NLW-GT-03

Niederlande

Technical Log, 1:1000

Mudlogging:

GEO SERVICE GmbH

Client:

Client: Trias Westland B.V.
Operator: Trias Westland B.V.

Project:

Borehole Section: NLW-GT-03
Well Name: NLW_GT-03

Location:

Country: Niederlande
Region or oilfield: Trias Westland B.V.
Location: NLW-GT-04
Concession:

Coordinates:

Longitude / Latitude: E 4° 14' 22.20" N 51° 59' 23.00"
Ordnance Survey Map:
Elev. well head / KB: 0.00 m / 8.60 m

Well Type:

Production/exploitation well

Duration:

Spud: 11.07.2020
Start depth (Tie-in) 0.00 m
Total depth: 0.00 m

Rig:

DrillTec VDD 200.1 Compact
DrillTec GUT GmbH

Team:

Company Man: John Boeijen; Mark de Jong; Chris van Vulpen, Johan Schutte, Jack Schelvis
Toolpusher: Frank Rektorik; Ype Jousma
Project- and operations geologist: Charlotte de Wijkerslooth
Wellsite geologist: Julien Smeulders

Mudlogging:

GeoService GmbH
Kreuzstraße 19
D-26603 Aurich
Germany
dirks@geoservice.de
Mudloggers: F. Hinz; M. Dostmann; C. Mantey; L. Borchers; D. Schläpfer

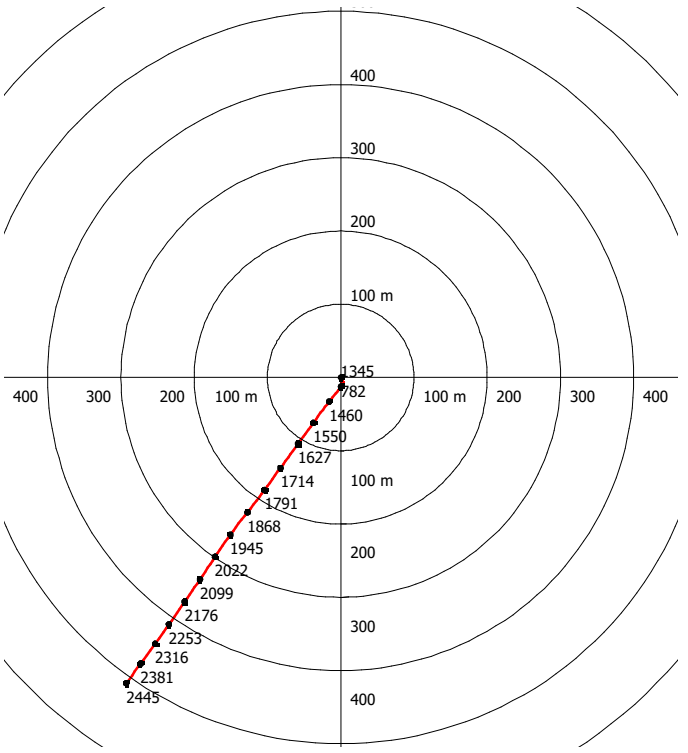
Service:

Fluid Services: Halliburton Baroid
Mud Engineers: Patrick William Huizen, Adrian Gurnett, Katarzyna Sliwa, Bernd Schulte

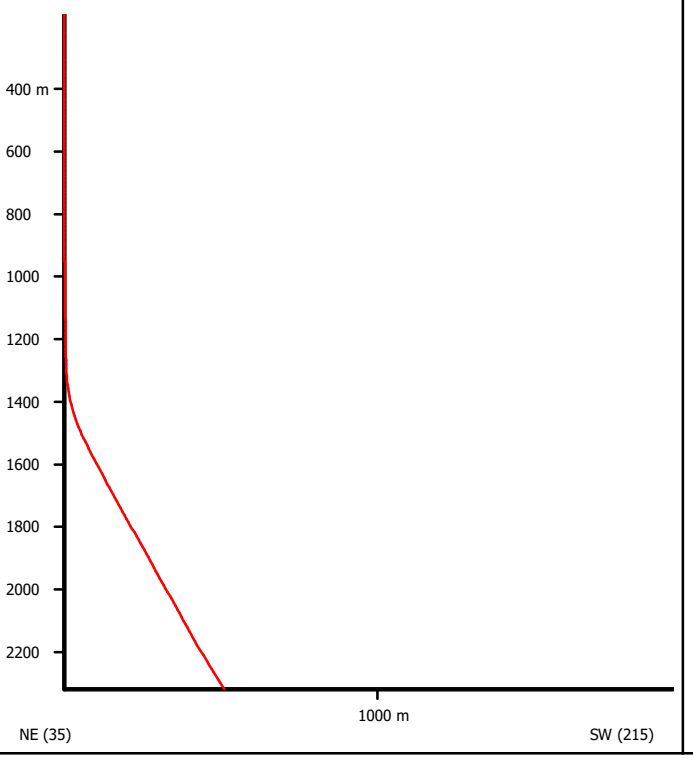
Remarks:

Print Date: 05.08.2020 00:21

H-Projection



V-Projection



Clastic sediments

Greensand, Sand, Sandstone, Silt, Siltstone, Claystone, Flint

Carbonates and Biogenic sediments

Chalk, Limestone, Limestone, marly, Shell beds, Marl (-stone), Marl, argillaceous, Coal

Artificial

Cement, Mud Additives, No sample

Accessories

Argillaceous, Calcareous, Calcite, Carbonaceous, Flint, Glauconite, Laminated, Marly, Mica (unspec.), Pyrite, Quartz, Sandy, Silty

Fossils

Bryozoans, Echinoids, Fish, Foraminifera, Fossiliferous

Inoceramus, Ostracods, Shell fragments, Sponges

Framework

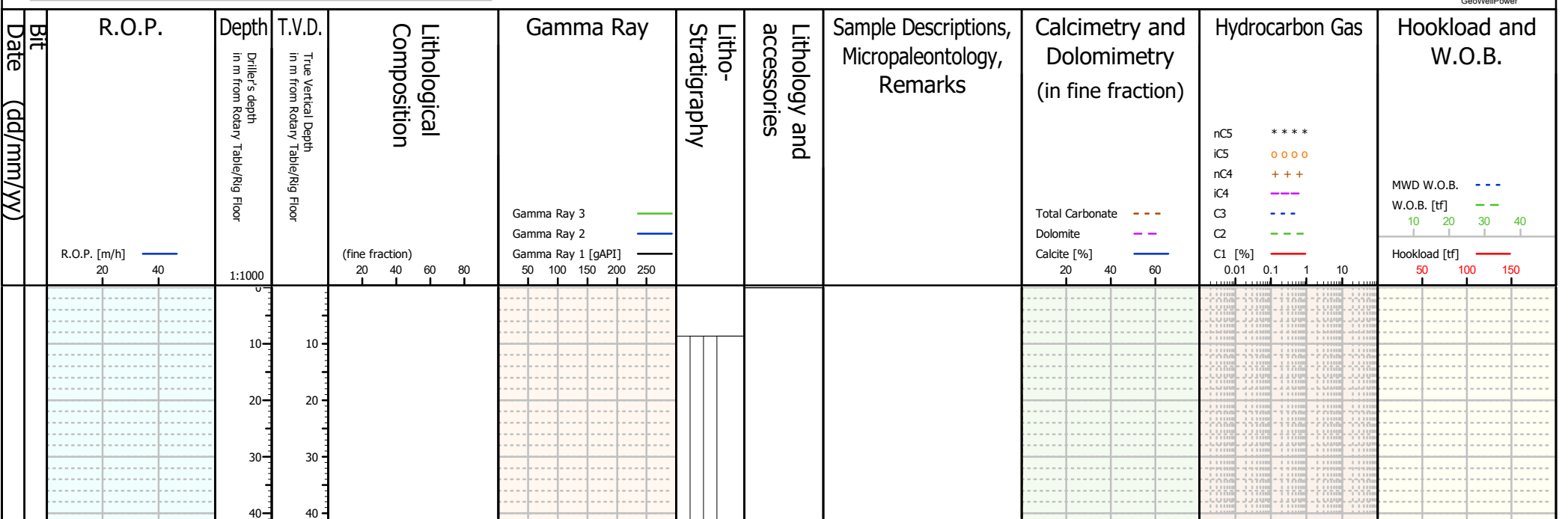
Lime-Mudstone, Lime-Wackestone, Lime-Grainstone, Microcrystalline, Crystalline, Matrix-supported

Technical symbols

Casing shoe, Liner head, Sidewall core, (unrecovered), Hydrocarbon show, Gains, Losses, FIT or leakoff test, Directional drilling

Vertical axis is measured depth.

GEOdata GeoWellPower



20" Conductor shoe
@ 133 m

Incl at 163.60 m
0.10 °
AZ : 39.10 °
TOT DEV: 0.14 m
TVD : 163.60 m

Incl at 220.00 m
0.10 °
AZ : 95.40 °
TOT DEV: 0.22 m
TVD : 220.00 m

Incl at 308.40 m
0.00 °
AZ : 35.30 °
TOT DEV: 0.28 m
TVD : 308.40 m

Incl at 359.80 m
0.10 °
AZ : 324.50 °
TOT DEV: 0.22 m
TVD : 359.80 m

Incl at 411.10 m
0.20 °
AZ : 156.20 °
TOT DEV: 0.21 m
TVD : 411.10 m

24" Varel Rock Bit S/N:1637217
11/07/2020

24" Varel Rock Bit S/N:1637217
12/07/2020

"Diverse"
Holocene - Pleistocene
Upper North Sea
Quaternary

Maassluis
Early Pleistocene
Upper North Sea
Quaternary

Oosterhout
Pliocene
Upper North Sea
Tertiary

Breda
Miocene

Sand, light grey to light brownish grey, fine to medium grained, moderately to well sorted, silty, unconsolidated; quartz grains milky translucent to colourless clear, occasionally light grey-green, orange-brown and pale reddish shaded, angular to subangular, rounded to subrounded. Acc.: mica, glauconite (dark green to black), shell fragments.
Some content of cement in the first sample near conductor shoe, later decreasingly (off white to whitish grey, very calcareous) and some mud additives.

Sand, light grey, also light brownish grey, fine grained, well sorted, increasingly silty, micaceous, slightly glauconitic, unconsolidated; quartz grains milky translucent to colourless clear, occasionally light yellow and pale red, orange.
Silt, light brownish grey, micromicaceous, unconsolidated. Acc.: mica, glauconite, abundant shell fragments, foraminifers, coaly detritus, wood fragments.

Sand, light grey to light brownish grey, generally fine grained and well sorted, mainly as previously described.
Furthermore some **Silt**, light brownish grey, occasionally ochre, micromicaceous, unconsolidated to firm, partly argillaceous and occ grading to very silty Clay.
Acc.: mica flakes, dark green to black glauconite, pyrite, abundant shell fragments, sponge needles, sea urchins, foraminifers.

Sand, light grey, fine grained, well sorted, silty, slightly glauconitic, unconsolidated; quartz grains milky to clear.
Moreover some **Silt**, pale greenish grey and pale brownish grey, crumbly, partially grading to very silty Claystone.
Acc.: decreasingly shell fragments, mica, glauconite, pyrite, fossil remains.

Argillaceous Marl, light grey to light brownish grey, very sandy, silty, generally soft, partly sticky, occ grading to **Marly Clay** and **Silt**.
Additionally alternating abundant **Sand**, light grey, fine grained, rarely medium grained, commonly well sorted, micaceous, slightly glauconitic.
Acc.: mica, glauconite, pyrite, foraminifers, rarely shell fragments and wooden fossil fragments, also some coal detritus.

Calcareous to **argillaceous marl**, grey to green-grey and brown, sandy, silty, glauconitic, micaceous, friable to firm; fine grained sand as before, with greensand, fine to medium grained, marly; to the bottom increasingly claystone, brown grey, sandy, silty, micaceous, firm. Acc.: pyrite aggregates, glauconite, mica, foraminifers, rarely coal detritus.

GeoService
gas measurement
system
tested completely
with Test-Gas
prior to spud-in.

Spud Mud 1.02 kg/l

KCl 1.05 kg/l

24" Varel Rock Bit S/N:1637217
12/07/2020

Incl at 462.30 m
0.00 °
AZ : 108.40 °
TOT DEV: 0.17 m
TVD : 462.30 m

Incl at 513.50 m
0.00 °
AZ : 354.30 °
TOT DEV: 0.13 m
TVD : 513.50 m

Incl at 565.00 m
0.10 °
AZ : 44.60 °
TOT DEV: 0.11 m
TVD : 565.00 m

Incl at 616.10 m
0.10 °
AZ : 352.30 °
TOT DEV: 0.13 m
TVD : 616.10 m

24" Varel Rock Bit S/N:1637217
13/07/2020

Incl at 667.40 m
0.20 °
AZ : 134.80 °
TOT DEV: 0.22 m
TVD : 667.40 m

Incl at 705.90 m
0.20 °
AZ : 61.10 °
TOT DEV: 0.32 m
TVD : 705.90 m

Incl at 757.10 m
0.50 °
AZ : 76.80 °
TOT DEV: 0.49 m
TVD : 757.10 m

Incl at 808.00 m
0.40 °
AZ : 163.10 °
TOT DEV: 0.70 m
TVD : 808.00 m

24" Varel Rock Bit S/N:1637217
13/07/2020

Tertiary
Oligocene (Chattian - Rupelian)
Middle North Sea
Rupel
Rupel Clay

Tertiary
Middle to La
Early to Middle Eocene (Ypresian - Lutetian)
Lower North Sea
Dongen
Asse
Brussels Sand

Tertiary
Early Eocene (Ypresian)
Lower North Sea
Dongen
Ieper

Tertiary
Late Paleocene (Thanetian)
Landen
Landen Clay

Cretaceous
Late Paleocene (Danian)
Chalk
Ekofisk

Upper Cretaceous (Ma

Argillaceous marlstone, light brown, light brownish grey, silty, micaceous, firm.

Claystone, grey-green, brown, sandy, silty, glauconitic, firm; with decreasing amount of fine grained, **glauconitic sand**, quartz grains milky to clear, subangular, well sorted. Acc.: mica, glauconite, pyrite, foraminifers.

Claystone, light grey, to the bottom light brownish grey, silty, occasionally slight sandy with very fine grained sand, firm to moderately hard. Acc.: mica, glauconite, pyrite, foraminifers.

Claystone, light to medium brownish grey to greyish brown, at the top of interval in places rarely also very pale greenish grey shaded (if wet), silty, commonly non calcareous, generally homogeneous, mainly firm to moderately hard, blocky. Sectionwise occasionally low amount of **Siltstone**, light grey, fine sandy, occ weak calcareous. Acc.: mica, pyrite, very rarely traces glauconite, occ. foraminifers.

Claystone, generally light to medium grey, just in traces at top and later decreasingly very pale brown shaded, occ silty, firm to moderately hard, micromicaceous, non to rarely weak calcareous. Additionally low percentage of **Marlstone**, light grey, firm. Moreover in the upper part occasionally some **Sandstone**, milled to loose quartz grains, colourless clear to light greyish translucent.

Claystone, light to medium grey, also light brown, silty, slightly micromicaceous and occasionally calcareous, firm to moderately hard. Abundant marlstone, light grey to grey white, friable to firm. Acc.: pyrite, mica.

Limestone, creme white, microcrystalline, predominantly arenitic and slightly glauconitic, also micritic, marly, blocky, splintery, moderately hard to hard; in layers abundant flintstone, brownish grey to dark grey, partly translucent, splintery, sharp edged, very hard. Subordinated claystone, light to dark grey, brownish grey, silty, micromicaceous, splintery, hard. Acc.: pyrite, calcite, fossil debris (foraminifers, echinoderms, inoceramus fragments).

Limestone, white to off white, microcrystallin, micritic, blocky, moderately hard. Increasing amount of **Chalk**, white, off white, occasionally creme white, micritic, porous, crumbly, friable, brittle; abundant flintstone, light to dark grey, brownish grey, translucent, splintery, sharp edged, very hard. Subordinated some claystone, light brownish grey, occasional silty, micromicaceous, firm to moderately hard. Acc.: pyrite, fossil debris.

Chalk, white, off white, micritic, crumbly, friable, as previously described.
Additionally abundant **Chert**, light to dark grey, milky translucent and opaque light brownish, generally splintery fragments, very hard.
Decreasingly versus depth some

KCl 1.11 kg/l

14/07/2020

20/07/20

21/07/2020

16" Varel PDC S/N:6024723

22/07/2020

16" Varel PDC S/N:6024723

23/07/2020

Incl at 859.60 m
0.50 °
AZ : 150.60 °
TOT DEV: 0.95 m
TVD : 859.60 m

Incl at 897.50 m
0.50 °
AZ : 152.40 °
TOT DEV: 1.21 m
TVD : 897.49 m

20" Casing shoe @ 904 m

Incl at 948.10 m
0.80 °
AZ : 178.90 °
TOT DEV: 1.65 m
TVD : 948.09 m

Incl at 999.20 m
0.80 °
AZ : 173.70 °
TOT DEV: 2.21 m
TVD : 999.19 m

Incl at 1050.30 m
0.90 °
AZ : 189.20 °
TOT DEV: 2.82 m
TVD : 1050.28 m

Incl at 1101.60 m
0.90 °
AZ : 178.20 °
TOT DEV: 3.66 m
TVD : 1101.58 m

Incl at 1152.90 m
1.00 °
AZ : 166.40 °
TOT DEV: 4.55 m
TVD : 1152.87 m

Incl at 1204.20 m
1.90 °
AZ : 164.40 °
TOT DEV: 5.79 m
TVD : 1204.15 m

Cretaceous
Chalk
Maastrichtian - Turonian)
Ommelanden

Upper Cretaceous (Maastrichtian - Turonian)
Ommelanden

Cretaceous
Chalk
Ommelanden
Upper Cretaceous (Maastrichtian - Turonian)

Cretaceous
Chalk
Ommelanden
Upper Cretaceous (Maastrichtian - Turonian)

Cretaceous
Chalk
Cenomanian
Texel
Texel Greensand

Limestone, grey white, brownish white to light brown, dolomitic, micro- to fine crystalline, splintery, hard.
Acc.: pyrite, rarely glauconite, foraminifers and fossil debris.

Glauconitic Sandstone, pale greenish grey, fine - coarse grained, poorly sorted; quartz grains a friable, chalky to marly matrix.

Sandstone, grey white, fine - coarse grained, poorly sorted; quartz grains cemented in a calcareous and partly calcitic matrix, hard, partly milled to loose grains.

24" Section TD @ 907 m (MD)

Chalk, as previously described, rarely marly, occasionally with flintstone/chert, dark grey, somewhat light brown, very hard. Decreasing amount of **cement** from drilling 20" casing shoe track.
Acc.: abundant pyrite and loose quartz grains (milky, yellowish, coarse grained, rounded to subrounded), less glauconite (dark green), euhedral calcite.

Chalk, grey white, micritic, marly, occasionally sandy, dissolution seams (enrichment of pyrite and sheet silicates), porous, streaky, milled with abundant fossil debris, creme white (inoceramus fragments, foraminifers, echinoderms); subordinated (calcareous) marlstone, light grey, light brownish grey, silty, firm.
Acc.: pyrite (often euhedral, partly fragmented crystals), glauconite, occasionally loose coarse and fine grained quartz (as before).

Chalk, as described before, micritic and microcrystalline, abundant fossil fragments. Marlstone, as before, somewhat grey to dark grey, enriched in pyrite. Subordinated euhedral calcite crystals (rhombohedral) and calcite crystal fragments, mainly translucent to milky, 1 to 3 mm in size (abundant in sample 1040 m, 1050 m).

Chalk, light grey, white to off-white, micritic, arenitic, marly, laminated with dissolution seams. To the bottom marlstone, light to dark grey, silty, partly laminated, moderately hard. Subordinated sandstone, loose grains, very fine to coarse grained, translucent, milky, yellowish, subrounded to subangular. Acc.: pyrite (as before), glauconite (dark green, fine and medium grained), calcite, fossil fragments (shells, ostracods, foraminifers, spines of sea urchins).

Chalk, off white, grey white, streaky grey, micritic, partly arenitic, marly, porous, crumbly, friable; increasing content of **chert**, light grey to light brownish grey, white to translucent, splintery, sharp edged, very hard; subordinated marlstone, light to dark grey, brownish grey, silty, platy, occasionally laminated, firm.
Acc.: pyrite, fossil debris (inoceramus fragments, foraminifers).

Chalk and **chert** with euhedral calcite and fragments of calcite crystals.

Drop of gamma curve due to changed mud properties (less KCL)

severe WBM losses started @ 1191 m (MD)

Sandstone, light grey, very fine to fine grained, medium grained, silty, glauconitic, quartz grains milky, translucent, subangular to subrounded, silty matrix, partly calcareous; abundant glauconite, green, dark green, very fine, fine to medium grained. **Siltstone** light to medium grey, micaceous, glauconitic, sandy, firm to moderately hard. Acc.: mica, glauconite.

Glauconitic sandstone, fine to medium grained, decreasing grain size downward, varying amount of

KCl 1.17 kg/l

KCl 1.18 kg/l

KCl 1.22 kg/l

KCl 1.24 kg/l, mud conditioning to < 1.20 kg/l

24/07/2020

16" Varel PDC S/N:6024723

Incl at 1253.90 m
2.10 °
AZ : 156.70 °
TOT DEV: 7.40 m
TVD : 1253.83 m

Incl at 1306.60 m
3.70 °
AZ : 200.00 °
TOT DEV: 9.42 m
TVD : 1306.48 m

Incl at 1357.80 m
8.90 °
AZ : 215.40 °
TOT DEV: 13.80 m
TVD : 1357.36 m

Incl at 1409.10 m
13.80 °
AZ : 219.30 °
TOT DEV: 22.69 m
TVD : 1407.66 m

25/07/2020

16" Varel PDC S/N:6024723

Incl at 1447.40 m
17.60 °
AZ : 220.50 °
TOT DEV: 32.47 m
TVD : 1444.52 m

Incl at 1498.90 m
23.90 °
AZ : 215.90 °
TOT DEV: 50.26 m
TVD : 1492.67 m

Incl at 1550.20 m
26.40 °
AZ : 215.90 °
TOT DEV: 72.37 m
TVD : 1538.90 m

Incl at 1601.50 m
27.70 °
AZ : 216.90 °
TOT DEV: 95.72 m
TVD : 1584.54 m

26/07/2020

1250 1260 1270 1280 1290 1300 1310 1320 1330 1340 1350 1360 1370 1380 1390 1400 1410 1420 1430 1440 1450 1460 1470 1480 1490 1500 1510 1520 1530 1540 1550 1560 1570 1580 1590 1600 1610 1620 1630 1640

20 40

50 100 150 200 250

R increase related to mudchange @1275 m

MWD problems

Cretaceous

Rijnland

Lower Cretaceous (Late Albian)

Upper Holland Marl Member

Holland

Middle Holland Claystone Member

Holland

Holland Greensand Member

Holland

Late Aptian to Early Albian

Rijnland

Early Albian

Rijnland

Cretaceous

Siltstone to fine grained **sandstone**, as described before. Increasing amount of **marlstone**, light to medium grey (calcareous), somewhat dark grey (argillaceous), silty to sandy, micaceous, firm. Acc. pyrite, glauconite, euhedral calcite, chert (cavings).

Marlstone, light grey to grey, brownish grey, as described before; also calcareous marlstone to marly limestone, off-white, light grey-white, laminated, chalky, friable to firm. Also **siltstone** (as described before) and **mud additives**. Acc.: foraminifers, glauconite, pyrite, euhedral calcite, loose rounded calcite and quartz grains, chert fragments (cavings).

Marlstone, predominant greenish grey, grey, less light grey marlstone, calcareous, silty to sandy, increasing amount of glauconite, silty to very fine grained, dark green. Subordinated siltstone to sandstone, loose quartz grains, very fine to fine grained, occasionally medium grained, translucent to milky, subrounded to subangular. Acc.: pyrite, glauconite (fine grained, dark green).

Calcareous and **argillaceous marlstone**, greenish medium grey (dark grey), silty to sandy, friable to firm, abundant glauconite, very fine to medium grained, dark green. **Glauconitic sandstone**, loose quartz grains, translucent (milky), very fine to fine grained, silty, subangular to angular. Acc.: pyrite, glauconite (fine and medium grained), fossil fragments.

Claystone, dark grey (medium grey), somewhat marly, silty, firm, sericitic, content increases. Glauconitic sandstone and less marlstone, as described before, varying glauconite content (very fine to fine grained).

Successions as described before, also brown **sandstone**, yellowish brown, fine grained quartz, predominant subangular, well sorted, predominant grain-supported, marly, partly quartzitic, hard to very hard.

Claystone, as described before, partly very silty and sandy. Increasing content of **sandstone**, loose quartz grains, translucent, milky, yellowish, very fine to fine grained, rarely medium grained.

Alternate bedding of **Claystone**, dark grey, firm to hard, silty, very sandy, micromicaceous, slightly calcareous and **Sandstone**, light grey, very fine grained, partly glauconitic, pyritic, firm. Quartz grains clear, milky, yellowish. Acc.: pyrite, glauconite.

Claystone, dark grey, firm to hard, silty, very sandy, micromicaceous, slightly calcareous. Acc.: pyrite, glauconite.

Alternating beds of predominant **claystone** and **marlstone**. Claystone, as described before, increasingly marly. Marlstone, medium grey, very silty and sandy, micaceous, partly argillaceous, friable, firm. Subordinated sandstone, loose very fine to fine grained quartz, translucent, milky, yellowish, subrounded to angular. Acc.: pyrite, glauconite, mud additives.

KCl 1.14 kg/l

Mudchange from WBM to OBM @ 1275 m (MD)

OBM 1.08 kg/l

20 40 60

0.01 0.1 1 10

10 20 30 40

50 100 150

OBM 1.08 kg/l

27/07/2020

Incl at 1652.60 m
27.80 °
AZ : 216.10 °
TOT DEV: 119.50 m
TVD : 1629.75 m

28/07/2

Incl at 1701.40 m
28.10 °
AZ : 216.20 °
TOT DEV: 142.24 m
TVD : 1672.92 m

16" Varel PDC S/N:60234761

Incl at 1752.90 m
28.80 °
AZ : 215.30 °
TOT DEV: 166.84 m
TVD : 1718.15 m

Incl at 1803.90 m
29.30 °
AZ : 216.90 °
TOT DEV: 191.73 m
TVD : 1762.65 m

29/07/2020

Incl at 1855.30 m
30.10 °
AZ : 217.80 °
TOT DEV: 217.02 m
TVD : 1807.38 m

Incl at 1906.40 m
30.20 °
AZ : 217.20 °
TOT DEV: 243.02 m
TVD : 1851.35 m

16" Varel PDC S/N:60234761

Incl at 1957.80 m
28.80 °
AZ : 215.30 °
TOT DEV: 268.28 m
TVD : 1896.10 m

Incl at 2009.10 m
28.70 °
AZ : 214.50 °
TOT DEV: 292.65 m
TVD : 1941.24 m

30/07/2020

1620 1650 1630 1660 1640 1670 1650 1680 1660 1690 1670 1700 1680 1710 1690 1720 1700 1730 1710 1740 1720 1750 1730 1760 1740 1770 1750 1780 1760 1790 1770 1800 1780 1810 1790 1820 1800 1830 1810 1840 1820 1850 1830 1860 1840 1870 1850 1880 1860 1890 1870 1900 1880 1910 1890 1920 1900 1930 1910 1940 1920 1950 1930 1960 1940 1970 1950 1980 1960 1990 1970 2000 1980 2010 1990 2020 2000 2030 2040

Rijnland
Cretaceous
Holland
Early Aptian
Lower Holland Marl

Increasing amount of **marlstone**, light grey to greenish grey, as described before; occasionally calcareous marlstone, yellowish light brown, off-white to grey, laminated, silt to sandy, somewhat glauconitic (very fine grained), friable. Claystone, as before, subordinated light grey, firm, fissile.

Calcareous and **argillaceous marlstone**, light and medium grey, greenish grey, laminated, micromicaceous, silty to sandy, friable to firm. Subordinated claystone, as described before, often dark grey, slaty cleavage. Acc.: pyrite, loose quartz grains (very fine to fine grained, translucent to milky, predominant subangular), mud additives.

Claystone (to argillaceous marlstone), grey, light grey to medium grey, dark grey, laminated, blocky, calcareous, micromicaceous, silty, sandy, firm. **Sandstone**, light grey to brownish grey, very fine grained, argillaceous, glauconitic, firm; mostly milled to translucent or milky quartz grains, well sorted, angular to subrounded, rarely round. Acc.: pyrite, glauconite, mud additives.

Rijnland
Cretaceous
Late Barremian to Early Aptian
Vlieland Sandstone
De Lier Sandstone

Sandstone, predominant grey, light and dark grey, greenish grey, very fine to fine grained, very silty, predominant matrix-supported fabric, argillaceous to marly, micaceous, some glauconite, firm to hard. Subordinated sandstone, brown, light brown to dark reddish brown, very fine to fine grained; predominant grain-supported, yellowish marly to calcareous matrix; medium hard to very hard. **Claystone** and somewhat **argillaceous marlstone**, as described before. Acc.: pyrite, mud additives.

Claystone with horizons of sandstone (as described before). Claystone, partly argillaceous marlstone, medium to dark grey, greenish grey, laminated, very silty to sandy, micaceous, often friable (to firm). Acc.: abundant light mica flakes, pyrite, loose quartz grains (as before), fragments of clay ironstone (yellowish brown), mud additives.

Sandstone light grey, seldom dark brown, reddish brown or yellowish brown, very fine to fine grained, well sorted, angular to subangular, rarely subrounded, glauconitic, argillaceous (grey), marly to calcareous matrix (grey and brown), firm: mostly milled to translucent or milky quartz grains. **Claystone**, grey to dark grey, blocky, partly marly, micromicaceous, silty, sandy, firm to hard. Acc.: pyrite, glauconite, clay ironstone, mud additives.

MWD problems

OBM 1.11 kg/l
OBM 1.11 kg/l
OBM 1.12 kg/l
OBM 1.14 kg/l

50 100 150 200 250
20 40 60
0.01 0.1 1 10
10 20 30 40
50 100 150

16" Varel PDC S/N:60234761
31/07/2020
01/08/2020
16" Varel PDC S/N:60234761
02/08/2020

Incl at 2059.00 m
29.10 °
AZ : 214.50 °
TOT DEV: 316.66 m
TVD : 1984.99 m

Incl at 2111.40 m
29.30 °
AZ : 214.40 °
TOT DEV: 342.33 m
TVD : 2030.66 m

Incl at 2162.90 m
28.10 °
AZ : 213.70 °
TOT DEV: 366.76 m
TVD : 2076.00 m

Incl at 2214.20 m
29.30 °
AZ : 214.90 °
TOT DEV: 391.34 m
TVD : 2121.03 m

Incl at 2265.60 m
30.60 °
AZ : 214.30 °
TOT DEV: 417.06 m
TVD : 2165.52 m

Incl at 2316.40 m
31.20 °
AZ : 215.80 °
TOT DEV: 443.09 m
TVD : 2209.15 m

Incl at 2368.00 m
31.40 °
AZ : 216.40 °
TOT DEV: 469.85 m
TVD : 2253.26 m

Incl at 2419.30 m
31.50 °
AZ : 216.90 °
TOT DEV: 496.49 m
TVD : 2297.10 m

1970 2050 1980 2060 1990 2070 2000 2080 2010 2090 2020 2100 2030 2110 2040 2120 2050 2130 2060 2140 2070 2150 2080 2160 2090 2170 2100 2180 2110 2190 2120 2200 2130 2210 2140 2220 2150 2230 2160 2240 2170 2250 2180 2260 2190 2270 2200 2280 2210 2290 2220 2300 2230 2310 2240 2320 2250 2330 2260 2340 2270 2350 2280 2360 2290 2370 2300 2380 2310 2390 2440 2410 2420

MWD problems

Cretaceous
Late Barremian
Vlieland Sandstone
Vlieland Clay
Rijnland
Cretaceous
Late Barremian
Vlieland Sandstone
Vlieland Clay
Rijnland
Cretaceous
Late Hauterivian to Mid Barremian
Vlieland Sandstone
Berkel Clastics
Rijswijk
Vlieland
Hauterivi
Late Valanginian to Early Hauterivian
Nieuwerkerk
Rodenrijs Claystone
Schieland
Cretaceous
Valanginian
Nieuwerkerk
Delft Sandstone

Alternating beds of **sandstone** and **claystone**, as described before. Acc.: glauconite, pyrite.

Sandstone and **claystone,** as before, also **calcareous claystone** to marlstone, light grey, off-white, laminated, dissolution seams enriched in opaque phases incl. coal and pyrite, very silty to sandy, micaceous, friable to hard. Acc.: shell fragments, glauconite (fine grained, dark green), pyrite.

Lithology as previously described, increasingly calcareous, abundant **coal** in calcareous claystone to marlstone, coal fragments < 2.5. mm in size, black, shiny, partly blocky, soft to friable.

Sandstone, light grey, occasionally medium to dark grey or brown, quartz very fine to finegrained, translucent, milky, grey, subangular to angular, well sorted, predominant marly matrix, silty, micaceous, some glauconitic, fine lignitic matter. Gradual transitions from marly sandstone to very sandy and silty calcareous claystone, as described before, less coal fragments.

Sandstone, light grey, also yellowish white, fine grained, argillaceous, micaceous, firm; mostly milled to translucent or milky, seldom grey, quartz grains, well sorted, angular to subrounded, calcareous matrix and **Claystone**, grey to dark grey, blocky, glauconitic, micromicaceous, silty, sandy, friable to moderately hard. Acc. glauconite and pyrite.

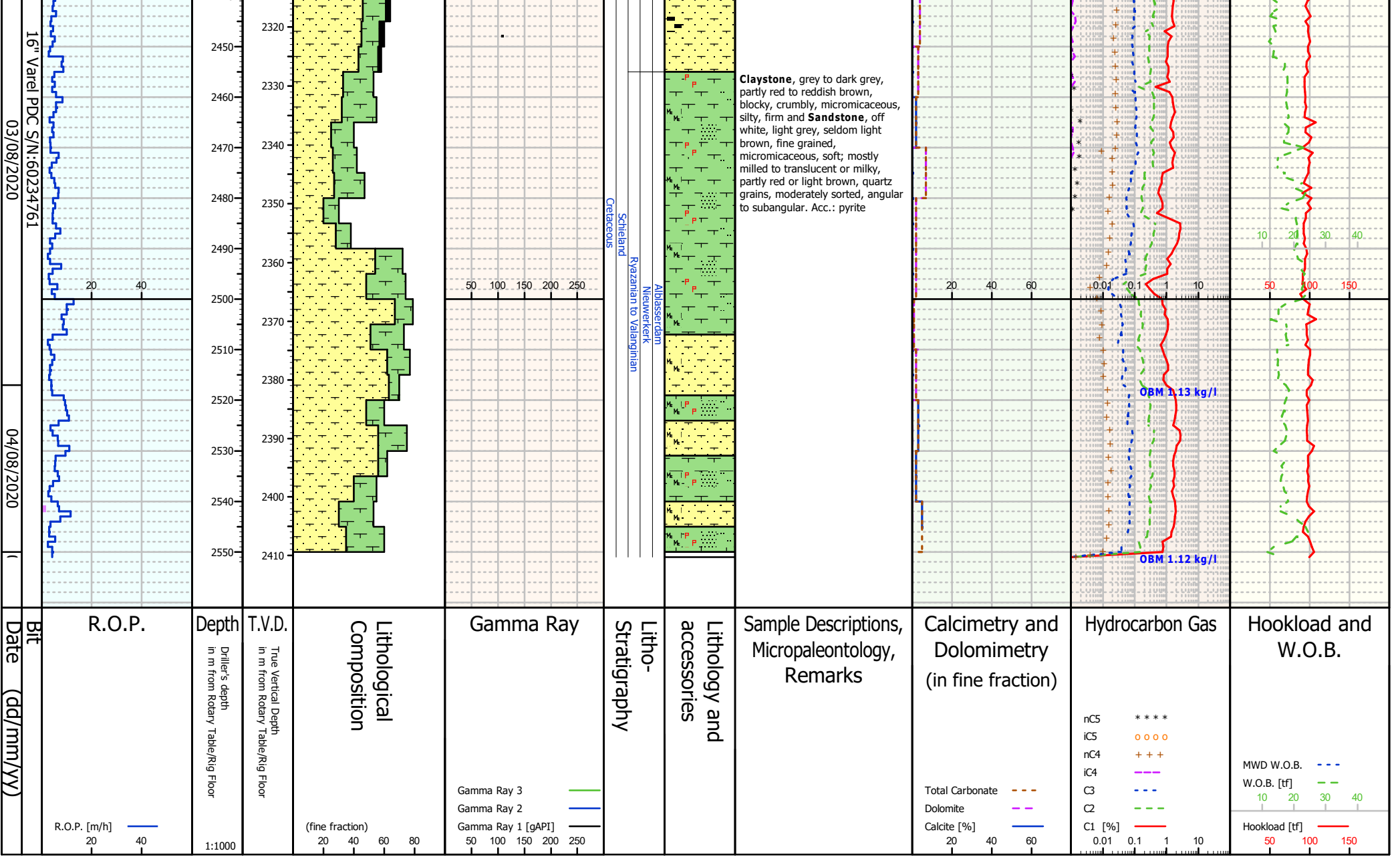
Sandstone, light grey to medium grey, fine to medium grained, argillaceous, micromicaceous, soft; mostly milled to milky, seldom translucent, quartz grains, fairly sorted, angular to subangular, calcareous matrix and **Claystone** as described before.

Claystone, grey to dark grey, crumbly, blocky, slightly calcareous, micromicaceous, silty, firm to hard. Acc.: pyrite.

Claystone, turns more dark grey, as described before and **Sandstone**, light grey to grey, seldom off white, seldom light brown, fine grained, argillaceous, micaceous, firm; partly milled to translucent or milky, seldom ochre, quartz grains, poorly sorted, angular to subangular, calcareous matrix. Acc.: pyrite, shall fragments.

Sandstone, light grey to medium grey, quartz grains milky white to translucent, fine to course grained, subangular to subrounded, moderately sorted. Acc.: **Coal/Lignite**, black, glossy, brittle.

OBM 1.13 kg/l
Degaser failure
OBM 1.13 kg/l
OBM 1.13 kg/l
OBM 1.13 kg/l


16" Varel PDC S/N:60234761
03/08/2020
04/08/2020
Bit
Date (dd/mm/yy)
R.O.P.
R.O.P. [m/h]
20
40
Depth
Driller's depth
in m from Rotary Table/Rig Floor
1:1000
2320
2450
2330
2460
2340
2470
2350
2480
2360
2490
2370
2500
2380
2510
2390
2520
2400
2530
2410
2540
2550
T.V.D.
True Vertical Depth
in m from Rotary Table/Rig Floor
Lithological Composition
(fine fraction)
20
40
60
80
Gamma Ray
50
100
150
200
250
Gamma Ray 3
Gamma Ray 2
Gamma Ray 1 [gAPI]
Litho-Stratigraphy
Cretaceous
Schieland
Ryazanian to Valanginian
Nieuwerkerk
Alblasserdam
Lithology and accessories
Sample Descriptions, Micropaleontology, Remarks
Claystone, grey to dark grey, partly red to reddish brown, blocky, crumbly, micromicaceous, silty, firm and Sandstone, off white, light grey, seldom light brown, fine grained, micromicaceous, soft; mostly milled to translucent or milky, partly red or light brown, quartz grains, moderately sorted, angular to subangular. Acc.: pyrite
Calcimetry and Dolomimetry
(in fine fraction)
20
40
60
Total Carbonate
Dolomite
Calcite [%]
Hydrocarbon Gas
nC5
iC5
nC4
iC4
C3
C2
C1 [%]
0.01
0.1
1
10
OBM 1.13 kg/l
OBM 1.12 kg/l
Hookload and W.O.B.
10
20
30
40
50
100
150
MWD W.O.B.
W.O.B. [tf]
Hookload [tf]