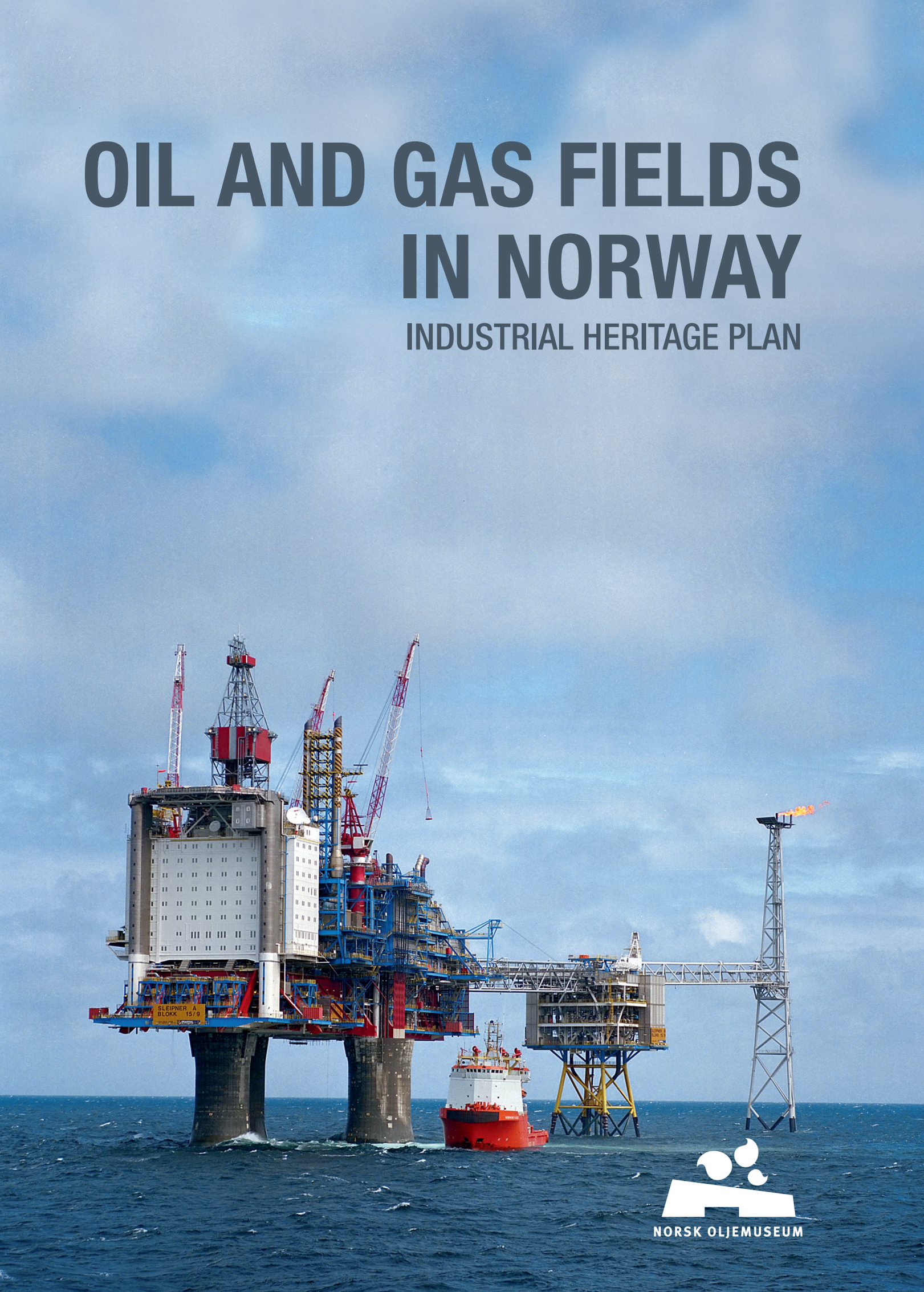
OIL AND GAS FIELDS IN NORWAY

INDUSTRIAL HERITAGE PLAN



NORSK OLJEMUSEUM

THE STATFJORD AREA

The Statfjord area lies in some 150 metres of water and embraces the Statfjord, Statfjord East, Statfjord North, Sygna and Murchison fields.

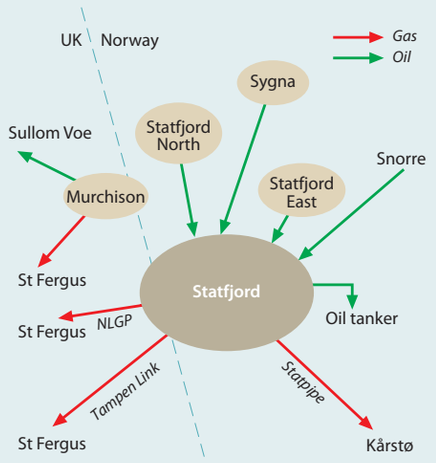
Statfjord

This oil field straddles the UK-Norwegian boundary in the North Sea, and is currently divided 85.47 per cent and 14.53 per cent between Norway and Britain. The Norwegian share lies in blocks 33/12 and 9, and the UK portion in block 211/25 with licences 104 and 293.

Mobil Exploration Norway became operator for production licence 037 in 1973, and field development was approved by the Storting on 16 June 1976. Exploration drilling started in December 1973, and Statfjord was discovered the following spring. The Statfjord A platform began production on 24 November 1979, followed by Statfjord B on 5 November 1982 and Statfjord C on 26 June 1985.

The licence terms specified that Statoil could take over as operator 10 years after the field was declared commercial. After political clarifications, this option was exercised on 1 January 1987.

Statfjord is the largest oil field on the NCS and in the North Sea. It also produces a considerable amount of natural gas.



During the mid-1980s, Statfjord accounted for half of Norway's crude output. Peak production was achieved on 16 January 1987, when the field yielded 850 204 barrels of oil. After 25 years on stream, Statfjord has produced oil worth more than NOK 1 000 billion and its licensees have paid NOK 450 billion in tax.

Statfjord was important for the development of transport solutions in the North Sea. The Statpipe project was the first to cross the Norwegian Trench with a pipeline, an achievement which laid the basis for creating an extensive gas export infrastructure. As a number of other fields have been tied back to it, Statfjord has become a hub for this part of the North Sea.

Development of the field has been a driving force behind a series of technological advances. It has thereby also been highly significant for sub-contractors and created spin-offs in land-based Norwegian industry. Combining concrete platforms with oil storage capacity and offshore loading to shuttle tankers was an important requirement for developing Statfjord.

Statfjord

Blocks	33/12 and 33/9
Production licence	037
Awarded	1973
UK block	211/25
Licences	104 and 293
Total recoverable reserves (Norwegian share)	
	3 551 mill bbl oil
	76.7 bn scm gas
	24 mill tonnes NGL
Remaining at 31 Dec 2008	41.5 mill bbl oil
	18.1 bn scm gas
	8.5 mill tonnes NGL
Discovery year	1974
Approved for development	16 Jun 1976
On stream	24 Nov 1979
Operator	Statoil
Operations organisation	Stavanger
Main supply bases	Sotra and Florø
Licensees	
Statoil	44.34%
ExxonMobil	21.37%
ConocoPhillips	10.33%
Norske Shell	8.55%
ConocoPhillips UK	4.84%
Centrica Resources	9.68%
Enterprise Oil Norge	0.89%

Reservoir and recovery strategy

The hydrocarbon-bearing sandstones in the Statfjord field lie 2 500-3 000 metres down and all hail from the Jurassic – in other words, about 150 million years ago. They belong to the Brent group and the Cook and Statfjord formations.

Production from the Brent reservoir utilises pressure support from water alternating gas (WAG) injection. The Statfjord formation produces with pressure support from water and supplementary gas injection in the upper zone and WAG injection in the lower. Recovery in the Cook formation is based on phasing in wells which already pass through this reservoir or on lengthening existing wells.

Injecting gas and water to maintain pressure in the reservoirs has played an important part in the recovery strategy. Combined with an extensive drilling programme to tap pockets of residual oil, injection has helped to push the recovery factor much higher than was expected when the field was first developed.

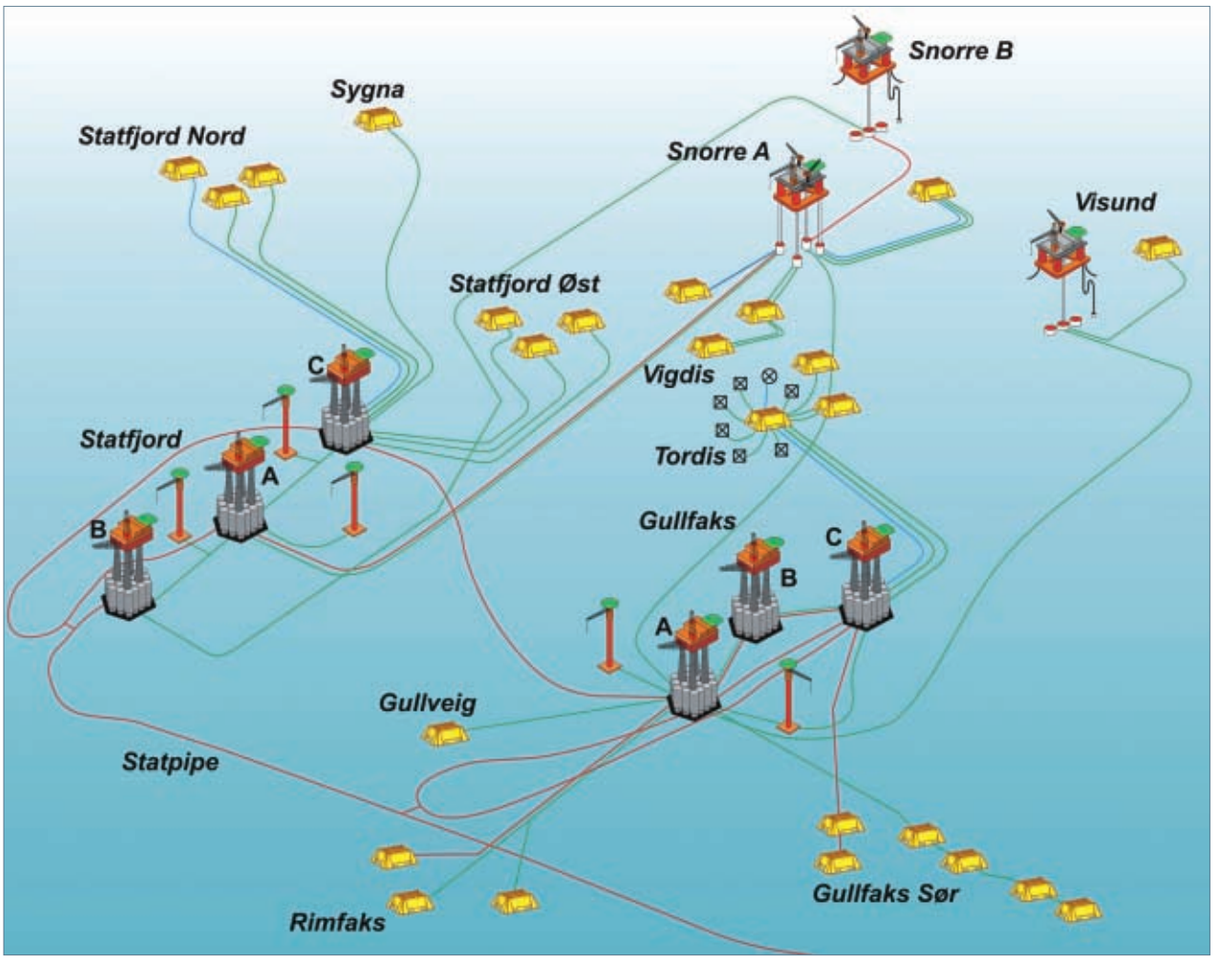
Statfjord late life

Well over 60 per cent of the proven oil resources have so far been recovered. This recovery factor is expected to rise to 68 per cent over the next few years.

Reducing pressure in the reservoirs and on the platforms makes it possible to recover large volumes of previously injected gas while liberating gas from the remaining unrecoverable oil. The gas recovery factor will rise from 54 per cent to almost 75 per cent. Statfjord is currently an oil field with associated gas, but the late life project will convert it into a gas field with associated oil. Production is expected to continue until 2020.

Transport

Stabilised oil is stored in the cells provided by each platform's GBS before being discharged to shuttle tankers via loading buoys. This method of transporting oil kicked off a development which made Statoil, and later Navion, the world's largest operator of shuttle tankers. The three loading buoys tied back to the platforms by two-kilometre flowlines have helidecks and quarters for use during maintenance. They are normally unstaffed. Gas flows through Statpipe to Kårstø, where the NGLs are extracted before the



The Statfjord area with adjacent fields in the Tampen region. Installations and pipelines. Illustration: Statoil

dry gas continues to Emden. The UK takes out its share of the gas through a spur from the Northern Leg Gas Pipeline (NLGP) and the Flags system to St Fergus in Scotland. Tampen Link is a new gas export pipeline from Statfjord late life to the UK via Flags.

Development solution

The field has been developed with three fully integrated production, drilling and quarters platforms. Statfjord A is sited centrally on the field and came on stream in 1979. Located at the southern end, the B platform began production in 1982. Statfjord C stands at the northern end and became operational in 1985. The B and C platforms have a similar design. A separate inlet separator is installed on Statfjord C to handle production from the Statfjord East, Statfjord North and Sygna satellites.

Statfjord A

This integrated platform in 145 metres of water has a Condeep GBS built in 1974-76 by Norwegian Contractors at Hinnavågen outside Stavanger. Statfjord A and Frigg TCP2 were the two first Condeep platforms on the NCS. The GBS contains 19 cells able to store four days of oil production, while three concrete shafts support the topside. Two of the shafts provide space for production wells, and the third contains equipment for oil loading, ballast water and firefighting pumps.

Facts about Statfjord A

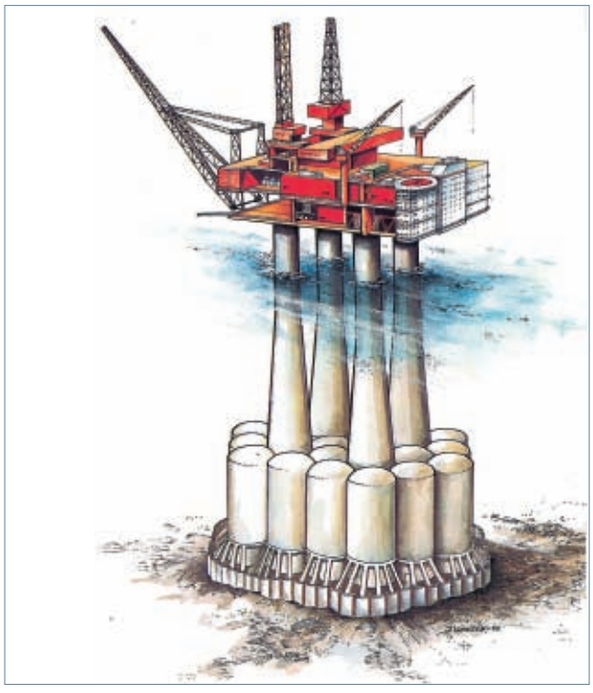
Weight: 600 000 tonnes
Total height: 270 metres
Living quarters: 206 berths
On stream: 24 November 1979
Storage cell capacity: 1.3 billion barrels of oil
Max production capacity: 300 000 b/d of oil in two trains

Statfjord A. Photo: Øyvind Hagen/Statoil

The GBS was towed in August 1976 to Stord north of Stavanger, where the Aker group had built the steel topside. Statfjord A was installed on the field on 8 May 1977, followed by 2.5 years of module loading and hook-up. The platform began production on 24 November 1979.

Statfjord A was originally intended to be a scaled-up copy of the Beryl A platform built for Mobil at Hinnavågen in 1976, but proved more complex in process terms. It had four separation stages compared with two on Beryl A, for instance. This meant in part a sharp increase in topside weight. Buoyancy at towout became too small to carry this load, and a significant part of the topside work had to be done offshore. Experience gained with Statfjord A was applied in later construction projects.

The Polycrown flotel spent many years alongside Statfjord A to increase accommodation capacity, and was finally removed in 2000. Both the Polymariner and the Nortrym flotels were also used for periods.



Statfjord B. Illustration: Statoil

Statfjord B. Photo: Øyvind Hagen/Statoil

An articulated loading platform (ALP) is tied back to Statfjord A.

Statfjord B

This integrated platform has a Condeep GBS with four support shafts, built by Norwegian Contractors at Hinnavågen near Stavanger, and a steel topside fabricated by Moss Rosenberg Verft.

Incorporating a fourth shaft meant that the deck area could be larger than on Statfjord A. Buoyancy during towout to the field was also sufficient for all topside equipment – such as living quarters, processing plant and the drilling module – to be installed at land. Another advantage was that the living quarters could be separated from drilling and production facilities.

Statfjord B became operational on 5 November 1982. It ranked at the time as the world's largest concrete platform and was the first four-shaft Condeep.

Ugland Engineering was awarded a contract in October 1989 to install the Ukols loading system for Statfjord B. The platform's single point mooring (SPM) loading buoy has since been removed from the field.

Facts about Statfjord B
Weight: 816 000 tonnes
Total height: 271 metres
Living quarters: 228 berths
On stream: 5 November 1982
Storage cell capacity: 1.9 million barrels
Max production capacity: 180 000 b/d of oil in one process train

Statfjord C

This integrated platform stands 5.5 kilometres north of Statfjord A, and was built as a copy of Statfjord B.

This means it has a Condeep GBS with four shafts, built by Norwegian Contractors at Hinnavågen, and a steel topsides fabricated by Moss Rosenberg Verft. Statfjord C began production on 2 July 1985.

The platform is tied to an SPM loading buoy and two subsea installations – Statfjord G for oil production and Statfjord H to provide water injection.

Statfjord C also carries processing equipment for production from Statfjord East, Statfjord North and Sygna.

Facts about Statfjord C
Weight: 643 700 tonnes
Total height: 290 metres
Living quarters: 345 berths
On stream: 2 July 1985
Storage cell capacity: 1.9 million barrels
Max production capacity: 210 000 b/d of oil.

Statfjord C. Photo: Harald Pettersen/Statoil

Statfjord North

This oil field lies 17 kilometres north of Statfjord. It straddles the UK-Norwegian boundary, with just over 85 per cent on Norway's side.

Reservoir and recovery strategy

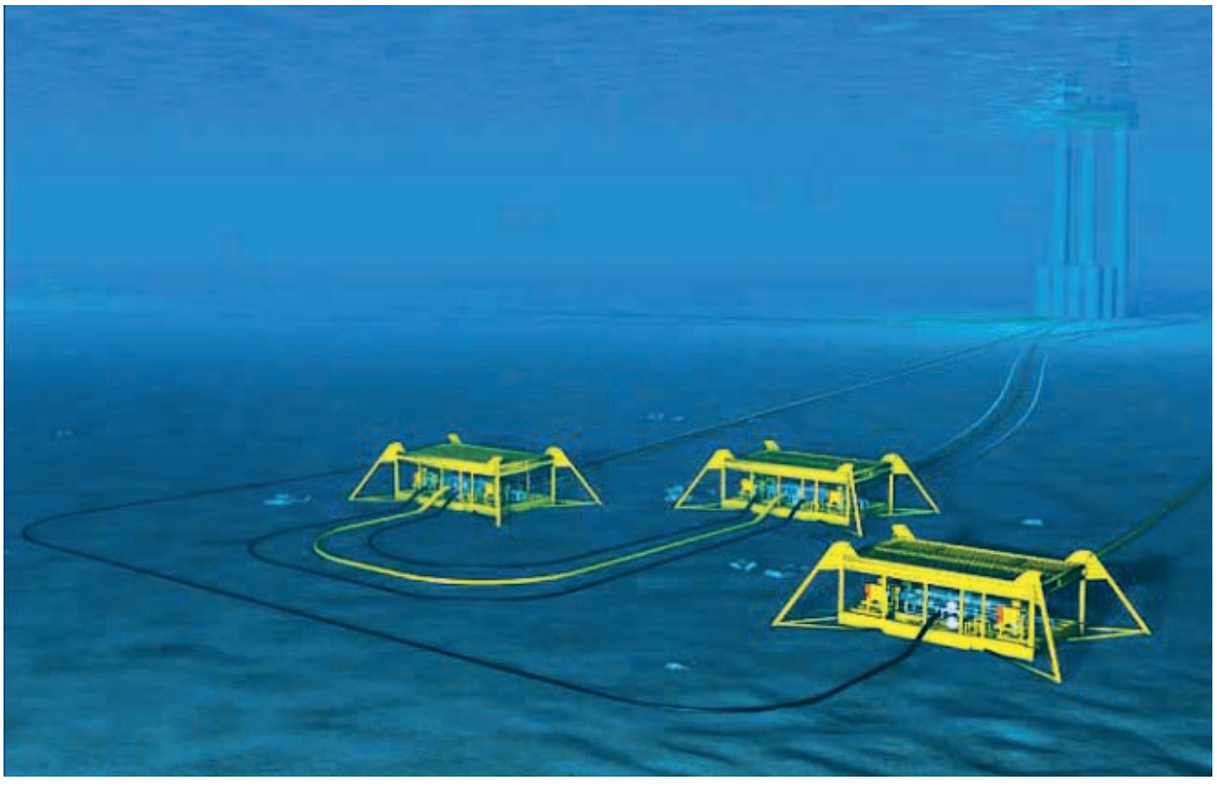
Statfjord North's reservoir comprises Jurassic sandstones, and is produced through pressure support from water injection.

Development solution

The field has been developed with three subsea templates in 250-290 metres of water. Statfjord North D and E are for production, while Statfjord North F provides water injection. One well slot is used for a water injector on Sygna.

Two 10-inch pipelines carry the wellstream to Statfjord C for processing, storage and onward transport, using the same platform facilities as Sygna and Statfjord East. All the Statfjord North installations are subsea and remotely controlled from Statfjord C.

Statfjord North	
Block	33/9
Production licence	037
Awarded	1973
Total recoverable reserves	257 mill bbl oil
	2.6 bn scm gas
	0.9 mill tonnes NGL
Remaining at 31 Dec 2008	34.6 mill bbl oil
	0.4 bn scm gas
	0.2 mill tonnes NGL
Discovery year	1977
Approved for development	11 Dec 1990
On stream	23 Jan 1995
Operator	Statoil
Licensees	
Petoro	30.00%
ExxonMobil	25.00%
Statoil	21.88%
ConocoPhillips	12.08%
Norske Shell	10.00%
Enterprise Oil Norge	1.04%



Statfjord North's subsea installations. Illustration: FMC Kongsberg Subsea

Statfjord East

This oil field, about seven kilometres north-east of Statfjord, was proven by the Norskald rig in 1976. It was approved for development in 1990 and began production on 24 September 1994.

Reservoir and recovery strategy

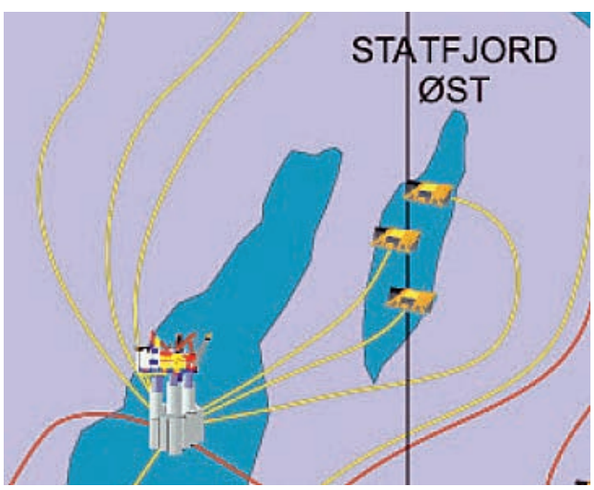
The Statfjord East reservoir is built up from middle Jurassic sandstones.

It produces through pressure support from water injection. An extended-reach production well was drilled from Statfjord C in 2006 to accelerate recovery.

Development solution

Located in 150-190 metres of water, the field has been developed with three subsea templates tied back to Statfjord C. Statfjord East L and M are for production, while Statfjord East K provides water injection. Each template has four well slots.

The wellstream is carried in two pipelines to Statfjord C for processing, storage and onward transport, using the same platform facilities as Sygna and Statfjord North.



Statfjord East tied back to Statfjord C. Illustration: Statoil

Statfjord East	
Blocks	33/9 and 34/7
Production licences	037 and 089
Awarded	1973 and 1984
Total recoverable reserves	232.7 mill bbl oil
	4 bn scm gas
	1.5 mill tonnes NGL
Remaining at 31 Dec 2008	20.1 mill bn oil
	0.4 bn scm gas
	0.3 mill tonnes NGL
Discovery year	1976
Approved for development	11 Dec 1990
On stream	24 Sep 1994
Operator	Statoil
Licensees	
Petoro	30.00%
Statoil	31.69%
ExxonMobil	17.75%
ConocoPhillips	6.04%
Norske Shell	5.00%
Idemitsu Petroleum Norge	4.80%
Total E&P Norge	2.80%
RWE Dea Norge	1.40%
Enterprise Oil Norge	0.52%

Sygna

The Sygna oil field lies 22 kilometres north of Statfjord. Discovered in 1996, it was approved for development in 1999 and began production on 1 August 2000.

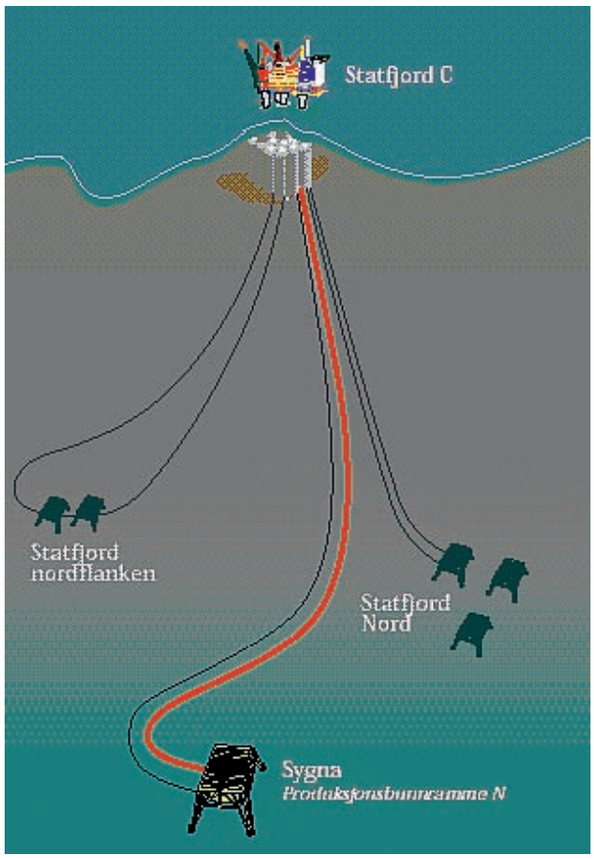
Reservoir and recovery strategy

Sygna's reservoir is built up from middle Jurassic sandstones. The field produces with the aid of water injection from Statfjord North, and is expected to remain on stream until 2014.

Development solution

Located in 300 metres of water, the field has been developed with the Sygna N subsea template. This installation provides four well slots and is tied back to Statfjord C. Three production wells have been drilled. Water injection capacity in the Statfjord North area was increased in 1999 to supply injection water for pressure support in Sygna, using a well from Statfjord North.

The wellstream is carried in a pipeline to Statfjord C for processing, storage and onward transport, using the same platform facilities as Statfjord North and East.



Sygna and Statfjord North tied back to Statfjord C. Illustration: Statoil

Sygna	
Blocks	33/9 and 34/7
Production licences	037 and 089
Awarded	1973 and 1984
Total recoverable reserves	67.9 mill bbl oil
Remaining at 31 Dec 2008	7.5 mill bbl oil
Discovery year	1996
Approved for development	30 Apr 1999
On stream	1 Aug 2000
Operator	Statoil
Operations organisation	Stavanger
Main supply base	Florø
Licensees	
Petoro	30.00%
Statoil	30.71%
ExxonMobil	18.48%
ConocoPhillips	6.65%
Norske Shell	5.50%
Idemitsu Petroleum Norge	4.32%
Total E&P Norge	2.52%
RWE Dea Norge	1.26%
Enterprise Oil Norge	0.57%

Murchison

The Murchison field was discovered in August 1975 in the northern North Sea. It straddles the UK-Norwegian boundary, lying partly in Britain's block 211/19a and partly in Norway's block 33/9. The British and Norwegian licensees concluded a unitisation agreement in 1979. Norway has 22.2 per cent of Murchison, and the UK 77.8 per cent. The Norwegian share was originally put at 25.06 per cent, but was reduced in 1986. In area terms, Murchison is grouped on the Norwegian side together with Statfjord.

Norway's production licence 037 was awarded in 1973. The development was approved by the Norwegian authorities in 1976, and the field came on stream in September 1980.

The operator is CNR International (UK).

Murchison. Photo: CNR International Ltd

Development solution

The field has been developed with the Murchison A combined production, drilling and quarters platform. Supported by a steel jacket, this stands in the UK sector. In addition come three remotely operated subsea installations, two for production and one for water injection.

Produced oil and NGL belonging to both the Norwegian and British licensees are landed through the Brent system at Sullom Voe in Shetland. Gas is piped to St Fergus in Scotland through the NLGP and Flags systems.

Recoverable reserves in Murchison are approaching full depletion.

Murchison

Blocks	33/9, 211/19a (UK)
Production licence	037 C
Awarded	2000
Total recoverable reserves	91.8 mill bbl oil
(Norwegian share)	0.4 bn scm gas
Remaining at 31 Dec 2008	5.6 mill bbl oil
	0.1 bn scm gas
Discovery year	1975
Approved for development	15 Dec 1976
On stream	28 Sep 1980
Operator	CNR International
(UK)	
Operations organisation	Aberdeen, UK
Main supply base	Peterhead, UK
Licensees	
CNR International (UK)	77.8%
Wintershall Norge	22.2%