



## Generell informasjon

|                            |               |
|----------------------------|---------------|
| Litostrat. enhet           | ROTLIEGEND GP |
| NPDID for litostrat. enhet | 136           |
| Nivå                       | GROUP         |

## Nivå under

## Beskrivelse

### Rotliegend Group

#### Name

An old German mining term referring to the ore-free, frequently red-coloured rocks of continental origin (New Red) beneath the Kupferschiefer (Copper Shale).

#### Type area

Well [7/3-1](#) (Amoco/Noco) ([Fig 1.5-8](#)), and well [17/4-1](#) (Petronord) ([Fig 1.11](#)), illustrate the lithology of the Rotliegend Group in the Norwegian sector.

#### Thickness

The thickness of the Rotliegend is quite variable, with a maximum in UK waters of over 525 m in well UK 29/18-1. There are few complete penetrations of the Rotliegend Group in Danish and Norwegian waters with maximum penetrations of 380 m reached in well [2/1-7](#) and 369 m in Elna-1; in neither well was the base Rotliegend reached. Other penetrations in Norwegian wells are 293m in well [7/3-1](#), 218m in [2/7-31](#).

#### Lithology

The Rotliegend Group consists of a sequence of clays, shales, sandstones and minor conglomerates deposited in a continental environment. Volcanic rocks including tuffaceous sediments are common in the lower part. The sediments are frequently red, and diagnostic floras are rare resulting in poor chronostratigraphic control. In well [7/3-1](#) the rocks are described as a continental red-bed sequence of reddish brown, very fine grained sandstone, argillaceous in part, with variable amounts of siliceous and carbonate cements. Dark, red micaceous non-calcareous shales are interbedded with the sandstone and become more common towards the base where the whole section becomes finer grained. In well [17/4-1](#) rocks of probable Rotliegend age include conglomerate with pebbles of quartzite, gneiss, acid volcanic rocks and mica schist in a well-cemented argillaceous and sandy matrix.

#### Boundaries

The Rotliegend Group normally rests on metamorphic basement, Devonian or Carboniferous rocks. It is mostly overlain by the thin Kupferschiefer (Copper Shale) and the Zechstein Group. There is a clear log break when passing from the arenaceous sediments of the Rotliegend Group into the Zechstein carbonates and evaporites or the highly radioactive Kupferschiefer which is developed at the Zechstein base in some wells.

#### Age

Early Permian.



### Distribution

Although the group has been penetrated in a few wells it is thought to be extensive in the southern part of the Norwegian North Sea, being missing only on local structural highs. Most of these sedimentary rocks are confined within the central North Sea, Inner Moray Firth basin and South Viking Graben areas, and far to the north in the Unst basin. Although Rotliegend sandstones are present in the South Viking Graben, they are absent on the adjacent Utsira High and Horda Platform, in the western part of the Danish central Graben, and along the northern rim of the Mid North Sea - Ringkøbing-Fyn High. On the east side of the South Viking Graben, the whole of the pre-Zechstein sedimentary sequence comprises undated sandstones and conglomerates assigned by the well operators to the Rotliegend Group, although these coarse-grained clastics could have been deposited during the Carboniferous or Devonian, for instance [16/1-3](#), [17/4-1](#) and [25/10-2R](#).

### Depositional environment

Continental red-beds (aeolian, fluvial, lacustrine – sabkha) and locally extensive acid volcanics.

### Subdivision

In the Norwegian sector no subdivision of the group is made.

### Compiled from

- Deegan, C. E. and Scull, B. J. (compilers) 1977: A standard lithostratigraphic nomenclature for the Central and Northern North Sea. UK Institute of Geological Sciences, Report 77/25. The Norwegian Petroleum Directorate, NPD-Bulletin No. 1, 36 pp.
- Glennie, K. W., Higham, J. and Stemmerik, L. Permian. 91 – 103 in: Evans, D., Graham, C., Armour, A. and Bathurst, P. (editors and coordinators) 2003: The Millennium Atlas: petroleum geology of the central and northern North Sea. The Geological Society of London, 389 pp.

### Brønnbaner som penetrerer

| Brønnbane navn           | Dato for boreslutt | Topp dyp [m] | Bunn dyp [m] |
|--------------------------|--------------------|--------------|--------------|
| <a href="#">1/3-5</a>    | 11.02.1985         | 4769         | 4850         |
| <a href="#">2/1-7</a>    | 06.03.1985         | 5084         | 5464         |
| <a href="#">2/4-17</a>   | 29.02.1992         | 4520         | 5258         |
| <a href="#">2/4-20</a>   | 14.03.2008         | 5631         | 5719         |
| <a href="#">2/4-22 S</a> | 22.02.2015         | 4830         | 4889         |
| <a href="#">2/6-6 S</a>  | 18.01.2019         | 3680         | 3843         |
| <a href="#">2/7-2</a>    | 02.03.1971         | 3875         | 3964         |
| <a href="#">2/7-29</a>   | 06.01.1994         | 4853         | 4900         |
| <a href="#">2/7-31</a>   | 09.06.1999         | 4750         | 4968         |
| <a href="#">2/9-2</a>    | 04.09.1979         | 4316         | 4367         |
| <a href="#">2/9-3</a>    | 14.12.1989         | 4670         | 4859         |
| <a href="#">2/9-4</a>    | 04.07.2008         | 5450         | 5500         |
| <a href="#">2/9-5 S</a>  | 18.09.2014         | 3556         | 3671         |
| <a href="#">2/10-1 S</a> | 23.04.1976         | 4297         | 4529         |
| <a href="#">2/10-2</a>   | 25.04.1993         | 4128         | 4164         |



## Faktasider Stratigrafi

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|                            |            |      |      |
|----------------------------|------------|------|------|
| <a href="#">2/12-1</a>     | 12.03.1987 | 4684 | 4795 |
| <a href="#">3/5-1</a>      | 28.06.1978 | 3103 | 3426 |
| <a href="#">3/7-2</a>      | 20.06.1981 | 4166 | 4330 |
| <a href="#">3/7-11 S</a>   | 27.05.2019 | 3790 | 3893 |
| <a href="#">3/8-1</a>      | 29.12.2010 | 4021 | 4070 |
| <a href="#">6/3-2</a>      | 10.03.1986 | 4045 | 4091 |
| <a href="#">7/3-1</a>      | 10.06.1969 | 4406 | 4692 |
| <a href="#">8/10-3</a>     | 06.10.2010 | 5398 | 5738 |
| <a href="#">9/4-5</a>      | 01.08.2006 | 5279 | 5838 |
| <a href="#">11/5-1</a>     | 12.09.2007 | 1322 | 1920 |
| <a href="#">15/9-9</a>     | 14.07.1981 | 3014 | 3044 |
| <a href="#">15/9-16</a>    | 24.08.1982 | 3068 | 3120 |
| <a href="#">15/12-3</a>    | 22.12.1980 | 4392 | 4450 |
| <a href="#">16/1-2</a>     | 07.08.1976 | 2808 | 2912 |
| <a href="#">16/1-3</a>     | 27.09.1982 | 3230 | 3440 |
| <a href="#">16/1-16</a>    | 07.12.2012 | 2671 | 2722 |
| <a href="#">16/1-29 S</a>  | 03.06.2018 | 1912 | 1915 |
| <a href="#">16/2-7</a>     | 01.09.2011 | 2244 | 2500 |
| <a href="#">16/2-13 A</a>  | 29.09.2012 | 2658 | 2693 |
| <a href="#">16/2-13 S</a>  | 30.08.2012 | 1955 | 2035 |
| <a href="#">16/2-16</a>    | 12.12.2012 | 2165 | 2214 |
| <a href="#">16/3-5</a>     | 07.03.2013 | 1967 | 2050 |
| <a href="#">16/3-7</a>     | 08.11.2013 | 2000 | 2089 |
| <a href="#">16/3-8 A</a>   | 01.04.2014 | 2069 | 2132 |
| <a href="#">16/3-8 S</a>   | 16.03.2014 | 2060 | 2109 |
| <a href="#">16/4-1</a>     | 18.11.1984 | 2621 | 2885 |
| <a href="#">16/4-11</a>    | 01.04.2018 | 2069 | 2475 |
| <a href="#">16/7-2</a>     | 30.03.1982 | 3117 | 3146 |
| <a href="#">16/7-3</a>     | 27.07.1982 | 2859 | 3141 |
| <a href="#">16/8-3 S</a>   | 01.05.2013 | 3015 | 3261 |
| <a href="#">17/4-1</a>     | 26.08.1968 | 3834 | 3997 |
| <a href="#">17/12-2</a>    | 09.10.1973 | 2293 | 2300 |
| <a href="#">25/10-2 R</a>  | 08.07.1972 | 3014 | 3152 |
| <a href="#">25/10-4 R</a>  | 13.06.1981 | 2363 | 2550 |
| <a href="#">25/10-8</a>    | 07.04.1997 | 2601 | 2653 |
| <a href="#">25/10-15 S</a> | 02.08.2016 | 2668 | 2696 |
| <a href="#">25/11-28</a>   | 25.09.2015 | 2229 | 2574 |

### Brønnbaner med kjerner



| Brønnbane navn            | Dato for boreslutt | Øjernelengde [m] |
|---------------------------|--------------------|------------------|
| <a href="#">1/3-5</a>     | 11.02.1985         | 9                |
| <a href="#">2/1-7</a>     | 06.03.1985         | 30               |
| <a href="#">2/7-2</a>     | 02.03.1971         | 9                |
| <a href="#">2/7-29</a>    | 06.01.1994         | 19               |
| <a href="#">2/7-31</a>    | 09.06.1999         | 41               |
| <a href="#">2/10-2</a>    | 25.04.1993         | 12               |
| <a href="#">3/7-2</a>     | 20.06.1981         | 9                |
| <a href="#">6/3-2</a>     | 10.03.1986         | 2                |
| <a href="#">7/3-1</a>     | 10.06.1969         | 47               |
| <a href="#">9/4-5</a>     | 01.08.2006         | 19               |
| <a href="#">15/9-9</a>    | 14.07.1981         | 11               |
| <a href="#">15/12-3</a>   | 22.12.1980         | 9                |
| <a href="#">16/2-7</a>    | 01.09.2011         | 27               |
| <a href="#">16/2-13 A</a> | 29.09.2012         | 11               |
| <a href="#">16/2-13 S</a> | 30.08.2012         | 17               |
| <a href="#">16/4-11</a>   | 01.04.2018         | 8                |
| <a href="#">17/4-1</a>    | 26.08.1968         | 3                |
| <a href="#">25/10-2 R</a> | 08.07.1972         | 34               |