

**General information**

|                                    |                               |
|------------------------------------|-------------------------------|
| Wellbore name                      | 34/7-9                        |
| Type                               | EXPLORATION                   |
| Purpose                            | APPRAISAL                     |
| Status                             | P&A                           |
| Factmaps in new window             | <a href="#">link to map</a>   |
| Main area                          | NORTH SEA                     |
| Field                              | <a href="#">SNORRE</a>        |
| Discovery                          | <a href="#">34/4-1 Snorre</a> |
| Well name                          | 34/7-9                        |
| Seismic location                   | SG 8420 ROW 011 COLUMN 470    |
| Production licence                 | <a href="#">089</a>           |
| Drilling operator                  | Saga Petroleum ASA            |
| Drill permit                       | 510-L                         |
| Drilling facility                  | <a href="#">TREASURE SAGA</a> |
| Drilling days                      | 61                            |
| Entered date                       | 13.04.1986                    |
| Completed date                     | 12.06.1986                    |
| Release date                       | 12.06.1988                    |
| Publication date                   | 20.06.2011                    |
| Purpose - planned                  | APPRAISAL                     |
| Reentry                            | NO                            |
| Content                            | OIL                           |
| Discovery wellbore                 | NO                            |
| 1st level with HC, age             | LATE TRIASSIC                 |
| 1st level with HC, formation       | LUNDE FM                      |
| Kelly bushing elevation [m]        | 26.0                          |
| Water depth [m]                    | 330.0                         |
| Total depth (MD) [m RKB]           | 3240.0                        |
| Final vertical depth (TVD) [m RKB] | 3239.0                        |
| Maximum inclination [°]            | 2.7                           |
| Bottom hole temperature [°C]       | 93                            |
| Oldest penetrated age              | LATE TRIASSIC                 |
| Oldest penetrated formation        | LUNDE FM                      |
| Geodetic datum                     | ED50                          |
| NS degrees                         | 61° 29' 11.99" N              |
| EW degrees                         | 2° 11' 43.6" E                |
| NS UTM [m]                         | 6817423.20                    |
| EW UTM [m]                         | 457150.88                     |



|                |     |
|----------------|-----|
| UTM zone       | 31  |
| NPDID wellbore | 889 |

## Wellbore history

### General

Well 34/7 9 was drilled on the Snorre structure in the northernmost part of the block. The main objective of the well was to test the hydrocarbon potential of the upper Lunde Formation in the Snorre structure.

### Operations and results

Appraisal well 34/7-9 was spudded with the semi-submersible installation Treasure Saga on 13 April 1986 and drilled to TD at 3240 m in the Late Triassic Lunde Formation. Minor shallow gas peaks were observed from mud gas readings in the pilot hole below the 30" casing at 498 - 500 m. Drilling proceeded without significant problems. The well was drilled with spud mud down to 471 m, with gel mud from 471 m to 915 m, with gypsum/polymer mud from 915 m to 2479 m, and with gel mud from 2479 m to TD.

Well 34/7-9 penetrated the reservoir at 2442.5 m, 50 m deeper than prognosed. From FMT pressure points the oil water contact (OWC) was defined in the upper Lunde at 2600 m (2574 m MSL). The average log porosity in the oil zone was 25.6%, the net/gross was 0.24, and the average water saturation was 30%.

Shows were seen from 2100 to 2315 m in the Shetland Group. Below 2315 m the shows disappeared and did not reappear before the upper Lunde reservoir was penetrated at 2442.5 m. Down to a sandstone/claystone boundary at 2594 m, the sandstones showed a pale brown oil stain, fair to good odour, 100% - 90% strong, patchy, yellow to light yellow fluorescence, fast to instant streaming bluish white cut and a pale yellow residue upon evaporation. Below 2594 m no shows were seen.

A total of 10 cores were cut and recovered during drilling of the well. The cores were taken in the upper Lunde Formation from 2470.0 to 2720.5 m core depth. The average core recovery was 96.7%. Logger's depths for the cores were from 1.75 to 4.00 m shallower than the core depths. FMT fluid samples were taken at 2585 m and 2592 m. All analysed sample chambers contained black oil and brown-grey water with sediments.

The well was permanently abandoned on 12 June 1986 as an oil appraisal.

### Testing

One DST was carried out with four zones in the upper Lunde Formation flowing simultaneously: 2501 - 2504 m, 2506 - 2515 m, 2527 - 2536 m, and 2550 - 2553. The zones were flowed for 175 hours, followed by a build-up of 50 hours. During the main flow period the flow rate through a 15.9 mm choke decreased from 1400 Sm<sup>3</sup>/day to 896 Sm<sup>3</sup>/day and the corresponding wellhead pressure decreased from 130 to 93 bar. Fluid analyses of pressurized samples from the test gave a GOR of 103 Sm<sup>3</sup>/Sm<sup>3</sup> and stock tank oil density of 0.8258 g/cm<sup>3</sup>. The maximum temperature recorded at reference depth, mid-perforations, was 93.3 deg C.

## Cuttings at the Norwegian Offshore Directorate



|                               |                                   |
|-------------------------------|-----------------------------------|
| Cutting sample, top depth [m] | Cutting samples, bottom depth [m] |
| 480.00                        | 3240.00                           |

|                                  |     |
|----------------------------------|-----|
| Cuttings available for sampling? | YES |
|----------------------------------|-----|

### Cores at the Norwegian Offshore Directorate

| Core sample number | Core sample - top depth | Core sample - bottom depth | Core sample depth - uom |
|--------------------|-------------------------|----------------------------|-------------------------|
| 1                  | 2470.0                  | 2494.5                     | [m ]                    |
| 2                  | 2494.5                  | 2518.0                     | [m ]                    |
| 3                  | 2518.0                  | 2546.0                     | [m ]                    |
| 4                  | 2546.0                  | 2574.0                     | [m ]                    |
| 5                  | 2574.0                  | 2593.0                     | [m ]                    |
| 6                  | 2593.0                  | 2607.7                     | [m ]                    |
| 7                  | 2615.0                  | 2642.3                     | [m ]                    |
| 8                  | 2643.0                  | 2670.5                     | [m ]                    |
| 9                  | 2670.0                  | 2692.5                     | [m ]                    |
| 10                 | 2692.5                  | 2720.5                     | [m ]                    |

|                               |       |
|-------------------------------|-------|
| Total core sample length [m]  | 243.0 |
| Cores available for sampling? | YES   |

### Core photos



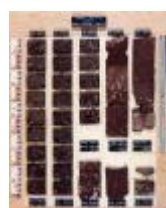
2470-2475m



2475-2480m



2480-2485m



2485-2490m



2490-2495m



2495-2499m



2499-2504m



2504-2509m



2509-2514m



2514-2518m



2518-2523m



2523-2528m



2528-2533m



2533-2538m



2538-2543m



2543-2546m



2546-2551m



2551-2556m



2556-2561m



2561-2566m



2566-2571m



2571-2574m



2574-2579m



2579-2584m



2584-2589m



2589-2593m



2593-2598m



2598-2603m



2603-2608m



2615-2620m



2620-2625m



2625-2630m



2630-2635m



2635-2640m



2640-2642m



2643-2648m



2648-2653m



2653-2658m



2658-2663m



2663-2668m



2668-2670m



2670-2675m



2675-2679m



2680-2685m



2685-2690m



2690-2694m



2692-2697m



2697-2702m



2702-2707m



2707-2712m



2712-2717m



2717-2621m

### Palynological slides at the Norwegian Offshore Directorate

| Sample depth | Depth unit | Sample type | Laboratory |
|--------------|------------|-------------|------------|
| 1839.0       | [m]        | SWC         | R.R.I      |
| 1863.0       | [m]        | SWC         | R.R.I      |
| 1900.0       | [m]        | SWC         | R.R.I      |
| 1930.0       | [m]        | SWC         | R.R.I      |
| 1965.0       | [m]        | SWC         | R.R.I      |
| 1996.0       | [m]        | SWC         | R.R.I      |
| 2026.0       | [m]        | SWC         | R.R.I      |
| 2058.0       | [m]        | SWC         | R.R.I      |
| 2095.0       | [m]        | SWC         | R.R.I      |
| 2146.0       | [m]        | SWC         | R.R.I      |
| 2212.0       | [m]        | SWC         | R.R.I      |
| 2245.0       | [m]        | SWC         | R.R.I      |
| 2330.0       | [m]        | SWC         | R.R.I      |
| 2380.0       | [m]        | SWC         | R.R.I      |

**Oil samples at the Norwegian Offshore Directorate**

| Test type | Bottle number | Top depth MD [m] | Bottom depth MD [m] | Fluid type | Test time          | Samples available |
|-----------|---------------|------------------|---------------------|------------|--------------------|-------------------|
| DST       | DST1B         | 2524.00          | 2527.00             | OIL        | 24.05.1986 - 20:30 | YES               |

**Lithostratigraphy**

| Top depth [mMD RKB] | Lithostrat. unit                |
|---------------------|---------------------------------|
| 356                 | <a href="#">NORDLAND GP</a>     |
| 1077                | <a href="#">UTSIRA FM</a>       |
| 1172                | <a href="#">HORDALAND GP</a>    |
| 1445                | <a href="#">NO FORMAL NAME</a>  |
| 1511                | <a href="#">NO FORMAL NAME</a>  |
| 1657                | <a href="#">ROGALAND GP</a>     |
| 1657                | <a href="#">BALDER FM</a>       |
| 1681                | <a href="#">LISTA FM</a>        |
| 1807                | <a href="#">SHETLAND GP</a>     |
| 1807                | <a href="#">JORSALFARE FM</a>   |
| 2025                | <a href="#">KYRRE FM</a>        |
| 2429                | <a href="#">CROMER KNOLL GP</a> |
| 2429                | <a href="#">RØDBY FM</a>        |
| 2435                | <a href="#">ÅSGARD FM</a>       |
| 2443                | <a href="#">HEGRE GP</a>        |
| 2443                | <a href="#">LUNDE FM</a>        |

**Geochemical information**

| Document name         | Document format | Document size [MB] |
|-----------------------|-----------------|--------------------|
| <a href="#">889_1</a> | pdf             | 0.36               |
| <a href="#">889_2</a> | pdf             | 2.18               |

**Documents - older Norwegian Offshore Directorate WDSS reports and other related documents**





| Document name                                   | Document format | Document size [MB] |
|-------------------------------------------------|-----------------|--------------------|
| <a href="#">889_01_WDSS_General_Information</a> | pdf             | 0.28               |
| <a href="#">889_02_WDSS_completion_log</a>      | pdf             | 0.26               |

**Documents - reported by the production licence (period for duty of secrecy expired)**

| Document name                                | Document format | Document size [MB] |
|----------------------------------------------|-----------------|--------------------|
| <a href="#">889_34_7_9_Completion_Log</a>    | pdf             | 1.84               |
| <a href="#">889_34_7_9_Completion_report</a> | pdf             | 37.25              |

**Drill stem tests (DST)**

| Test number | From depth MD [m] | To depth MD [m] | Choke size [mm] |
|-------------|-------------------|-----------------|-----------------|
| 1.0         | 2554              | 2501            | 15.9            |
| 1.1         | 2536              | 2527            | 15.9            |
| 1.2         | 2515              | 2506            | 15.9            |
| 1.3         | 2504              | 2501            | 15.9            |

| Test number | Final shut-in pressure [MPa] | Final flow pressure [MPa] | Bottom hole pressure [MPa] | Downhole temperature [°C] |
|-------------|------------------------------|---------------------------|----------------------------|---------------------------|
| 1.0         | 35.000                       | 9.000                     | 33.000                     | 92                        |
| 1.1         |                              |                           |                            | 93                        |
| 1.2         |                              |                           |                            | 94                        |
| 1.3         |                              |                           |                            | 95                        |

| Test number | Oil [Sm3/day] | Gas [Sm3/day] | Oil density [g/cm3] | Gas grav. rel.air | GOR [m3/m3] |
|-------------|---------------|---------------|---------------------|-------------------|-------------|
| 1.0         | 896           | 79000         | 0.839               | 0.778             | 88          |
| 1.1         | 1135          | 109000        | 0.835               | 0.805             | 96          |
| 1.2         | 893           | 79000         | 0.835               | 0.795             | 89          |
| 1.3         | 896           | 79000         | 0.838               | 0.805             | 88          |

**Logs**





| Log type           | Log top depth [m] | Log bottom depth [m] |
|--------------------|-------------------|----------------------|
| CDL CNL GR         | 2400              | 3154                 |
| CDL CNL GR FMT     | 1819              | 2717                 |
| DIFL LS BHC CDL GR | 899               | 1832                 |
| DIFL LS BHC GR     | 1819              | 3154                 |
| DIFL LS BHC GR FMT | 3120              | 3238                 |
| DIPLOG FMT         | 1819              | 3254                 |
| DLL MLL GR         | 1819              | 2716                 |
| MWD - GR           | 466               | 471                  |
| MWD - GR RES       | 466               | 915                  |
| MWD - GR RES DIR   | 466               | 3238                 |
| VSP                | 700               | 3238                 |

**Casing and leak-off tests**

| Casing type | Casing diam. [inch] | Casing depth [m] | Hole diam. [inch] | Hole depth [m] | LOT/FIT mud eqv. [g/cm3] | Formation test type |
|-------------|---------------------|------------------|-------------------|----------------|--------------------------|---------------------|
| CONDUCTOR   | 30                  | 465.0            | 36                | 471.0          | 0.00                     | LOT                 |
| SURF.COND.  | 20                  | 899.0            | 26                | 1002.0         | 1.46                     | LOT                 |
| INTERM.     | 13 3/8              | 1821.0           | 17 1/2            | 2138.0         | 1.83                     | LOT                 |
| INTERM.     | 9 5/8               | 2802.0           | 12 1/4            | 3240.0         | 0.00                     | LOT                 |

**Drilling mud**

| Depth MD [m] | Mud weight [g/cm3] | Visc. [mPa.s] | Yield point [Pa] | Mud type    | Date measured |
|--------------|--------------------|---------------|------------------|-------------|---------------|
| 390          | 1.03               |               |                  | WATER BASED | 15.06.1986    |
| 471          | 1.03               |               |                  | WATER BASED | 21.04.1986    |
| 616          | 1.10               | 8.0           | 22.1             | WATER BASED | 21.04.1986    |
| 858          | 1.15               | 6.0           | 21.6             | WATER BASED | 21.04.1986    |
| 915          | 1.16               | 7.0           | 26.9             | WATER BASED | 21.04.1986    |
| 915          | 1.03               |               |                  | WATER BASED | 21.04.1986    |
| 915          | 1.20               | 8.0           | 27.8             | WATER BASED | 21.04.1986    |
| 1002         | 1.10               | 12.0          | 7.7              | WATER BASED | 21.04.1986    |
| 1461         | 1.20               | 15.0          | 10.1             | WATER BASED | 23.04.1986    |
| 1498         | 1.20               | 16.0          | 9.6              | WATER BASED | 23.04.1986    |
| 1617         | 1.30               | 18.0          | 10.1             | WATER BASED | 25.04.1986    |
| 1709         | 1.73               | 20.0          | 5.8              | WATER BASED | 15.06.1986    |



|      |      |      |      |             |            |
|------|------|------|------|-------------|------------|
| 1837 | 1.41 | 22.0 | 9.1  | WATER BASED | 28.04.1986 |
| 1837 | 1.41 | 22.0 | 9.6  | WATER BASED | 28.04.1986 |
| 1837 | 1.41 | 22.0 | 8.7  | WATER BASED | 02.05.1986 |
| 2138 | 1.58 | 25.0 | 10.1 | WATER BASED | 02.05.1986 |
| 2350 | 1.65 | 28.0 | 8.7  | WATER BASED | 09.05.1986 |
| 2430 | 1.70 | 29.0 | 6.8  | WATER BASED | 05.05.1986 |
| 2446 | 1.73 | 27.0 | 6.8  | WATER BASED | 05.05.1986 |
| 2446 | 1.73 | 28.0 | 6.3  | WATER BASED | 12.05.1986 |
| 2446 | 1.73 | 27.0 | 6.8  | WATER BASED | 12.05.1986 |
| 2446 | 1.73 | 18.0 | 4.8  | WATER BASED | 24.05.1986 |
| 2446 | 1.73 | 19.0 | 5.3  | WATER BASED | 06.06.1986 |
| 2446 | 1.73 | 27.0 | 6.3  | WATER BASED | 09.05.1986 |
| 2518 | 1.73 | 26.0 | 8.2  | WATER BASED | 05.05.1986 |
| 2546 | 1.73 | 26.0 | 6.8  | WATER BASED | 05.05.1986 |
| 2574 | 1.73 | 28.0 | 6.3  | WATER BASED | 05.05.1986 |
| 2603 | 1.73 | 25.0 | 8.7  | WATER BASED | 05.05.1986 |
| 2641 | 1.73 | 26.0 | 6.8  | WATER BASED | 09.05.1986 |
| 2670 | 1.73 | 25.0 | 6.8  | WATER BASED | 09.05.1986 |
| 2770 | 1.73 | 28.0 | 6.3  | WATER BASED | 09.05.1986 |
| 2802 | 1.73 | 19.0 | 5.3  | WATER BASED | 06.06.1986 |
| 2802 | 1.73 | 18.0 | 4.8  | WATER BASED | 25.05.1986 |
| 2802 | 1.73 | 18.0 | 4.8  | WATER BASED | 06.06.1986 |
| 2802 | 1.73 | 22.0 | 7.2  | WATER BASED | 21.05.1986 |
| 2802 | 1.73 | 20.0 | 5.8  | WATER BASED | 15.06.1986 |
| 2802 | 1.73 | 20.0 | 5.8  | WATER BASED | 15.06.1986 |
| 2802 | 1.73 | 20.0 | 5.8  | WATER BASED | 15.06.1986 |
| 2802 | 1.73 | 19.0 | 4.8  | WATER BASED | 24.05.1986 |
| 2802 | 1.73 | 19.0 | 5.8  | WATER BASED | 06.06.1986 |
| 2806 | 1.73 | 26.0 | 7.2  | WATER BASED | 12.05.1986 |
| 2813 | 1.73 | 20.0 | 6.3  | WATER BASED | 21.05.1986 |
| 2820 | 1.73 | 25.0 | 6.3  | WATER BASED | 21.05.1986 |
| 2937 | 1.73 | 26.0 | 8.2  | WATER BASED | 20.05.1986 |
| 3090 | 1.73 | 26.0 | 7.7  | WATER BASED | 20.05.1986 |
| 3156 | 1.73 | 23.0 | 7.2  | WATER BASED | 20.05.1986 |
| 3160 | 1.73 | 21.0 | 7.2  | WATER BASED | 21.05.1986 |
| 3240 | 1.73 | 24.0 | 8.2  | WATER BASED | 21.05.1986 |
| 3240 | 1.73 | 24.0 | 7.7  | WATER BASED | 21.05.1986 |

**Pressure plots**





The pore pressure data is sourced from well logs if no other source is specified. In some wells where pore pressure logs do not exist, information from Drill stem tests and kicks have been used. The data has been reported to the NPD, and further processed and quality controlled by IHS Markit.

| Document name                                            | Document format | Document size [MB] |
|----------------------------------------------------------|-----------------|--------------------|
| <a href="#">889 Formation pressure (Formasjonstrykk)</a> | pdf             | 0.21               |

