**WellPlan**TMReport

04. КМГ-Бурение

Well Name: 81

Wellbore: 81

Design: Design #1

Case: 2159

Date: October 6, 2023 at 12:35 AM

Created By:

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

# General Information

* 1. **General Case Information**

|  |  |  |  |
| --- | --- | --- | --- |
| **Company** | 04. КМГ-Бурение | | |
| **Project** | Гран | **Site** | 81 |
| **Well** | 81 | **Wellbore** | 81 |
| **Design** | Design #1 | **Case** | 2159 |
| **Hole MD** | 566.00 m | **Hole TVD** | 449.37 m |
| **Air Gap** | 0.00 m | **Ground Elevation** | -17.90 m |
| **Reference Point** | WELL (copy) @ -17.9m | **Well Type** | Platform |

* 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**  **(°)** |
| 33 | 1 | 1200 | 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** | **170** | **170** | **170** | **224.41** | **222.25** | **295.3** | **0.25** | **39.55** |  |
| **Open Hole** | **566** | **396** |  | **215.9** | **222.25** | **215.9** | **0.3** | **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 | 294.522 | 294.52 | 127 | 108.61 | 9.144 | 0.433 | 152.4 | 82.55 | 32.62 | CS\_API 5D/7 | G | 2 |
| Heavy Weight | 60 | 354.52 | 127 | 76.2 | 9.14 | 1.219 | 165.1 | 76.2 | 73.13 | CS\_1340 MOD | 1340 MOD |  |
| Jar | 10.058 | 364.58 | 165.1 | 69.85 | 10.058 |  |  |  | 136.6 | CS\_API 5D/7 | 4145H MOD |  |
| Heavy Weight | 40 | 404.58 | 127 | 76.2 | 9.14 | 1.219 | 165.1 | 76.2 | 73.13 | CS\_1340 MOD | 1340 MOD |  |
| Drill Pipe | 140 | 544.58 | 127 | 108.61 | 9.144 | 0.433 | 152.4 | 82.55 | 32.62 | CS\_API 5D/7 | G | 2 |
| MWD | 10.4 | 554.98 | 172 | 83 | 10.4 |  |  |  | 149.77 | SS\_15-15LC | 15-15LC MOD (1) |  |
| Sub | 0.91 | 555.89 | 170.69 | 60.96 | 0.91 |  |  |  | 156.36 | SS\_15-15LC | 15-15LC MOD (1) |  |
| Mud Motor | 9.71 | 565.6 | 171.45 | 76.2 | 9.71 |  |  |  | 103.53 | CS\_API 5D/7 | 4145H MOD |  |
| Bit | 0.4 | 566 | 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 | 566 | NA | NA | NA | 7.0X14.0 | 1.052 |

### **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. **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 | 2.50 | 322.98 | 210.00 | 7.500 | 0.357 | 0.000 | 0.22 | 0.17 | -0.13 | 7.500 | 0.000 |
| 225.00 | 6.25 | 322.98 | 224.95 | 7.500 | 0.833 | 0.000 | 1.36 | 1.09 | -0.82 | 7.500 | 0.000 |
| 240.00 | 10.00 | 322.98 | 239.80 | 7.500 | 1.250 | 0.000 | 3.47 | 2.78 | -2.10 | 7.500 | 0.000 |
| 255.00 | 13.75 | 322.98 | 254.47 | 7.500 | 1.618 | 0.000 | 6.55 | 5.25 | -3.95 | 7.500 | 0.000 |
| 270.00 | 17.50 | 322.98 | 268.92 | 7.500 | 1.944 | 0.000 | 10.58 | 8.47 | -6.38 | 7.500 | 0.000 |
| 285.00 | 21.25 | 322.98 | 283.06 | 7.500 | 2.237 | 0.000 | 15.55 | 12.44 | -9.38 | 7.500 | 0.000 |
| 300.00 | 25.00 | 322.98 | 296.86 | 7.500 | 2.500 | 0.000 | 21.42 | 17.15 | -12.92 | 7.500 | 0.000 |
| 315.00 | 28.75 | 322.98 | 310.23 | 7.500 | 2.738 | 0.000 | 28.19 | 22.56 | -17.00 | 7.500 | 0.000 |
| 330.00 | 32.50 | 322.98 | 323.14 | 7.500 | 2.955 | 0.000 | 35.81 | 28.66 | -21.60 | 7.500 | 0.000 |
| 345.00 | 36.25 | 322.98 | 335.52 | 7.500 | 3.152 | 0.000 | 44.26 | 35.43 | -26.70 | 7.500 | 0.000 |
| 360.00 | 40.00 | 322.98 | 347.32 | 7.500 | 3.333 | 0.000 | 53.49 | 42.82 | -32.27 | 7.500 | 0.000 |
| 375.00 | 43.75 | 322.98 | 358.48 | 7.500 | 3.500 | 0.000 | 63.48 | 50.82 | -38.29 | 7.500 | 0.000 |
| 380.00 | 45.00 | 322.98 | 362.06 | 7.500 | 3.553 | 0.000 | 66.97 | 53.61 | -40.40 | 7.500 | 0.000 |
| 390.00 | 45.00 | 322.98 | 369.13 | 0.000 | 3.462 | 0.000 | 74.02 | 59.26 | -44.65 | 0.000 | 0.000 |
| 405.00 | 48.71 | 322.98 | 379.38 | 7.428 | 3.608 | 0.000 | 84.94 | 68.00 | -51.24 | 7.428 | 0.000 |
| 420.00 | 52.43 | 322.98 | 388.91 | 7.428 | 3.745 | 0.000 | 96.50 | 77.25 | -58.21 | 7.428 | 0.000 |
| 435.00 | 56.14 | 322.98 | 397.66 | 7.428 | 3.872 | 0.000 | 108.64 | 86.97 | -65.54 | 7.428 | 0.000 |
| 450.00 | 59.86 | 322.98 | 405.61 | 7.428 | 3.990 | 0.000 | 121.33 | 97.13 | -73.19 | 7.428 | 0.000 |
| 465.00 | 63.57 | 322.98 | 412.72 | 7.428 | 4.101 | 0.000 | 134.51 | 107.68 | -81.14 | 7.428 | 0.000 |
| 480.00 | 67.28 | 322.98 | 418.95 | 7.428 | 4.205 | 0.000 | 148.12 | 118.57 | -89.35 | 7.428 | 0.000 |
| 495.00 | 71.00 | 322.98 | 424.29 | 7.428 | 4.303 | 0.000 | 162.10 | 129.76 | -97.78 | 7.428 | 0.000 |
| 510.00 | 74.71 | 322.98 | 428.72 | 7.428 | 4.395 | 0.000 | 176.39 | 141.21 | -106.41 | 7.428 | 0.000 |
| 525.00 | 78.43 | 322.98 | 432.20 | 7.428 | 4.481 | 0.000 | 190.95 | 152.86 | -115.19 | 7.428 | 0.000 |
| 540.00 | 82.14 | 322.98 | 434.73 | 7.428 | 4.563 | 0.000 | 205.69 | 164.66 | -124.08 | 7.428 | 0.000 |
| 555.00 | 85.85 | 322.98 | 436.30 | 7.428 | 4.641 | 0.000 | 220.57 | 176.57 | -133.06 | 7.428 | 0.000 |
| 566.49 | 88.70 | 322.98 | 436.85 | 7.428 | 4.697 | 0.000 | 232.03 | 185.74 | -139.97 | 7.428 | 0.000 |
| 570.00 | 88.70 | 323.33 | 436.92 | 3.000 | 4.687 | 0.000 | 235.53 | 188.55 | -142.07 | -0.003 | 3.001 |
| 600.00 | 88.70 | 326.33 | 437.61 | 3.000 | 4.603 | 0.000 | 265.49 | 213.07 | -159.33 | -0.001 | 3.001 |
| 625.48 | 88.70 | 328.88 | 438.18 | 3.000 | 4.537 | 0.000 | 290.96 | 234.58 | -172.97 | 0.002 | 3.001 |
| 630.00 | 88.70 | 328.88 | 438.29 | 0.000 | 4.505 | 0.000 | 295.48 | 238.45 | -175.31 | 0.000 | 0.000 |
| 660.00 | 88.70 | 328.88 | 438.97 | 0.000 | 4.300 | 0.000 | 325.45 | 264.13 | -190.80 | 0.000 | 0.000 |
| 690.00 | 88.70 | 328.88 | 439.65 | 0.000 | 4.113 | 0.000 | 355.43 | 289.81 | -206.29 | 0.000 | 0.000 |
| 720.00 | 88.70 | 328.88 | 440.33 | 0.000 | 3.942 | 0.000 | 385.40 | 315.49 | -221.78 | 0.000 | 0.000 |
| 750.00 | 88.70 | 328.88 | 441.01 | 0.000 | 3.784 | 0.000 | 415.38 | 341.17 | -237.27 | 0.000 | 0.000 |
| 780.00 | 88.70 | 328.88 | 441.69 | 0.000 | 3.638 | 0.000 | 445.35 | 366.86 | -252.77 | 0.000 | 0.000 |
| 810.00 | 88.70 | 328.88 | 442.37 | 0.000 | 3.504 | 0.000 | 475.33 | 392.54 | -268.26 | 0.000 | 0.000 |
| 840.00 | 88.70 | 328.88 | 443.05 | 0.000 | 3.379 | 0.000 | 505.30 | 418.22 | -283.75 | 0.000 | 0.000 |
| 870.00 | 88.70 | 328.88 | 443.73 | 0.000 | 3.262 | 0.000 | 535.28 | 443.90 | -299.24 | 0.000 | 0.000 |
| 900.00 | 88.70 | 328.88 | 444.41 | 0.000 | 3.153 | 0.000 | 565.25 | 469.58 | -314.73 | 0.000 | 0.000 |
| 930.00 | 88.70 | 328.88 | 445.09 | 0.000 | 3.052 | 0.000 | 595.23 | 495.26 | -330.23 | 0.000 | 0.000 |
| 960.00 | 88.70 | 328.88 | 445.77 | 0.000 | 2.956 | 0.000 | 625.20 | 520.94 | -345.72 | 0.000 | 0.000 |
| 990.00 | 88.70 | 328.88 | 446.45 | 0.000 | 2.867 | 0.000 | 655.17 | 546.63 | -361.21 | 0.000 | 0.000 |
| 1020.00 | 88.70 | 328.88 | 447.14 | 0.000 | 2.782 | 0.000 | 685.15 | 572.31 | -376.70 | 0.000 | 0.000 |
| 1050.00 | 88.70 | 328.88 | 447.82 | 0.000 | 2.703 | 0.000 | 715.12 | 597.99 | -392.19 | 0.000 | 0.000 |
| 1080.00 | 88.70 | 328.88 | 448.50 | 0.000 | 2.628 | 0.000 | 745.10 | 623.67 | -407.69 | 0.000 | 0.000 |
| 1110.00 | 88.70 | 328.88 | 449.18 | 0.000 | 2.557 | 0.000 | 775.07 | 649.35 | -423.18 | 0.000 | 0.000 |
| 1118.63 | 88.70 | 328.88 | 449.37 | 0.000 | 2.537 | 0.000 | 783.69 | 656.74 | -427.63 | 0.000 | 0.000 |

* 1. **Geothermal Gradient Data**

|  |  |  |  |
| --- | --- | --- | --- |
| **Ambient Temperature** | 27.000 °C | **Mudline Temperature** | °C |
| **Temperature @ Depth** | 33.000 °C @ 449.37 m | **Gradient** | 1.34 °C/100m |

# Schematics

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Well:** | 81 | **Wellbore:** | 81 | **Case:** | 2159 | **String Name:** | 215,9 мм |
|  |  |  |  |  |  |  |  |
| Schematic | | | | | | | |

# Torque & Drag Setup Data

* 1. **Settings**

|  |  |  |  |
| --- | --- | --- | --- |
| **Measured Depth of Bit** | 566.00 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** | 30.000 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** | 200.00 m | **End MD** | 566.00 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 | 0.30 |

* 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** | 75.74 tonne | using | 80.00% of yield |
| **Minimum Weight on Bit to Sinusoidal Buckle during a rotating on bottom operation** | 11.30 tonne | at | 190.57 m |
| **Minimum Weight on Bit to Helical Buckle during a rotating on bottom operation** | 11.67 tonne | at | 190.57 m |
| **Pick-Up Drag** | 3.28 tonne | | |
| **Slack-Off Drag** | 3.42 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 | 29.30 | 0.24 | 317.54 | 248.46 | 566.00 | 0.00 |
| Подъём |  |  |  |  |  |  |  | 0.0000 | 0.0 | 0.0 | 36.00 | 0.27 | 469.20 | 96.80 | 566.00 | 0.00 |
| Бурение ротором |  |  |  |  |  |  |  | 7.7435 | 0.6 | 0.2 | 26.73 | 0.22 | 294.52 | 271.48 | 322.65 | 243.35 |
| Бурение ГЗД |  |  |  |  |  |  |  | 0.0000 | 0.0 | 0.0 | 25.48 | 0.21 | 263.81 | 302.19 | 303.84 | 262.16 |
| Вращение над забоем |  |  |  |  |  |  |  | 2.5544 | 0.2 | 0.2 | 32.73 | 0.25 | 354.52 | 211.48 | 566.00 | 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 | 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** | 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** | 30.000 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 | 200.00 m | **End MD** | 566.00 m |
| Step Size | 9.30 m |  |  |

* 1. **Flow Rate (Q= 30.000 L/sec)**

### **Bit Parameters**

|  |  |  |  |
| --- | --- | --- | --- |
| **Pump Rate** | 30.000 L/sec | **Stand Pipe Pressure** | 89.4989 atm |
| **Bit Pressure Loss** | 12.8118 atm | **Percent Power at Bit** | 14.32 % |
| **Bit Hydraulic Power / Area (HSI)** | 0.9 hp/in² | **Bit Nozzle Velocity** | 44.19 m/s |
| **Bit Hydraulic Power** | 52.23 hp | **Bit Impact Force** | 162.22 kgf |
| **Surface Equip. Pressure Loss** | 6.8046 atm | **Total Bit Flow Area** | 1.052 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** |