 0.000 | 220.49 | 206.15 | 78.28 | 5.560 | -2.699 |
| 2290.90 | 69.64 | 22.61 | 2195.99 | 6.100 | 1.145 | 0.000 | 223.67 | 209.12 | 79.42 | 5.567 | -2.667 |
| 2300.50 | 71.38 | 22.26 | 2199.19 | 5.534 | 1.164 | 0.000 | 232.72 | 217.59 | 82.61 | 5.437 | -1.094 |
| 2302.50 | 71.68 | 22.10 | 2199.82 | 5.018 | 1.167 | 0.000 | 234.62 | 219.37 | 83.27 | 4.449 | -2.447 |
| 2310.00 | 72.79 | 21.49 | 2202.11 | 5.018 | 1.180 | 0.000 | 241.76 | 226.08 | 85.72 | 4.454 | -2.427 |
| 2319.40 | 74.27 | 20.67 | 2204.78 | 5.349 | 1.197 | 0.000 | 250.77 | 234.58 | 88.70 | 4.723 | -2.617 |
| 2329.00 | 75.48 | 21.05 | 2207.28 | 3.951 | 1.208 | 0.000 | 260.04 | 243.34 | 91.73 | 3.781 | 1.187 |
| 2332.50 | 75.96 | 21.18 | 2208.15 | 4.273 | 1.212 | 0.000 | 263.43 | 246.54 | 92.85 | 4.148 | 1.057 |
| 2338.40 | 76.78 | 21.38 | 2209.54 | 4.273 | 1.220 | 0.000 | 269.17 | 251.95 | 94.77 | 4.149 | 1.051 |
| 2343.10 | 77.00 | 21.38 | 2210.60 | 1.404 | 1.221 | 0.000 | 273.74 | 256.26 | 96.30 | 1.404 | 0.000 |
| 2352.50 | 77.30 | 21.89 | 2212.69 | 1.853 | 1.223 | 0.000 | 282.91 | 264.88 | 99.42 | 0.957 | 1.628 |
| 2362.50 | 79.62 | 21.16 | 2214.69 | 7.300 | 1.249 | 0.000 | 292.70 | 274.10 | 102.73 | 6.971 | -2.212 |
| 2377.50 | 83.11 | 20.07 | 2216.94 | 7.300 | 1.287 | 0.000 | 307.53 | 288.13 | 107.51 | 6.977 | -2.172 |
| 2392.50 | 86.60 | 19.00 | 2218.29 | 7.300 | 1.325 | 0.000 | 322.45 | 302.36 | 112.07 | 6.982 | -2.141 |
| 2407.09 | 90.00 | 17.97 | 2218.72 | 7.300 | 1.361 | 0.000 | 337.01 | 316.32 | 116.26 | 6.984 | -2.125 |
| 2419.81 | 90.00 | 17.97 | 2218.72 | 0.000 | 1.354 | 0.000 | 349.71 | 328.54 | 119.81 | 0.000 | 0.000 |
| 2422.50 | 90.00 | 18.23 | 2218.72 | 3.000 | 1.356 | 0.000 | 352.39 | 331.12 | 120.57 | 0.000 | 3.000 |
| 2452.50 | 90.00 | 21.23 | 2218.72 | 3.000 | 1.376 | 0.000 | 382.36 | 359.65 | 129.82 | 0.000 | 3.000 |
| 2459.89 | 90.00 | 21.97 | 2218.72 | 3.000 | 1.381 | 0.000 | 389.75 | 366.60 | 132.32 | 0.000 | 3.000 |
| 2482.50 | 90.00 | 21.97 | 2218.72 | 0.000 | 1.368 | 0.000 | 412.36 | 387.83 | 140.13 | 0.000 | 0.000 |
| 2512.50 | 90.00 | 21.97 | 2218.72 | 0.000 | 1.352 | 0.000 | 442.36 | 415.98 | 150.49 | 0.000 | 0.000 |
| 2542.50 | 90.00 | 21.97 | 2218.72 | 0.000 | 1.336 | 0.000 | 472.36 | 444.13 | 160.85 | 0.000 | 0.000 |
| 2572.50 | 90.00 | 21.97 | 2218.72 | 0.000 | 1.320 | 0.000 | 502.36 | 472.29 | 171.21 | 0.000 | 0.000 |
| 2602.50 | 90.00 | 21.97 | 2218.72 | 0.000 | 1.305 | 0.000 | 532.36 | 500.44 | 181.57 | 0.000 | 0.000 |
| 2632.50 | 90.00 | 21.97 | 2218.72 | 0.000 | 1.290 | 0.000 | 562.36 | 528.60 | 191.93 | 0.000 | 0.000 |
| 2662.50 | 90.00 | 21.97 | 2218.72 | 0.000 | 1.276 | 0.000 | 592.36 | 556.75 | 202.28 | 0.000 | 0.000 |
| 2692.50 | 90.00 | 21.97 | 2218.72 | 0.000 | 1.261 | 0.000 | 622.36 | 584.91 | 212.64 | 0.000 | 0.000 |
| 2722.50 | 90.00 | 21.97 | 2218.72 | 0.000 | 1.247 | 0.000 | 652.36 | 613.06 | 223.00 | 0.000 | 0.000 |
| 2752.50 | 90.00 | 21.97 | 2218.72 | 0.000 | 1.234 | 0.000 | 682.36 | 641.22 | 233.36 | 0.000 | 0.000 |
| 2782.50 | 90.00 | 21.97 | 2218.72 | 0.000 | 1.221 | 0.000 | 712.36 | 669.37 | 243.72 | 0.000 | 0.000 |
| 2812.50 | 90.00 | 21.97 | 2218.72 | 0.000 | 1.208 | 0.000 | 742.36 | 697.53 | 254.08 | 0.000 | 0.000 |
| 2842.50 | 90.00 | 21.97 | 2218.72 | 0.000 | 1.195 | 0.000 | 772.36 | 725.68 | 264.44 | 0.000 | 0.000 |
| 2872.50 | 90.00 | 21.97 | 2218.72 | 0.000 | 1.182 | 0.000 | 802.36 | 753.84 | 274.80 | 0.000 | 0.000 |
| 2902.50 | 90.00 | 21.97 | 2218.72 | 0.000 | 1.170 | 0.000 | 832.36 | 781.99 | 285.16 | 0.000 | 0.000 |
| 2919.84 | 90.00 | 21.97 | 2218.72 | 0.000 | 1.163 | 0.000 | 849.70 | 798.26 | 291.14 | 0.000 | 0.000 |

* 1. **Geothermal Gradient Data**

|  |  |  |  |
| --- | --- | --- | --- |
| **Ambient Temperature** | 26.000 °C | **Mudline Temperature** | °C |
| **Temperature @ Depth** | 70.000 °C @ 2218.91 m | **Gradient** | 1.98 °C/100m |

# Schematics

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Well:** | 120 | **Wellbore:** | 120 | **Case:** | 152,4мм | **String Name:** | 1524 |
|  |  |  |  |  |  |  |  |
| Schematic | | | | | | | |

# Torque & Drag Setup Data

* 1. **Settings**

|  |  |  |  |
| --- | --- | --- | --- |
| **Measured Depth of Bit** | 2928.00 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** | 14.000 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** | 2359.00 m | **End MD** | 2928.00 m |
| **Step Size** | 50.00 m |  |  |

* 1. **Normal Analysis Operational Parameters**

|  |  |  |  |
| --- | --- | --- | --- |
| Drilling | WOB/Overpull  (tonne) | Torque at Bit  (kN-m) | Include Pump Rate |
| Rotating On Bottom | 6.00 | 1.3730 | NA |
| Slide Drilling | 2.50 | 0.0000 | NA |
| Backreaming | NA | NA | NA |
| Rotating Off Bottom |  |  | NA |
| Tripping | **Speed**  **(m/min)** | **RPM**  **(rpm)** | **Include Pump Rate** |
| Tripping In | 10.00 | 0 | NA |
| Tripping Out | 10.00 | 0 | NA |

* 1. **Friction Factors**

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

* 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** | 53.86 tonne | using | 80.00% of yield |
| **Minimum Weight on Bit to Sinusoidal Buckle during a rotating on bottom operation** | 12.30 tonne | at | 1835.45 m |
| **Minimum Weight on Bit to Helical Buckle during a rotating on bottom operation** | 12.74 tonne | at | 1835.45 m |
| **Pick-Up Drag** | 12.05 tonne | | |
| **Slack-Off Drag** | 10.63 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 |  |  |  |  |  |  |  | 0.0000 | 0.0 | 0.0 | 58.11 | 2.53 | 1731.51 | 1196.49 | 2928.00 | 0.00 |
| Подъём |  |  |  |  |  |  |  | 0.0000 | 0.0 | 0.0 | 80.80 | 3.17 | 2125.76 | 802.24 | 2928.00 | 0.00 |
| Бурение ротором |  |  |  |  |  |  |  | 8.1923 | 6.5 | 4.9 | 62.75 | 2.58 | 1783.38 | 1144.62 | 1994.97 | 933.03 |
| Бурение ГЗД |  |  |  |  |  |  |  | 0.0000 | 0.0 | 0.0 | 54.98 | 2.38 | 1585.31 | 1342.69 | 1852.71 | 1075.29 |

# 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** | 80 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** | 14.000 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 | 2359.00 m | **End MD** | 2928.00 m |
| Step Size | 50.00 m |  |  |

* 1. **Flow Rate (Q= 14.000 L/sec)**

### **Bit Parameters**

|  |  |  |  |
| --- | --- | --- | --- |
| **Pump Rate** | 14.000 L/sec | **Stand Pipe Pressure** | 268.5390 atm |
| **Bit Pressure Loss** | 9.7092 atm | **Percent Power at Bit** | 3.62 % |
| **Bit Hydraulic Power / Area (HSI)** | 0.7 hp/in² | **Bit Nozzle Velocity** | 39.30 m/s |
| **Bit Hydraulic Power** | 18.47 hp | **Bit Impact Force** | 64.51 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** |