



General information

Lithostrat. unit	RØYE FM
NPDID lithostrat. unit	138
Level	FORMATION
Lithostrat. unit, parent	TEMPELFJORDEN GP

Level below

Lithostrat. unit

Description

Røye Formation

Name

From the Norwegian name for the Arctic Char (*Salvelinus alpinus*).

Definition

The type section is defined as the interval from 1745.4 m to 1623.5 m in well [7128/6-1](#) located on the Finnmark Platform ([Fig 9.53](#)). The base of the formation is there characterised by a marked increase in the gamma ray log response, and a corresponding decrease in both density and interval transit time based on the density and sonic logs. This represents the transition from tight limestones of the underlying [Isbjørn Formation](#) to silicified deposits in the basal part of the Røye Formation ([Fig 9.54](#)).

Reference sections

Reference sections are defined:

In Loppa High well [7120/1-1 R2](#), with formational base at 2997 m on the [Ulv Formation](#); this well shows an interfingering of the Røye and [Ørret](#) formations, with typical Røye lithofacies occurring from 2997 m to 2604 m and from 2458 m to 2430 m ([Fig 9.51](#), [9.55](#)).

In Loppa High well [7121/1-1 R](#) with formational base on the [Isbjørn Formation](#) at 3502 m and direct contact with Triassic shales at 2993 m ([Fig 9.56](#)).

In [7228/9-1 S](#) from 4065 m to 3966 m on the northern margins of the Finnmark Platform ([Fig 9.57](#)), resting on the [Isbjørn Formation](#).

In well [7120/1-1 R2](#), the formational base at 2997 m is characterised by a slight increase in both gamma ray and sonic log response ([Fig 9.55](#)). This well's interfingering of the Røye and [Ørret](#) formations shows that the transition from the [Ørret](#) back into the Røye Formation at 2458 m displays a marked decrease in both gamma ray response and density, reflecting the transition back from silicified fine-grained siliciclastics to limestone.

Thickness

The formation is 122 m thick in the type well [7128/6-1](#) on the central Finnmark Platform. It thins to 19 m in core 7128/12-U-01 further to the south. Along the northern margins of the platform, the formation is 99 m thick in well [7228/9-1 S](#) and less than 70 m thick in [7229/11-1](#). It thickens north of the Nordkapp Basin to 230 m in [7124/3-1](#) on the Bjarmeland Platform and to its thickest development of 509 m in reference well [7121/1-1 R](#) on the southeastern Loppa High; 421 m of Røye Formation occur in the interfingering development found in [7120/1-1 R2](#) further west on the high. Our tentative interpretations of wells [7120/12-2](#) and [7120/12-4](#) on the southern margins of the Hammerfest Basin suggest a very complex interfingering of possible Røye and [Ørret](#) formation representatives, the former showing a total of up to about 150 m in several intercalations ([Fig 9.58](#)); more data are however needed from this area to confirm this interpretation.

Lithology

Silicified sediments dominate the Røye Formation as the result of early silicification processes that were sourced by abundant silica sponge spicules. On the eastern Finnmark Platform, the lower part of the Røye Formation consists of dark grey to black, silicified calcareous claystone with minor pyrite and traces of organic material (e.g. 1745.4 to 1728 m in well [7128/6-1](#); (Fig 9.54). The lithology of the lower part of the formation changes somewhat toward the Loppa High where it is characterised by interbedded silicified marls, silty carbonate mudstone and calcareous claystone with some thin beds of spiculitic cherts (e.g. 3177 to 2860 m in well [7120/1-1 R2](#)). The relative proportion of these facies varies laterally and spiculitic chert dominates well [7228/9-1 S](#) (4064-4014 m) whereas the basal part of the formation in well [7121/1-1 R](#) (3502-3367 m) is dominated by silicified silty carbonate mudstone. The upper part of the formation consists of interbedded spiculite, spiculitic chert, silicified bioclastic, bryozoan-dominated limestone (wackestone to grainstone), silicified carbonate mudstone, silicified marl and calcareous claystone (e.g. 3367 to 2993 m in [7121/1-1 R](#), 3800 to 3671 m in [7124/3-1](#) and 1688 to 1569 m in [7128/4-1](#)). The silicified limestone is best developed on the Loppa High (reference wells [7120/1-1 R2](#) and [7121/1-1 R](#)) and on the eastern Finnmark Platform ([7128/4-1](#), 7128/12-U-01 and 7129/10-U-01, (Fig 9.59). The spiculitic deposits show variable clay and dolomitic lime mud content. These rocks are mainly tight, with no apparent porosity; however, on inner parts of the Finnmark Platform white to light grey porous spiculites are present in wells [7128/4-1](#), [7128/6-1](#) and 7128/12-U-01 (Fig 9.60, 9.61a, 9.61b) – the porosities apparently reflecting secondary solution processes.

Lateral extent and variation

The formation forms a laterally continuous unit at the base of the [Tempelfjorden Group](#) from the eastern Finnmark Platform and westward to the Loppa High. In the southern Hammerfest Basin the formation is less clearly developed, but as mentioned above, our interpretation suggests several units, each 30 to 100 m thick, interbedded with sediments herein assigned to the [Ørret Formation](#). The Røye Formation thins toward the east and updip on the Finnmark Platform. Local thinning is also seen above carbonate buildups of the underlying [Bjarmeland Group](#) (see e.g. well [7229/11-1](#)), (Fig 9.51).

Age

Cores from 7128/12-U-01 and 7129/10-U-01 suggest a ?Kungurian to Kazanian – (? Tatarian) age (Mangerud 1994; Bugge et al. 1995).

Depositional environments

The lower part of the formation represents distal marine, low-energy deep shelf to basinal conditions established during and after major initial transgression. On the Loppa High and inner parts of the Finnmark Platform bryozoan-dominated, low relief carbonate platforms prevailed. The middle to upper parts of the formation represent distal marine, moderate to deep shelf conditions affected by periodic high-energy storm episodes which reworked the sediments, but with a normal depositional environment characterised by a very rich siliceous sponge fauna. Carbonate ramps were still situated on the Loppa High and inner parts of the Finnmark Platform. On the Loppa High in well [7121/1-1 R](#) the upper part of the formation reflects initial transgression with deposition of deep shelf spiculites succeeded by carbonate platform deposits. Towards the crest of the Loppa High the formation was truncated by late Permian uplift and erosion.

Source

- Larssen, G. B., Elvebakk, G., Henriksen, L. B., Kristensen, S. E., Nilsson, I., Samuelsberg, T. J., Svånå, T. A., Stemmerik, L. and Worsley, D. 2002: Upper Palaeozoic lithostratigraphy of the Southern Norwegian Barents Sea. NPD-Bulletin No. 9, 69 pp.

Wellbores penetrating



Wellbore name	Wellbore completion date	Top depth [m]	Bottom depth [m]
7120/1-1	15.11.1985	2430	2458
7120/1-1 R	26.12.1985	2430	2458
7120/1-1 R	26.12.1985	2604	2610
7120/1-1 R2	21.07.1986	2430	2458
7120/1-1 R2	21.07.1986	2604	2997
7120/1-3	07.10.2013	2281	2542
7120/1-4 S	03.08.2014	2314	2520
7120/1-5	07.05.2017	2242	2527
7120/9-2	20.10.1984	4956	5072
7120/12-2	11.09.1981	3920	3975
7120/12-2	11.09.1981	4031	4076
7120/12-2	11.09.1981	4485	4558
7120/12-4	16.04.1984	1469	1502
7120/12-4	16.04.1984	1648	1688
7120/12-4	16.04.1984	1700	1728
7120/12-4	16.04.1984	2003	2118
7121/1-1 R	23.08.1986	2993	3502
7124/3-1	20.10.1987	3670	3900
7128/4-1	26.02.1994	1569	1704
7128/6-1	08.11.1991	1623	1745
7130/4-1	08.01.2016	2055	2231
7132/2-2	07.04.2019	3454	3528
7221/4-1	01.12.2020	1565	1570
7222/1-1	02.08.2016	2195	2400
7225/3-1	25.09.2011	3771	3931
7226/11-1	11.04.1988	3966	4103
7228/9-1 S	07.05.1990	3966	4065
7229/11-1	15.12.1993	3901	3970
7234/6-1	19.07.2021	3758	3880
7321/8-1	03.09.1987	3398	3482

Wellbores with cores

Wellbore name	Wellbore completion date	Core length [m]
7120/1-3	07.10.2013	50
7120/1-4 S	03.08.2014	105
7120/1-5	07.05.2017	152
7120/12-4	16.04.1984	7



7121/1-1 R	23.08.1986	2
7128/4-1	26.02.1994	2
7128/6-1	08.11.1991	59
7130/4-1	08.01.2016	41
7321/8-1	03.09.1987	1