Nodal Analysis - Engineering Report

Generated: 2025-11-23 19:49:42

Query: Nodal Analysis

I. Summary of Solution

Nodal Analysis Summary

Density: 1000.0 kg/m3 | Viscosity: 0.001 Pa.s | Roughness: 1e-05 m
Reservoir pressure: 230.0 bar | Wellhead pressure: 10.0 bar | PI: 5.0 m3/hr/bar
ESP depth: 500.0 m

Pump curve points: 5
Trajectory segments: 3

Operating point: Q=315.79 m3/hr, BHP=167.07 bar, Head=268.4 m

V. Supporting Sources

Source 1: pdfFiles/NLOG_GS_PUB_EOWR ADK-GT-01 SODM v1.1.pdf | Page: 15

Early
Valanginian to Barremian/ Early Aptian
Thuringian
Lower Permian (Saxonian)
Late Westphalia
"Diverse"
"Diverse"
Maassluis
Oosterhout
Oosterhout
Breda
Rupel
Rupel
Dongen
Dongen
Dongen
Landen
Ommelanden
Ommelanden
Texel
Holland
Holland
Holla
Vlieland
Zechstein 1 (Werra)
Slochteren
Slochteren
Ruurlo
Rupel Clay
Vessem
Asse
Brussels Sand

Ieper
B.D.T
Landen Clay
Ple
Texel Marlstone
Upper Holland Marl
Upper Holland Marl
Middle Holland Claystone
Lowe
Vlieland Claystone
Z1 Anhydrite
Z1 Copp
18/11/2017
19/11/2017
20/11/2017
25/11/2017
26/11/2017
26/11/2017
27/11/2017
28/11/2017
05/12/2017
06/12/2017
06/12/2017
07/12/2017
08/12/2017
09/12/2017
16/12/2017
21/1
22/12/2017
22/12/2017
2
24" Roller Cone Bit VG-1/HC; S/N: 5251002
24" Roller Cone Bit VG-1/HC; S/N: 5251002
24" Roller Cone Bit VG-1/HC; S/N: 5251002
17.5" Roller Cone Bit S/N: 5233668; IADC 415
17.5" Roller Cone Bit S/N: 5233668; IADC 415
17.5" Roller Cone Bit S/N: 5233668; IADC 415
17.5" Roller Cone Bit S/N: 5233668; IADC 415
17.5" Roller Cone Bit S/N: 5233668; IADC 415
12 1/4" PDC; Type: TD506FX/BHI; S/N: 7158723
12 1/4" PDC; Type: TD506FX/BHI; S/N: 7158723
12 1/4" PDC; Type: TD506FX/BHI; S/N: 7158723
12 1/4" PDC; Type: TD506FX/BHI; S/N: 7158723
12 1/4" PDC S/N: 7038898
8 1/2" PDC ; Type: TD 506X ; S/N: 7042273
Incl at 121.68 m
1.99 °
AZ : 282.46 °
TOT DEV: 2.11 m
TVD : 121.66 m
Incl at 158.88 m
1.52 °
AZ : 290.80 °
TOT DEV: 3.20 m
TVD : 158.84 m
Incl at 196.46 m
0.99 °
AZ : 290.28 °
TOT DEV: 4.04 m
TVD : 196.41 m
Incl at 233.84 m
0.83 °
AZ : 297.19 °
TOT DEV: 4.64 m
TVD : 233.78 m
Incl at 271.78 m
0.56 °
AZ : 299.26 °

TOT DEV: 5.08 m
TVD : 271.72 m
Incl at 308.47 m
0.96 °
AZ : 314.18 °
TOT DEV: 5.57 m
TVD : 308.41 m
Incl at 345.62 m
1.42 °
AZ : 289.01 °
TOT DEV: 6.38 m
TVD : 345.55 m
Incl at 382.83 m
2.11 °
AZ : 284.56 °
TOT DEV: 7.49 m
TVD : 382.74 m

Source 2: pdfFiles/NLOG_GS_PUB_EOWR ADK-GT-01 SODM v1.1.pdf | Page: 15

Early
Valanginian to Barremian/ Early Aptian
Thuringian
Lower Permian (Saxonian)
Late Westphalia
"Diverse"
"Diverse"
Maassluis
Oosterhout
Oosterhout
Breda
Rupel
Rupel
Dongen
Dongen
Dongen
Landen
Ommelanden
Ommelanden
Texel
Holland
Holland
Holla
Vlieland
Zechstein 1 (Werra)
Slochteren
Slochteren
Ruurlo
Rupel Clay
Vessem
Asse
Brussels Sand
Ieper
B.D.T
Landen Clay
Ple
Texel Marlstone
Upper Holland Marl
Upper Holland Marl
Middle Holland Claystone
Lowe
Vlieland Claystone
Z1 Anhydrite
Z1 Copp
18/11/2017
19/11/2017
20/11/2017
25/11/2017

26/11/2017
26/11/2017
27/11/2017
28/11/2017
05/12/2017
06/12/2017
06/12/2017
07/12/2017
08/12/2017
09/12/2017
16/12/2017
21/1
22/12/2017
22/12/2017
2
24" Roller Cone Bit VG-1/HC; S/N: 5251002
24" Roller Cone Bit VG-1/HC; S/N: 5251002
24" Roller Cone Bit VG-1/HC; S/N: 5251002
17.5" Roller Cone Bit S/N: 5233668; IADC 415
17.5" Roller Cone Bit S/N: 5233668; IADC 415
17.5" Roller Cone Bit S/N: 5233668; IADC 415
17.5" Roller Cone Bit S/N: 5233668; IADC 415
17.5" Roller Cone Bit S/N: 5233668; IADC 415
12 1/4" PDC; Type: TD506FX/BHI; S/N: 7158723
12 1/4" PDC; Type: TD506FX/BHI; S/N: 7158723
12 1/4" PDC; Type: TD506FX/BHI; S/N: 7158723
12 1/4" PDC; Type: TD506FX/BHI; S/N: 7158723
12 1/4" PDC S/N: 7038898
8 1/2" PDC ; Type: TD 506X ; S/N: 7042273
Incl at 121.68 m
1.99 °
AZ : 282.46 °
TOT DEV: 2.11 m
TVD : 121.66 m
Incl at 158.88 m
1.52 °
AZ : 290.80 °
TOT DEV: 3.20 m
TVD : 158.84 m
Incl at 196.46 m
0.99 °
AZ : 290.28 °
TOT DEV: 4.04 m
TVD : 196.41 m
Incl at 233.84 m
0.83 °
AZ : 297.19 °
TOT DEV: 4.64 m
TVD : 233.78 m
Incl at 271.78 m
0.56 °
AZ : 299.26 °
TOT DEV: 5.08 m
TVD : 271.72 m
Incl at 308.47 m
0.96 °
AZ : 314.18 °
TOT DEV: 5.57 m
TVD : 308.41 m
Incl at 345.62 m
1.42 °
AZ : 289.01 °
TOT DEV: 6.38 m
TVD : 345.55 m
Incl at 382.83 m
2.11 °
AZ : 284.56 °
TOT DEV: 7.49 m

TVD : 382.74 m

Source 3: pdfFiles/NLOG_GS_PUB_EOWR ADK-GT-01 SODM v1.1.pdf | Page: 15

flow rate (< 2000
l/min)
Final Depth: 2358
m (MD)
Purebore 1.03
kg/l
Ca. 10 m³/h dynamic
losses
Ca. 8 m³/h dynamic
losses
Total losses (dynamic)
between 225 m and 275
m ca. 88 m³
Purebore 1.04 kg/l
Purebore 1.07 kg/l
(incr.)
0.9 % of glycol
Losses (dynamic) in 24"
section ca. 88 m³
Static losses at 515 m
0.3 m³/h.
Purebore 1.14 kg/l
Glycol: 3 %
KCl: 110 kg/m³
NaCl: 11 kg/m³
Purebore 1.14 kg/l
Glycol: 3 %
KCl: 110 kg/m³
NaCl: 11 kg/m³
Purebore 1.16 kg/l
Glycol 3.1%
KCl: 108 kg/m³
NaCl: 27.5 kg/m³
Purebore 1.18 kg/l
(incr.)
Glycol 3.0%
KCl: 110 kg/m³
NaCl: 33 kg/m³
Purebore 1.18 kg/l
Glycol 3 %
KCl: 109 kg/m³
NaCl: 34 kg/m³
No losses in 17
1/2" section
Purebore 1.23 kg/l
Glycol 3 %
KCl: 97 kg/m³
NaCl: 47 kg/m³
Purebore 1.24 kg/l
Glycol 4 %
KCl:120 kg/m³
NaCl: 52 kg/m³
Purebore 1.25 kg/l
Glycol 4 %
KCl:121 kg/m³
NaCl: 64 kg/m³
Purebore 1.25 kg/l
Glycol 4 %
KCl:114 kg/m³
NaCl: 75 kg/m³
Purebore 1.30 kg/l
Glycol 4 %
KCl:114 kg/m³
NaCl: 103 kg/m³

Purebore 1.35 kg/l
Glycol 4 %
KCl:116 kg/m³
NaCl: 168 kg/m³
Drill In Fluid : 1.08 kg/l
Drill In Fluid : 1.08 kg/l
Bit #1, Run # 1
24" Roller Cone VG-1/HC; IADC 115
S/N: 52511001
1x20+3x22, TFA = 1.4205 in²
Gauge In
Flow in = 1470 l/min
SPP = 13 bar
Flow in = 1590 l/min
SPP = 23 bar
Flow in = 1550 l/min
SPP = 24.4 bar
Flow in = 1630 l/min
SPP = 35 bar
Flow in = 1900 l/min
SPP = 53 bar
Bit #2, Run # 1
17.5" Roller Cone; IADC 415
S/N: 5233668
3x20+1x22, TFA = 1.2916 in²
Flow in = 3000 l/min
SPP = 105 bar
Flow in = 3000 l/min
SPP = 115 bar
Flow in = 3030 l/min
SPP = 128 bar
Flow in = 3499 l/min
SPP= 140 bar
Flow in = 3460 l/min
SPP= 185 bar
Flow in = 3480 l/min
SPP= 191 bar
Flow in = 3500 l/min
SPP= 203 bar
Flow in = 3500 l/min
SPP= 222 bar
Flow in = 3548 l/min
SPP= 244 bar
Flow in = 3500 l/min
SPP= 261 bar
Flow in = 3500 l/min
SPP= 262 bar
Flow in = 3548 l/min
SPP= 273 bar
Flow in = 3450 l/min
SPP= 291 bar
Flow in = 3240 l/min
SPP= 301 bar
Bit #5, Run # 1
12.25" PDC
S/N: 7038898
6x18, TFA = 1.4916 in²

Source 4: pdfFiles/NLOG_GS_PUB_EOWR ADK-GT-01 SODM v1.1.pdf | Page: 15

flow rate (< 2000 l/min)
Final Depth: 2358 m (MD)

Purebore 1.03
kg/l
Ca. 10 m³/h dynamic
losses
Ca. 8 m³/h dynamic
losses
Total losses (dynamic)
between 225 m and 275
m ca. 88 m³
Purebore 1.04 kg/l
Purebore 1.07 kg/l
(incr.)
0.9 % of glycol
Losses (dynamic) in 24"
section ca. 88 m³
Static losses at 515 m
0.3 m³/h.
Purebore 1.14 kg/l
Glycol: 3 %
KCl: 110 kg/m³
NaCl: 11 kg/m³
Purebore 1.14 kg/l
Glycol: 3 %
KCl: 110 kg/m³
NaCl: 11 kg/m³
Purebore 1.16 kg/l
Glycol 3.1%
KCl: 108 kg/m³
NaCl: 27.5 kg/m³
Purebore 1.18 kg/l
(incr.)
Glycol 3.0%
KCl: 110 kg/m³
NaCl: 33 kg/m³
Purebore 1.18 kg/l
Glycol 3 %
KCl: 109 kg/m³
NaCl: 34 kg/m³
No losses in 17
1/2" section
Purebore 1.23 kg/l
Glycol 3 %
KCl: 97 kg/m³
NaCl: 47 kg/m³
Purebore 1.24 kg/l
Glycol 4 %
KCl:120 kg/m³
NaCl: 52 kg/m³
Purebore 1.25 kg/l
Glycol 4 %
KCl:121 kg/m³
NaCl: 64 kg/m³
Purebore 1.25 kg/l
Glycol 4 %
KCl:114 kg/m³
NaCl: 75 kg/m³
Purebore 1.30 kg/l
Glycol 4 %
KCl:114 kg/m³
NaCl: 103 kg/m³
Purebore 1.35 kg/l
Glycol 4 %
KCl:116 kg/m³
NaCl: 168 kg/m³
Drill In Fluid : 1.08 kg/l
Drill In Fluid : 1.08 kg/l
Bit #1, Run # 1
24" Roller Cone VG-

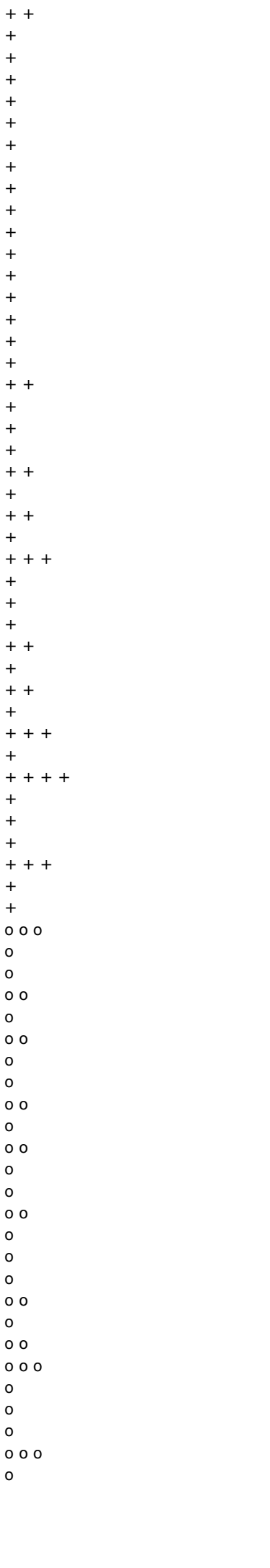
1/HC; IADC 115
S/N: 52511001
1x20+3x22, TFA =
1.4205 in²
Gauge In
Flow in = 1470 l/min
SPP = 13 bar
Flow in = 1590 l/min
SPP = 23 bar
Flow in = 1550 l/min
SPP = 24.4 bar
Flow in = 1630 l/min
SPP = 35 bar
Flow in = 1900 l/min
SPP = 53 bar
Bit #2, Run # 1
17.5" Roller Cone; IADC
415
S/N: 5233668
3x20+1x22, TFA =
1.2916 in²
Flow in = 3000 l/min
SPP = 105 bar
Flow in = 3000 l/min
SPP = 115 bar
Flow in = 3030 l/min
SPP = 128 bar
Flow in = 3499 l/min
SPP= 140 bar
Flow in = 3460 l/min
SPP= 185 bar
Flow in = 3480 l/min
SPP= 191 bar
Flow in = 3500 l/min
SPP= 203 bar
Flow in = 3500 l/min
SPP= 222 bar
Flow in = 3548 l/min
SPP= 244 bar
Flow in = 3500 l/min
SPP= 261 bar
Flow in = 3500 l/min
SPP= 262 bar
Flow in = 3548 l/min
SPP= 273 bar
Flow in = 3450 l/min
SPP= 291 bar
Flow in = 3240 l/min
SPP= 301 bar
Bit #5, Run # 1
12.25" PDC
S/N: 7038898
6x18, TFA = 1.4916 in²

Source 5: pdfFiles/NLOG_GS_PUB_EOWR ADK-GT-01 SODM v1.1.pdf | Page: 15

Flow in = 3500 l/min
SPP= 262 bar
Flow in = 3548 l/min
SPP= 273 bar
Flow in = 3450 l/min
SPP= 291 bar
Flow in = 3240 l/min
SPP= 301 bar
Bit #5, Run # 1
12.25" PDC
S/N: 7038898
6x18, TFA = 1.4916 in²

Flow in = 3430 l/min
SPP= 300 bar
Bit # 6, Run # 1
8.5 " PDC
S/N: 7042273
6x14, TFA = 0.902 in²
Flow in = 2446 L/min
SPP= 142 bar
Flow in=2527 l/min
SPP=152 bar
+
+ +
+
+
+
+ +
+
+ +
+
+ +
+
+
+
+
+
+ +
+
+
+ +
+
+ +
+
+
+
+
+
+ +
+
+
+
+
+
+
+ +
+
+
+
+
+ +
+
+
+
+
+ +
+
+ + +
+
+
+ + +
+
+
+ + +
+
+
+ + +
+
+

+ +
+
+
+
+ + +
+
+
+
+ +
+
+ +
+
+ +
+
+ +
+
+ + +
+
+
+ + +
+
+ +
+
+ + +
+
+
+ + +
+
+ +
+
+
+
+
+ +
+
+ +
+
+ +
+
+
+
+
+
+ +
+
+
+ +
+
+
+
+ +
+
+
+
+
+
+ +
+
+ +
+
+
+
+ +
+
+ +
+



o
o o o
o
o
o o
o
o
o
o
o o o
o
o
o o
o
o
o o
o
o o
o
o o
o
o
o o o
o
o o
o
o
o o o
o
o
o o o
o
o
o o o
o
o
o o o
o
o
o o o
o
o
o o o
o
o
o o o
o
o
o o
o
o o o
o
o o o
o
o
o o o
o
o
o o o
o
o
o o o
o
o
o o o
o
o
o o o
o
o
o o o
o
o
o

o
o
o o
o
o
o o o
o
o
o o o
o
o
o o o
o
o
o o o
o
o
o o
o
o o o
o
o
o o
o
o o o
o
o
o
o
o
o o o
o
o
o
o o
o
o o o
o
o
o
o
o
o
o
o o
o
o o
o
o o
o
o o o
o
o
o o
o
o
o o
o
o
o
o
o
o
o
o o o
o
o
o

o
o
o
o
o
o
o o
o
o o
o
o o o
o
o
* * *
*
*
* * *
*
*
* *
*
* *
*
* * *
*
*
* *
*
* * *
*
*
*
* * *
*
*
* * *
*
*
* *
*
* *
*
* *
*
* *
*
*
*
* *
*
* *
*
*
*
* * *
*
* *
*
* *
*
* * * *
*
*
* * *
*
*
* * *
*
*

```
****
*
*
*
****
*
*
*
***
*
***
*
*
***
*
****
*
*
*
****
*
*
*
***
*
*
***
*
*
***
*
*
*
*
****
*
*
*
****
*
*
*
***
*
*
***
*
*
***
*
*
***
*
*
***
*
***
*
**
*
***
*
*
*
*
**
*
**
```

*
***
*
*
*
*
*
*
**
*
***
*
***
*
**
*
****
*
*
*
**
*
**
*
*
*
*
*
**
*
***
*
*
*
**
*
*
**
***
*
*
*
***
*
*
***
*
*
***
*
*
***
*
*
****
*
*
*
10
20
10
20
10
20
10
20
50
100

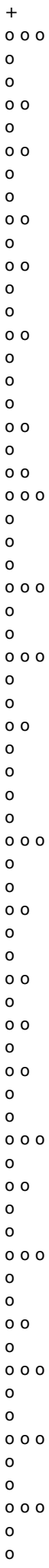
150
200
50
100
150
200
50
100
150
200
50
100

Source 6: pdfFiles/NLOG_GS_PUB_EOWR ADK-GT-01 SODM v1.1.pdf | Page: 15

Flow in = 3500 l/min
SPP= 262 bar
Flow in = 3548 l/min
SPP= 273 bar
Flow in = 3450 l/min
SPP= 291 bar
Flow in = 3240 l/min
SPP= 301 bar
Bit #5, Run # 1
12.25" PDC
S/N: 7038898
6x18, TFA = 1.4916 in²
Flow in = 3430 l/min
SPP= 300 bar
Bit # 6, Run # 1
8.5 " PDC
S/N: 7042273
6x14, TFA = 0.902 in²
Flow in = 2446 L/min
SPP= 142 bar
Flow in=2527 l/min
SPP=152 bar
+
+ +
+
+
+
+ +
+
+ +
+
+ +
+
+
+
+
+ +
+
+
+ +
+
+ +
+
+
+
+
+ +
+
+
+
+

+
+
+
+ +
+
+
+
+
+ +
+
+
+
+
+ +
+
+ + +
+
+
+ + +
+
+
+ + +
+
+
+ + +
+
+
+ +
+
+
+
+ + +
+
+
+ +
+
+ +
+
+ +
+
+ +
+
+ + +
+
+
+ + +
+
+ +
+
+ + +
+
+
+ + +
+
+ +
+
+
+
+
+ +
+
+ +
+
+ +
+
+
+

+
+
+
+ +
+
+
+ +
+
+
+
+ +
+
+
+
+
+
+
+ +
+
+ +
+
+
+
+ +
+
+ +
+
+ +
+
+
+
+
+
+
+
+
+
+
+
+
+
+
+
+ +
+
+
+
+ +
+
+ +
+
+ + +
+
+
+
+ +
+
+ +
+
+ + +
+
+ + + +
+
+
+
+ + +
+



o o o
o
o
o o o
o
o
o o o
o
o
o o
o
o o o
o
o o o
o
o
o o o
o
o
o o o
o
o
o o o
o
o
o o o
o
o
o o
o
o o o
o
o
o o
o
o o o
o
o
o
o
o
o o o
o
o
o
o o
o
o o o
o
o
o
o

o
o
o
o o
o
o o
o
o o
o
o o o
o
o
o o
o
o
o o
o
o
o
o
o
o
o
o o o
o
o
o
o
o
o
o
o
o
o o
o
o o
o
o o o
o
o
* * *
*
*
* * *
*
*
* *
*
* *
*
* * *
*
*
* *
*
* * *
*
*
*
* * *
*
*
* * *
*
*
* *
*
* *

```
*
**
*
**
*
*
*
**
*
**
*
*
***
*
**
*
**
*
****
*
*
***
*
*
***
*
*
****
*
*
*
***
*
***
*
*
***
*
****
*
*
*
****
*
*
*
***
*
*
***
*
*
***
*
*
*
*
****
*
*
*
****
*
*
```

*
***
*
*
***
*
*
***
*
*
***
*
*
***
*
***
*
**
*
***
*
*
*
*
**
*
**
*
***
*
*
*
*
*
**
*
***
*
***
*
**
*
****
*
*
*
**
*
**
*
*
*
*
*
**
*
***
*
*
*
**
*
*
**
***
*
*

```
*
***
*
*
***
*
*
***
*
*
***
*
*
****
*
*
*
```

```
10
20
10
20
10
20
10
20
50
100
150
200
50
100
150
200
50
100
150
200
50
100
```