



### General information

|                        |              |
|------------------------|--------------|
| Lithostrat. unit       | ZECHSTEIN GP |
| NPDID lithostrat. unit | 194          |
| Level                  | GROUP        |

### Level below

|                                   |
|-----------------------------------|
| Lithostrat. unit                  |
| <a href="#">KUPFERSCHIEFER FM</a> |

### Description



## **Zechstein Group**

### **Name**

An old German mining term referring to the sediments of several saline rock cycles above the Kupferschiefer (Copper Shale).

### **Type area**

Well [7/3-1](#) (Amoco/Noco) and well [17/4-1](#) (Petronord) ([Fig 1.9-11](#)). illustrate the lithology of the Zechstein Group in the Norwegian sector.

### **Thickness**

The Zechstein Group is very variable in thickness, partly as a result of post-depositional salt movements (halokinesis). The succession possibly exceeds 1500 m in thickness in central parts of the Norwegian-Danish Basin.

### **Lithology**

Evaporates and carbonates with local clastic rocks. Halites dominate the basin-centre sequences, while limestones, dolomites and anhydrites prevail along the basin margins. Well [17/4-1](#) shows a thick halite-rich section which is not significantly distorted by halokinesis. The top and bottom boundaries of the Zechstein Group is conformable in this well and the cyclic nature of Zechstein deposition recognised in Germany and the Southern North Sea Basin can also be tentatively recognised.

### **Boundaries**

The Zechstein Group rests on arenaceous sediments of the [Rotliegend Group](#) or crystalline basement.

The Zechstein Group is overlain mostly by Triassic sedimentary rocks. Adjacent to the North Sea graben system where Late Jurassic uplift resulted in erosion, Permian rocks are covered by strata ranging in age up to Late Cretaceous or Paleocene.

### **Age**

Late Permian.

### **Distribution**

Zechstein sedimentary rocks are widespread over the Norwegian-Danish Basin, but are absent east and north of the Utsira High and over the Mid North Sea and Ringkøbing-Fyn highs.

### **Depositional environment**

Marine.

### **Subdivision**

In the Norwegian sector no subdivision of the group is made. The only possible exception is the basal unit, the Kupferschiefer (Copper Shale), which is thin but appears to be developed uniformly throughout the North Sea.

### **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.

## **Wellbores penetrating**



| Wellbore name            | Wellbore completion date | Top depth [m] | Bottom depth [m] |
|--------------------------|--------------------------|---------------|------------------|
| <a href="#">1/3-1</a>    | 11.11.1968               | 4671          | 4877             |
| <a href="#">1/3-3</a>    | 24.03.1983               | 4820          | 4876             |
| <a href="#">1/3-4</a>    | 08.05.1983               | 3160          | 3198             |
| <a href="#">1/3-5</a>    | 11.02.1985               | 4734          | 4769             |
| <a href="#">1/5-2</a>    | 15.04.1974               | 4228          | 4287             |
| <a href="#">1/5-4 S</a>  | 22.05.2002               | 3077          | 3090             |
| <a href="#">1/6-1</a>    | 26.11.1972               | 4800          | 4822             |
| <a href="#">1/6-5</a>    | 02.09.1990               | 1742          | 1854             |
| <a href="#">1/9-4</a>    | 12.01.1978               | 3690          | 3710             |
| <a href="#">1/9-4 R</a>  | 26.04.1991               | 3690          | 3710             |
| <a href="#">2/1-2</a>    | 26.02.1978               | 3540          | 3556             |
| <a href="#">2/1-3</a>    | 29.03.1980               | 4219          | 4297             |
| <a href="#">2/1-4</a>    | 03.08.1982               | 4485          | 4525             |
| <a href="#">2/1-7</a>    | 06.03.1985               | 4332          | 5084             |
| <a href="#">2/1-9</a>    | 06.07.1991               | 4289          | 4298             |
| <a href="#">2/2-1</a>    | 03.07.1982               | 3947          | 4003             |
| <a href="#">2/2-2</a>    | 27.08.1982               | 3105          | 3127             |
| <a href="#">2/2-5</a>    | 19.02.1992               | 4079          | 4082             |
| <a href="#">2/3-1</a>    | 03.04.1969               | 2917          | 2934             |
| <a href="#">2/3-3</a>    | 20.11.1971               | 2930          | 2973             |
| <a href="#">2/3-4</a>    | 24.07.1984               | 3377          | 3386             |
| <a href="#">2/4-8</a>    | 29.03.1972               | 3696          | 4075             |
| <a href="#">2/4-11</a>   | 09.04.1974               | 4211          | 4281             |
| <a href="#">2/4-17</a>   | 29.02.1992               | 4486          | 4520             |
| <a href="#">2/4-20</a>   | 14.03.2008               | 5496          | 5631             |
| <a href="#">2/4-22 S</a> | 22.02.2015               | 4743          | 4830             |
| <a href="#">2/5-3</a>    | 15.06.1972               | 3716          | 3731             |
| <a href="#">2/6-1</a>    | 30.05.1969               | 3302          | 3336             |
| <a href="#">2/6-2</a>    | 25.05.1980               | 4723          | 4760             |
| <a href="#">2/6-3</a>    | 25.02.1983               | 3729          | 3918             |
| <a href="#">2/6-4 S</a>  | 02.06.1990               | 3615          | 3617             |
| <a href="#">2/6-6 S</a>  | 18.01.2019               | 3599          | 3680             |
| <a href="#">2/7-3</a>    | 11.10.1972               | 4192          | 4359             |
| <a href="#">2/7-12</a>   | 30.01.1979               | 1686          | 1832             |
| <a href="#">2/7-19</a>   | 02.02.1981               | 4840          | 4876             |
| <a href="#">2/7-19 R</a> | 14.03.1990               | 4837          | 4873             |
| <a href="#">2/7-28</a>   | 07.08.1992               | 3839          | 3893             |
| <a href="#">2/7-29</a>   | 06.01.1994               | 4800          | 4853             |



|                           |            |      |      |
|---------------------------|------------|------|------|
| <a href="#">2/7-31</a>    | 09.06.1999 | 4668 | 4750 |
| <a href="#">2/8-7</a>     | 24.08.1975 | 2825 | 2868 |
| <a href="#">2/8-13</a>    | 22.06.1989 | 1775 | 1940 |
| <a href="#">2/8-17 A</a>  | 21.02.1998 | 3119 | 3145 |
| <a href="#">2/9-5 S</a>   | 18.09.2014 | 3547 | 3556 |
| <a href="#">2/10-1 S</a>  | 23.04.1976 | 4271 | 4297 |
| <a href="#">2/10-2</a>    | 25.04.1993 | 4062 | 4128 |
| <a href="#">2/11-12 A</a> | 07.03.2019 | 3390 | 3427 |
| <a href="#">2/12-1</a>    | 12.03.1987 | 4674 | 4684 |
| <a href="#">3/4-1</a>     | 26.02.1994 | 3077 | 3107 |
| <a href="#">3/5-1</a>     | 28.06.1978 | 2902 | 3103 |
| <a href="#">3/7-2</a>     | 20.06.1981 | 2998 | 4166 |
| <a href="#">3/7-3</a>     | 31.08.1981 | 3506 | 3540 |
| <a href="#">3/7-4</a>     | 23.01.1990 | 3688 | 3723 |
| <a href="#">3/7-5</a>     | 07.02.1992 | 3609 | 3666 |
| <a href="#">3/7-8 S</a>   | 03.03.2013 | 4148 | 4188 |
| <a href="#">3/7-11 S</a>  | 27.05.2019 | 3741 | 3790 |
| <a href="#">3/8-1</a>     | 29.12.2010 | 3563 | 4021 |
| <a href="#">6/3-2</a>     | 10.03.1986 | 3293 | 4045 |
| <a href="#">7/3-1</a>     | 10.06.1969 | 2696 | 4406 |
| <a href="#">7/4-1</a>     | 21.08.1993 | 3083 | 3133 |
| <a href="#">7/4-2</a>     | 13.03.2008 | 3457 | 3459 |
| <a href="#">7/7-2</a>     | 25.04.1992 | 3388 | 3430 |
| <a href="#">7/7-3</a>     | 04.07.1993 | 3567 | 3584 |
| <a href="#">7/8-2</a>     | 29.08.1973 | 2997 | 3006 |
| <a href="#">7/8-3</a>     | 12.12.1983 | 4237 | 4320 |
| <a href="#">7/9-1</a>     | 29.05.1971 | 2811 | 2931 |
| <a href="#">7/11-1</a>    | 15.06.1968 | 3740 | 3974 |
| <a href="#">7/11-7</a>    | 25.12.1983 | 4856 | 4927 |
| <a href="#">7/11-7 R</a>  | 08.10.1984 | 4856 | 4927 |
| <a href="#">7/12-3 A</a>  | 06.09.1977 | 4095 | 4191 |
| <a href="#">7/12-5</a>    | 07.06.1981 | 4393 | 4440 |
| <a href="#">8/1-1</a>     | 07.02.1972 | 2873 | 2971 |
| <a href="#">8/3-1</a>     | 10.10.1966 | 2205 | 2965 |
| <a href="#">8/4-1</a>     | 25.07.1977 | 2582 | 2632 |
| <a href="#">8/9-1</a>     | 10.02.1976 | 2247 | 2376 |
| <a href="#">8/10-1</a>    | 01.07.1969 | 3081 | 3089 |
| <a href="#">8/10-2</a>    | 17.03.1980 | 2880 | 2997 |
| <a href="#">8/10-3</a>    | 06.10.2010 | 3394 | 5398 |
| <a href="#">8/10-4 S</a>  | 27.10.2011 | 3058 | 3071 |
| <a href="#">8/10-5 A</a>  | 24.05.2014 | 2618 | 2662 |



|                            |            |      |      |
|----------------------------|------------|------|------|
| <a href="#">8/10-5 S</a>   | 04.03.2014 | 2810 | 2925 |
| <a href="#">8/10-6 S</a>   | 16.07.2014 | 2196 | 2256 |
| <a href="#">8/10-7 S</a>   | 04.01.2019 | 3146 | 3155 |
| <a href="#">9/2-8 S</a>    | 02.02.1998 | 6023 | 7378 |
| <a href="#">9/4-1</a>      | 19.05.1968 | 2939 | 2963 |
| <a href="#">9/4-5</a>      | 01.08.2006 | 5224 | 5279 |
| <a href="#">9/8-1</a>      | 29.06.1968 | 2109 | 2176 |
| <a href="#">10/4-1</a>     | 12.07.2015 | 2364 | 2415 |
| <a href="#">10/5-1</a>     | 26.06.1976 | 1597 | 1818 |
| <a href="#">10/7-1</a>     | 30.07.1992 | 1836 | 1890 |
| <a href="#">10/8-1</a>     | 17.01.1971 | 2825 | 2861 |
| <a href="#">11/9-1</a>     | 28.02.1976 | 1930 | 1972 |
| <a href="#">15/2-1</a>     | 24.02.1982 | 4555 | 4600 |
| <a href="#">15/5-3</a>     | 07.12.1980 | 3800 | 4850 |
| <a href="#">15/9-9</a>     | 14.07.1981 | 2969 | 3014 |
| <a href="#">15/9-13</a>    | 27.05.1982 | 3256 | 3280 |
| <a href="#">15/9-16</a>    | 24.08.1982 | 3011 | 3068 |
| <a href="#">15/12-2</a>    | 27.02.1976 | 2888 | 2924 |
| <a href="#">15/12-3</a>    | 22.12.1980 | 3238 | 4392 |
| <a href="#">15/12-17 S</a> | 04.02.2007 | 3345 | 3371 |
| <a href="#">15/12-18 S</a> | 07.11.2007 | 3468 | 3520 |
| <a href="#">15/12-26</a>   | 13.05.2021 | 2784 | 2787 |
| <a href="#">16/1-2</a>     | 07.08.1976 | 2713 | 2808 |
| <a href="#">16/1-3</a>     | 27.09.1982 | 3082 | 3230 |
| <a href="#">16/1-16</a>    | 07.12.2012 | 2642 | 2671 |
| <a href="#">16/1-29 S</a>  | 03.06.2018 | 1885 | 1912 |
| <a href="#">16/1-34 A</a>  | 15.09.2021 | 2061 | 2109 |
| <a href="#">16/2-6</a>     | 20.09.2010 | 2075 | 2131 |
| <a href="#">16/2-7</a>     | 01.09.2011 | 2134 | 2244 |
| <a href="#">16/2-16</a>    | 12.12.2012 | 2065 | 2165 |
| <a href="#">16/3-5</a>     | 07.03.2013 | 1932 | 1967 |
| <a href="#">16/3-7</a>     | 08.11.2013 | 1963 | 2000 |
| <a href="#">16/3-8 A</a>   | 01.04.2014 | 1986 | 2069 |
| <a href="#">16/3-8 S</a>   | 16.03.2014 | 1993 | 2060 |
| <a href="#">16/4-1</a>     | 18.11.1984 | 2430 | 2621 |
| <a href="#">16/4-12</a>    | 08.10.2021 | 2144 | 2171 |
| <a href="#">16/5-3</a>     | 20.03.2013 | 1990 | 1993 |
| <a href="#">16/7-1</a>     | 24.09.1967 | 2085 | 2781 |
| <a href="#">16/7-2</a>     | 30.03.1982 | 3010 | 3117 |
| <a href="#">16/7-3</a>     | 27.07.1982 | 2795 | 2859 |
| <a href="#">16/8-2</a>     | 13.08.1980 | 2254 | 3585 |



|                             |            |      |      |
|-----------------------------|------------|------|------|
| <a href="#">16/8-3 S</a>    | 01.05.2013 | 2734 | 3015 |
| <a href="#">16/9-1</a>      | 12.07.1968 | 3199 | 3655 |
| <a href="#">16/10-1</a>     | 14.07.1986 | 3116 | 3151 |
| <a href="#">16/10-4</a>     | 10.08.1998 | 2550 | 2580 |
| <a href="#">16/11-1 S</a>   | 31.10.1967 | 2255 | 3050 |
| <a href="#">16/11-2</a>     | 23.07.1973 | 2269 | 2378 |
| <a href="#">17/4-1</a>      | 26.08.1968 | 2665 | 3834 |
| <a href="#">17/8-1</a>      | 23.10.2021 | 2658 | 2838 |
| <a href="#">17/11-1</a>     | 30.06.1968 | 2517 | 3269 |
| <a href="#">17/12-1 R</a>   | 21.06.1972 | 4133 | 4298 |
| <a href="#">17/12-2</a>     | 09.10.1973 | 2243 | 2293 |
| <a href="#">25/10-2 R</a>   | 08.07.1972 | 2897 | 3014 |
| <a href="#">25/10-4</a>     | 18.01.1981 | 2314 | 2349 |
| <a href="#">25/10-4 R</a>   | 13.06.1981 | 2314 | 2363 |
| <a href="#">25/10-8</a>     | 07.04.1997 | 2577 | 2601 |
| <a href="#">25/10-10</a>    | 02.04.2010 | 2488 | 2513 |
| <a href="#">25/10-15 S</a>  | 02.08.2016 | 2628 | 2668 |
| <a href="#">25/11-17</a>    | 22.03.1993 | 2146 | 2233 |
| <a href="#">25/11-29 S</a>  | 13.05.2019 | 2230 | 2304 |
| <a href="#">6201/11-3 R</a> | 20.10.2012 | 2940 | 3000 |
| <a href="#">6608/6-1</a>    | 11.08.2019 | 2468 | 2754 |
| <a href="#">6608/8-1</a>    | 30.03.1997 | 2755 | 3013 |
| <a href="#">6609/7-1</a>    | 03.08.1983 | 1876 | 1912 |

### Wellbores with cores

| Wellbore name             | Wellbore completion date | Core length [m] |
|---------------------------|--------------------------|-----------------|
| <a href="#">1/6-5</a>     | 02.09.1990               | 9               |
| <a href="#">2/6-3</a>     | 25.02.1983               | 1               |
| <a href="#">2/7-29</a>    | 06.01.1994               | 0               |
| <a href="#">2/8-13</a>    | 22.06.1989               | 2               |
| <a href="#">7/3-1</a>     | 10.06.1969               | 4               |
| <a href="#">8/3-1</a>     | 10.10.1966               | 9               |
| <a href="#">9/8-1</a>     | 29.06.1968               | 17              |
| <a href="#">15/5-3</a>    | 07.12.1980               | 11              |
| <a href="#">15/12-3</a>   | 22.12.1980               | 7               |
| <a href="#">16/1-29 S</a> | 03.06.2018               | 15              |
| <a href="#">16/1-34 A</a> | 15.09.2021               | 9               |
| <a href="#">16/2-7</a>    | 01.09.2011               | 19              |
| <a href="#">16/3-5</a>    | 07.03.2013               | 17              |



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|                           |            |    |
|---------------------------|------------|----|
| <a href="#">16/3-7</a>    | 08.11.2013 | 14 |
| <a href="#">16/3-8 S</a>  | 16.03.2014 | 42 |
| <a href="#">25/10-2 R</a> | 08.07.1972 | 12 |
| <a href="#">6608/8-1</a>  | 30.03.1997 | 9  |