



General information

Lithostrat. unit	ROTLIEGEND GP
NPDID lithostrat. unit	136
Level	GROUP

Level below

Lithostrat. unit

Description

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.

Wellbores penetrating

Wellbore name	Wellbore completion date	Top depth [m]	Bottom depth [m]
1/3-5	11.02.1985	4769	4850
2/1-7	06.03.1985	5084	5464
2/4-17	29.02.1992	4520	5258
2/4-20	14.03.2008	5631	5719
2/4-22 S	22.02.2015	4830	4889
2/6-6 S	18.01.2019	3680	3843
2/7-2	02.03.1971	3875	3964
2/7-29	06.01.1994	4853	4900
2/7-31	09.06.1999	4750	4968
2/9-2	04.09.1979	4316	4367
2/9-3	14.12.1989	4670	4859
2/9-4	04.07.2008	5450	5500
2/9-5 S	18.09.2014	3556	3671
2/10-1 S	23.04.1976	4297	4529
2/10-2	25.04.1993	4128	4164



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

Wellbores with cores



Wellbore name	Wellbore completion date	Core length [m]
1/3-5	11.02.1985	9
2/1-7	06.03.1985	30
2/7-2	02.03.1971	9
2/7-29	06.01.1994	19
2/7-31	09.06.1999	41
2/10-2	25.04.1993	12
3/7-2	20.06.1981	9
6/3-2	10.03.1986	2
7/3-1	10.06.1969	47
9/4-5	01.08.2006	19
15/9-9	14.07.1981	11
15/12-3	22.12.1980	9
16/2-7	01.09.2011	27
16/2-13 A	29.09.2012	11
16/2-13 S	30.08.2012	17
16/4-11	01.04.2018	8
17/4-1	26.08.1968	3
25/10-2 R	08.07.1972	34