**WellPlan**TMReport

04. КМГ-Бурение

Well Name: 245 ГC

Wellbore: 245 ГС

Design: 245

Case: 215,9 для ТП

Date: October 5, 2023 at 6:16 PM

Created By:

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

# General Information

* 1. **General Case Information**

|  |  |  |  |
| --- | --- | --- | --- |
| **Company** | 04. КМГ-Бурение | | |
| **Project** | Балгимбаев | **Site** | 245 перенос устья |
| **Well** | 245 ГC | **Wellbore** | 245 ГС |
| **Design** | 245 | **Case** | 215,9 для ТП |
| **Hole MD** | 776.00 m | **Hole TVD** | 657.16 m |
| **Air Gap** | 0.00 m | **Ground Elevation** | -24.00 m |
| **Reference Point** | WELL (copy) @ -24m | **Well Type** | Onshore |

* 1. **Active Fluid**

### **Fluid Data**

|  |  |  |  |
| --- | --- | --- | --- |
| **Fluid** | KC1 | **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**  **(°)** |
| 33 | 1 | 1150 | Yes | 18 | 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** | **300** | **300** | **300** | **224.41** | **222.25** | **295.3** | **0.25** | **39.55** |  |
| **Open Hole** | **776** | **476** |  | **215.9** | **222.25** | **215.9** | **0.2** | **36.61** | **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 | 490.522 | 490.52 | 127 | 108.61 | 9.144 | 0.433 | 152.4 | 82.55 | 32.62 | CS\_API 5D/7 | G | 2 |
| Heavy Weight | 54 | 544.52 | 127 | 76.2 | 9.14 | 1.219 | 165.1 | 76.2 | 73.13 | CS\_1340 MOD | 1340 MOD |  |
| Jar | 10.058 | 554.58 | 165.1 | 69.85 | 10.058 |  |  |  | 136.6 | CS\_API 5D/7 | 4145H MOD |  |
| Heavy Weight | 80 | 634.58 | 127 | 76.2 | 9.14 | 1.219 | 165.1 | 76.2 | 73.13 | CS\_1340 MOD | 1340 MOD |  |
| Drill Pipe | 120 | 754.58 | 127 | 108.61 | 9.144 | 0.433 | 152.4 | 82.55 | 32.62 | CS\_API 5D/7 | G | 2 |
| MWD | 10.4 | 764.98 | 172 | 83 | 10.4 |  |  |  | 149.77 | SS\_15-15LC | 15-15LC MOD (1) |  |
| Sub | 0.91 | 765.89 | 170.69 | 60.96 | 0.91 |  |  |  | 156.36 | SS\_15-15LC | 15-15LC MOD (1) |  |
| Mud Motor | 9.71 | 775.6 | 171.45 | 76.2 | 9.71 |  |  |  | 103.53 | CS\_API 5D/7 | 4145H MOD |  |
| Bit | 0.4 | 776 | 215.9 |  | 0.4 |  |  |  | 100 |  |  |  |

### **Grade in Use**

| Grade | Minimum Yield Stress (psi) |
| --- | --- |
| 1340 MOD | 55,000 |
| 15-15LC MOD (1) | 110,000 |
| 4145H MOD | 110,000 |
| G | 105,000 |

### **String Nozzles**

| Component | MD  (m) | Port Open | Diverted Flow | Amount Diverted  (%) | Nozzle  (32nd") | TFA  (in²) |
| --- | --- | --- | --- | --- | --- | --- |
| Polycrystalline Diamond Bit | 776 | NA | NA | NA |  | 0.752 |
| Polycrystalline Diamond Bit | 776 | NA | NA | NA | 5.0X14.0 | 0.752 |

### **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 |
| 340.00 | 1.00 |
| 805.00 | 1.00 |

* 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 | 0.01 | 0.00 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 |
| 30.00 | 0.00 | 0.01 | 30.00 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 |
| 60.00 | 0.00 | 0.01 | 60.00 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 |
| 90.00 | 0.00 | 0.01 | 90.00 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 |
| 120.00 | 0.00 | 0.01 | 120.00 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 |
| 150.00 | 0.00 | 0.01 | 150.00 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 |
| 180.00 | 0.00 | 0.01 | 180.00 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 |
| 210.00 | 0.00 | 0.01 | 210.00 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 |
| 240.00 | 0.00 | 0.01 | 240.00 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 |
| 270.00 | 0.00 | 0.01 | 270.00 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 |
| 300.00 | 0.00 | 0.01 | 300.00 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 |
| 330.00 | 0.00 | 0.01 | 330.00 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 |
| 360.00 | 5.04 | 248.01 | 359.96 | 5.040 | 0.420 | 0.000 | 1.32 | -0.49 | -1.22 | 5.040 | 0.000 |
| 390.00 | 10.08 | 248.01 | 389.69 | 5.040 | 0.775 | 0.000 | 5.26 | -1.97 | -4.88 | 5.040 | 0.000 |
| 420.00 | 15.12 | 248.01 | 418.96 | 5.040 | 1.080 | 0.000 | 11.81 | -4.42 | -10.95 | 5.040 | 0.000 |
| 450.00 | 20.16 | 248.01 | 447.54 | 5.040 | 1.344 | 0.000 | 20.89 | -7.83 | -19.37 | 5.040 | 0.000 |
| 480.00 | 25.20 | 248.01 | 475.21 | 5.040 | 1.575 | 0.000 | 32.46 | -12.16 | -30.09 | 5.040 | 0.000 |
| 510.00 | 30.24 | 248.01 | 501.76 | 5.040 | 1.779 | 0.000 | 46.41 | -17.38 | -43.03 | 5.040 | 0.000 |
| 540.00 | 35.28 | 248.01 | 526.98 | 5.040 | 1.960 | 0.000 | 62.64 | -23.46 | -58.08 | 5.040 | 0.000 |
| 570.00 | 40.32 | 248.01 | 550.68 | 5.040 | 2.122 | 0.000 | 81.02 | -30.35 | -75.12 | 5.040 | 0.000 |
| 580.00 | 42.00 | 248.01 | 558.20 | 5.040 | 2.172 | 0.000 | 87.60 | -32.82 | -81.22 | 5.040 | 0.000 |
| 600.00 | 42.00 | 248.01 | 573.07 | 0.000 | 2.100 | 0.000 | 100.98 | -37.83 | -93.63 | 0.000 | 0.000 |
| 620.00 | 43.33 | 248.01 | 587.77 | 2.000 | 2.097 | 0.000 | 114.54 | -42.91 | -106.20 | 2.000 | 0.000 |
| 630.00 | 45.92 | 248.01 | 594.89 | 7.759 | 2.187 | 0.000 | 121.56 | -45.54 | -112.71 | 7.759 | 0.000 |
| 645.00 | 49.80 | 248.01 | 604.95 | 7.759 | 2.316 | 0.000 | 132.68 | -49.70 | -123.02 | 7.759 | 0.000 |
| 660.00 | 53.68 | 248.01 | 614.24 | 7.759 | 2.440 | 0.000 | 144.46 | -54.11 | -133.94 | 7.759 | 0.000 |
| 675.00 | 57.56 | 248.01 | 622.71 | 7.759 | 2.558 | 0.000 | 156.83 | -58.75 | -145.41 | 7.759 | 0.000 |
| 690.00 | 61.44 | 248.01 | 630.32 | 7.759 | 2.671 | 0.000 | 169.76 | -63.59 | -157.39 | 7.759 | 0.000 |
| 705.00 | 65.32 | 248.01 | 637.04 | 7.759 | 2.779 | 0.000 | 183.16 | -68.61 | -169.83 | 7.759 | 0.000 |
| 720.00 | 69.20 | 248.01 | 642.84 | 7.759 | 2.883 | 0.000 | 196.99 | -73.80 | -182.65 | 7.759 | 0.000 |
| 735.00 | 73.08 | 248.01 | 647.69 | 7.759 | 2.983 | 0.000 | 211.19 | -79.11 | -195.81 | 7.759 | 0.000 |
| 750.00 | 76.96 | 248.01 | 651.56 | 7.759 | 3.078 | 0.000 | 225.67 | -84.54 | -209.24 | 7.759 | 0.000 |
| 765.00 | 80.84 | 248.01 | 654.45 | 7.759 | 3.170 | 0.000 | 240.39 | -90.05 | -222.88 | 7.759 | 0.000 |
| 780.00 | 84.72 | 248.01 | 656.34 | 7.759 | 3.258 | 0.000 | 255.27 | -95.62 | -236.68 | 7.759 | 0.000 |
| 795.00 | 88.59 | 248.01 | 657.21 | 7.759 | 3.343 | 0.000 | 270.24 | -101.23 | -250.56 | 7.759 | 0.000 |
| 800.43 | 90.00 | 248.01 | 657.28 | 7.759 | 3.373 | 0.000 | 275.67 | -103.27 | -255.60 | 7.759 | 0.000 |
| 810.00 | 90.00 | 248.01 | 657.28 | 0.000 | 3.333 | 0.000 | 285.24 | -106.85 | -264.47 | 0.000 | 0.000 |
| 840.00 | 90.00 | 248.01 | 657.28 | 0.000 | 3.214 | 0.000 | 315.24 | -118.09 | -292.28 | 0.000 | 0.000 |
| 870.00 | 90.00 | 248.01 | 657.28 | 0.000 | 3.103 | 0.000 | 345.24 | -129.33 | -320.10 | 0.000 | 0.000 |
| 900.00 | 90.00 | 248.01 | 657.28 | 0.000 | 3.000 | 0.000 | 375.24 | -140.57 | -347.91 | 0.000 | 0.000 |
| 930.00 | 90.00 | 248.01 | 657.28 | 0.000 | 2.903 | 0.000 | 405.24 | -151.80 | -375.73 | 0.000 | 0.000 |
| 960.00 | 90.00 | 248.01 | 657.28 | 0.000 | 2.812 | 0.000 | 435.24 | -163.04 | -403.55 | 0.000 | 0.000 |
| 990.00 | 90.00 | 248.01 | 657.28 | 0.000 | 2.727 | 0.000 | 465.24 | -174.28 | -431.36 | 0.000 | 0.000 |
| 1020.00 | 90.00 | 248.01 | 657.28 | 0.000 | 2.647 | 0.000 | 495.24 | -185.52 | -459.18 | 0.000 | 0.000 |
| 1050.00 | 90.00 | 248.01 | 657.28 | 0.000 | 2.571 | 0.000 | 525.24 | -196.76 | -486.99 | 0.000 | 0.000 |
| 1080.00 | 90.00 | 248.01 | 657.28 | 0.000 | 2.500 | 0.000 | 555.24 | -208.00 | -514.81 | 0.000 | 0.000 |
| 1110.00 | 90.00 | 248.01 | 657.28 | 0.000 | 2.432 | 0.000 | 585.24 | -219.23 | -542.62 | 0.000 | 0.000 |
| 1140.00 | 90.00 | 248.01 | 657.28 | 0.000 | 2.368 | 0.000 | 615.24 | -230.47 | -570.44 | 0.000 | 0.000 |
| 1170.00 | 90.00 | 248.01 | 657.28 | 0.000 | 2.308 | 0.000 | 645.24 | -241.71 | -598.25 | 0.000 | 0.000 |
| 1200.00 | 90.00 | 248.01 | 657.28 | 0.000 | 2.250 | 0.000 | 675.24 | -252.95 | -626.07 | 0.000 | 0.000 |
| 1230.00 | 90.00 | 248.01 | 657.28 | 0.000 | 2.195 | 0.000 | 705.24 | -264.19 | -653.89 | 0.000 | 0.000 |
| 1260.00 | 90.00 | 248.01 | 657.28 | 0.000 | 2.143 | 0.000 | 735.24 | -275.43 | -681.70 | 0.000 | 0.000 |
| 1280.43 | 90.00 | 248.01 | 657.28 | 0.000 | 2.109 | 0.000 | 755.67 | -283.08 | -700.65 | 0.000 | 0.000 |

* 1. **Geothermal Gradient Data**

|  |  |  |  |
| --- | --- | --- | --- |
| **Ambient Temperature** | 26.667 °C | **Mudline Temperature** | 4.444 °C |
| **Temperature @ Depth** | 33.000 °C @ 657.16 m | **Gradient** | 0.96 °C/100m |

# Schematics

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Well:** | 245 ГC | **Wellbore:** | 245 ГС | **Case:** | 215,9 для ТП | **String Name:** | 215,9 мм |
|  |  |  |  |  |  |  |  |
| Schematic | | | | | | | |

# Torque & Drag Setup Data

* 1. **Settings**

|  |  |  |  |
| --- | --- | --- | --- |
| **Measured Depth of Bit** | 776.00 m | **Bending Stress Magnification** | Yes |
| **Block Weight** | 6.00 tonne | **Stiff String Analysis** | No |
| **Enable Sheave Friction Correction** | No | **Viscous Torque and Drag** | No |
| **Pump Rate** | 18.000 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** | 320.00 m | **End MD** | 776.00 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 | 6.00 | 4.1670 | NA |
| Slide Drilling | 3.00 | 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 | 0.20 |

* 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** | 81.28 tonne | using | 80.00% of yield |
| **Minimum Weight on Bit to Sinusoidal Buckle during a rotating on bottom operation** | 16.48 tonne | at | 308.85 m |
| **Minimum Weight on Bit to Helical Buckle during a rotating on bottom operation** | 17.34 tonne | at | 299.76 m |
| **Pick-Up Drag** | 2.87 tonne | | |
| **Slack-Off Drag** | 2.76 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 | 26.32 | 0.36 | 529.48 | 246.52 | 776.00 | 0.00 |
| Подъём |  |  |  |  |  |  |  | 0.0000 | 0.0 | 0.0 | 31.95 | 0.40 | 639.80 | 136.20 | 776.00 | 0.00 |
| Бурение ротором |  |  |  |  |  |  |  | 6.8025 | 0.7 | 0.2 | 23.08 | 0.33 | 490.52 | 285.48 | 550.30 | 225.70 |
| Бурение ГЗД |  |  |  |  |  |  |  | 0.0000 | 0.0 | 0.0 | 23.03 | 0.33 | 490.52 | 285.48 | 565.36 | 210.64 |
| Вращение над забоем |  |  |  |  |  |  |  | 2.1827 | 0.2 | 0.2 | 29.08 | 0.38 | 544.52 | 231.48 | 776.00 | 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 | 10.00 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** | 270.0000 atm |
| Equipment Mode | NA | **Surface Pressure Loss** | 6.8046 atm |
| Equipment Type | NA |  |  |

* 1. **Pump Pressure Information**

|  |  |  |  |
| --- | --- | --- | --- |
| Maximum Surface Pressure | 350.0000 atm | **Pump Rate** | 18.000 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 | 320.00 m | **End MD** | 776.00 m |
| Step Size | 9.30 m |  |  |

* 1. **Flow Rate (Q= 18.000 L/sec)**

### **Bit Parameters**

|  |  |  |  |
| --- | --- | --- | --- |
| **Pump Rate** | 18.000 L/sec | **Stand Pipe Pressure** | 82.9255 atm |
| **Bit Pressure Loss** | 8.6633 atm | **Percent Power at Bit** | 10.45 % |
| **Bit Hydraulic Power / Area (HSI)** | 0.4 hp/in² | **Bit Nozzle Velocity** | 37.12 m/s |
| **Bit Hydraulic Power** | 21.19 hp | **Bit Impact Force** | 78.35 kgf |
| **Surface Equip. Pressure Loss** | 6.8046 atm | **Total Bit Flow Area** | 0.752 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** |