OIL AND GAS PRODUCTION IN DENMARK

99

Energistyrelsen
Miljø- og Energiministeriet

PREFACE

1999 was a year of records for Danish oil and gas production: a new production record, a higher degree of self-sufficiency, the shortest time span ever from discovery of a field to production start-up, a large surplus on the balance of trade and the greatest upward adjustment of oil reserves in 15 years.

Oil and gas production in 1999 yet again helped ensure Denmark's self-sufficiency in energy. Moreover, along with escalating oil prices this production was a major contributor to Denmark's balance of payments surplus in 1999.

From 1998 to 1999, oil production increased by 26%. An increase of such magnitude has not been witnessed in 12 years. The sharp increase in production is attributable mainly to production from the three new fields, Halfdan, Siri and South Arne, which were brought on stream in 1999. The development of these new fields also meant a welcome to two new operators, Statoil and Amerada Hess, in the Danish area.

At the end of 1999, A. P. Møller submitted applications for the development of the Sif, Lola and Tyra South East Fields, the further development of the Valdemar Field and the southern flank of the Tyra Field, and for production start-up from the Boje structure.

Several of the exploration wells drilled during the year proved successful, leading to new oil and gas discoveries. Five new licences were granted, which will raise the level of exploration activity in the years to come.

Relative to the size of production, the emission of CO_2 from the flaring of gas offshore generally decreased from the beginning of the 1990s until 1999, when this trend was temporarily reversed due to extraordinary conditions connected with the commissioning of new production facilities. However, during the first months of 2000, CO_2 emissions were rapidly on their way to becoming normalized.

Taken as a whole, 1999 was characterized by highly favourable development in oil and gas exploration and production. The new activities and results afford grounds for optimism on sustained and environmentally sound production of oil and gas in the North Sea.

Copenhagen, May 2000

Ib Larsen

Director

CONVERSION FACTORS

Reference pressure and temperature for the above-mentioned units:

		TEMP.	PRESSURE
Crude oil	m^3 (st)	15°C	101.325 kPa
	stb	60°F	14.73 psia[ii]
Natural gas	m^3 (st)	15°C	101.325 kPa
	Nm^3	0°C	101.325 kPa
	scf	60°F	14.73 psia

ii) The reference pressure used in Denmark and in US Federal Leases and in a few states in the USA is 14.73 psia.

In the oil industry, two different systems of units are frequently used: SI units and the so-called oil field units. The SI units are based on international definitions, whereas the use of oil field units may vary from one country to another, being defined by tradition.

The abbreviations used for oil field units are those recommended by the SPE (Society of Petroleum Engineers).

The density of oil is often expressed in API gravity or degrees API: °API. The conversion factors are shown in the formulae below.

Quantities of oil and natural gas may be indicated by volume or energy content. As gas, and, to some extent, oil are compressible, the volume of a specific amount varies according to pressure and temperature. Therefore, measurements of volume are only unambiguous if the pressure and temperature are indicated.

The composition, and thus the calorific value, of crude oil and natural gas vary from field to field and with time. Therefore the conversion factors for t and GJ are dependent on time. The table below shows the average for 1999. The lower calorific value is indicated.

The SI prefixes m (milli), k (kilo), M (mega), G (giga), T (tera) and P (peta) stand for 10^{-3}, 10^3, 10^6, 10^9, 10^{12} and 10^{15}, respectively.

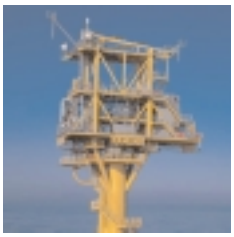
A somewhat special prefix is used for oil field units: M (roman numeral 1,000). Thus, the abbreviated form of one million stock tank barrels is 1 MMstb, and the abbreviation used for one billion standard cubic feet is 1 MMMscf.

Some abbreviations:

**)*	*Exact value*
i)	*Average value for Danish fields*
kPa	*kilopascal. Unit of pressure. 100 kPa = 1 bar*
Nm^3	*Normal cubic metre. Unit of measurement used for natural gas in the reference state 0°C and 101.325 kPa.*
m^3 (st)	*Standard cubic metre. Unit of measurement used for natural gas and crude oil in a reference state of 15°C and 101.325 kPa.*
Btu	*British Thermal Unit. Other thermal units are J (= Joule) and cal (calorie).*
bbl	*Blue barrel. In the early days of the oil industry when oil was traded in physical barrels, different barrel sizes soon emerged To avoid confusion, Standard Oil painted their standard-volume barrels blue.*
Kg · mol	*kilogrammol; the mass of a substance whose mass in kilograms is equal to the molecular mass of the substance.*
γ	*gamma; relative density.*
in	*inch; British unit of length. 1 inch = 2.54 cm*
ft	*foot/feet; British unit of length. 1 ft = 12 in.*
t.o.e.	*tons oil equivalent; this unit is internationally defined as 1 t.o.e. = 10 Gcal.*

	FROM	TO	MULTIPLY BY
Crude Oil	m^3 (st)	stb	6.293
	m^3 (st)	GJ	36.3
	m^3 (st)	t	0.86[i]
Natural Gas	Nm^3	scf	37.2396
	Nm^3	GJ	0.040
	Nm^3	kg · mol	0.0446158
	m^3 (st)	scf	35.3014
	m^3 (st)	GJ	0.0373
	m^3 (st)	kg · mol	0.0422932
Units of Volume	m^3	bbl	6.28981
	m^3	ft^3	35.31467
	US gallon	in^3	231*
	bbl	US gallon	42*
Energy	t.o.e.	GJ	41.868*
	GJ	Btu	947817
	cal	J	4.1868*

	FROM	TO	CONVERSION
Density	°API	kg/m^3	141364.33/(°API + 131.5)
	°API	γ	141.5/(°API + 131.5)



1. EXPLORATION

In 1999, five new licences for the exploration and production of hydrocarbons were awarded - four licences under the Open Door procedure and one licence for a block adjacent to the area comprised by A.P. Møller's Sole Concession of 1962.

Generally, the exploration and appraisal wells drilled during the year showed positive results and led to new oil and gas discoveries.

As expected, the new licences issued in the Fifth Licensing Round resulted in a high degree of activity and the acquisition of 3D seismic data in preparation for the exploration wells to be drilled in 2000 and the following years.

OPEN DOOR PROCEDURE

In the first half of 1999, four new licences for the exploration and production of hydrocarbons were granted under the Open Door procedure; see Fig. 1.1.

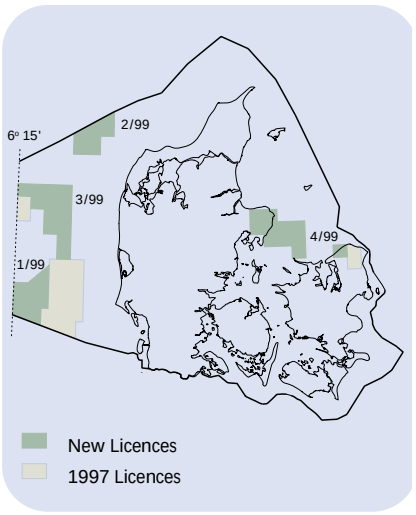
Licence 1/99 was awarded to Agip Denmark BV on 15 February 1999. This licence covers an area situated between the Central Graben and the Horn Graben, adjacent to the Danish/German border.

On 20 March 1999, Gustavson Associates was awarded licence 2/99, covering an area in the eastern part of the North Sea, south of the Norwegian/Danish border. Gustavson is a small US company incorporated in Boulder, Colorado.

Anschutz Overseas Corporation, incorporated in Denver, Colorado, was likewise granted a licence on 20 March 1999 for a major area in the Norwegian-Danish Basin, viz. licence 3/99.

A group of companies consisting of Courage Energy Inc., Emerald Energy Plc., Amerada Hess A/S and Odin Energi ApS, was granted licence 4/99 for areas in Djursland, the Kattegat and North Zealand on 1 May 1999. Amerada Hess is the operator under this licence. Courage Energy and Emerald Energy are incorporated in Calgary, Canada, and Epsom, the UK, respectively. The two remaining companies already have shares in other licences in Denmark.

Fig. 1.1 New Open Door Licences

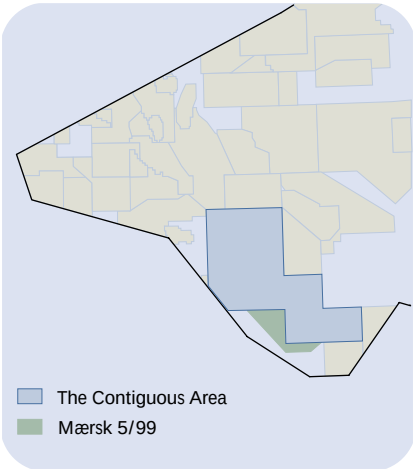


The companies participating in the new licences are now to carry out further evaluations and investigations before deciding whether to drill any exploration wells. Apart from a single well drilled in North Zealand in 1959 in the area comprised by the new licence 4/99, no exploration wells have previously been drilled in the new licence areas.

Under the Open Door procedure, applications are invited for all unlicensed areas east of 6°15' East longitude every year in the period from 2 January through 30 September. DONG Efterforskning og Produktion A/S (DONG E & P A/S) is to have a 20% share of all licences in the Open Door area.

The location of the new licence areas also appears from the map at the back of the report.

Fig. 1.2 Allocation of Neighbouring Block



ALLOCATION OF NEIGHBOURING BLOCK

In May 1999, A.P. Møller applied for the allocation of a block adjacent to the Contiguous Area. Investigations have shown that the physical properties in the chalk to the south and west of the Dan/Kraka Fields may be assumed also to exist in the area adjoining the Sole Concession area. Therefore, these fields are likely to extend into the neighbouring block. If this theory proves true, part of this area is expected to be exploitable through horizontal wells drilled from existing platforms. A work programme providing for further exploration of this prospectivity has been agreed upon.

Against this background, the Minister for Environment and Energy granted a licence on 27 November 1999 for the exploration and production of hydrocarbons in the neighbouring block; see Fig. 1.2. DONG E & P A/S will have a 20% share in the new licence, designated licence 5/99. In other respects, the licence has been awarded on the general terms and conditions applicable to the licences most recently issued in the Fifth Licensing Round and in the Open Door area. However, considering the attractiveness of this area, an 8.5% royalty is payable, which corresponds to the royalty currently payable on production from the Dan/Kraka Fields.

A.P. Møller plans to extend its cooperation in DUC to the new area.

AMENDED LICENCES

The Contiguous Area

Under the 1981 agreement between the Danish state and A.P. Møller, the Concessionaires are to relinquish 25% of each of the nine blocks comprised by the Contiguous Area as at 1 January 2000. Areas which include producing fields and for which development plans have been submitted to the Danish Energy Agency are exempted, however.

At the end of 1999, the Concessionaires made a proposal for the relinquishment of areas. The Danish Energy Agency is reviewing this proposal, and the result will not be published until the relinquishment has been approved.

The Concessionaires also submitted proposed work programmes for 2000-2005 in the Contiguous Area at the end of 1999. The work programmes describe the exploration activities foreseen for the nine blocks in the years to come. The programmes cover a six-year term and are reviewed every third year.

Extended Licence Terms

In 1999, the exploration term for the three licences remaining from the Third Licensing Round was extended by two years until 20 December 2001. Two of the licences, 7/89 and 8/89, are close to the South Arne Field, and are operated by Amerada Hess A/S and Dansk Operatørselskab i-s (Danop), respectively. Mærsk Olie og Gas AS is operator for the third licence, 10/89, which comprises an area at the Norwegian/Danish border.

Relinquished Areas

Two of the licences granted in 1997 under the Open Door procedure were relinquished on 15 September 1999. Generally, the work programmes for the Open Door licences are divided into two-year phases. Upon the completion of each phase, the licensee may choose either to commit himself to further exploratory work or to relinquish the licence. The operator for the two relinquished licences, 2/97 and 3/97, was Amerada Hess.

Half of licence 4/95 was relinquished on 15 May 1999, the relinquishment being attributable to the terms of the licence. Of the licences granted in the Fourth Licensing Round in 1995, this licence covered the largest area.

Finally, a large part of the original licence area comprised by licence 10/89 was relinquished in connection with the above-mentioned extension of the licence term.

Approved Transfers

The Danish Energy Agency is to approve all transfers of licences and the terms of the transfer.

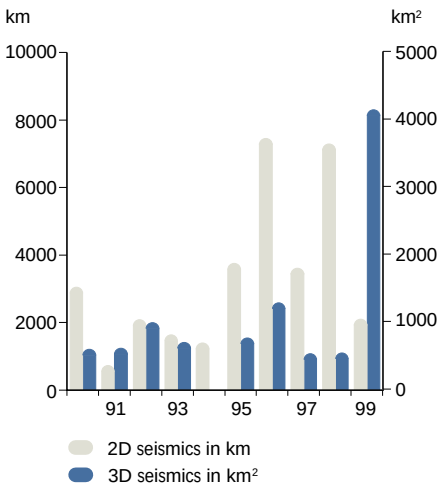
At the beginning of 1999, Veba Oil Denmark GmbH took over a 20% share of licence 11/98 from Amerada Hess A/S and Denerco Oil A/S, which reduced their shares by 15% and 5%, respectively. The transfer was made effective 1 January 1999. Veba Oil did not previously participate in this licence. Subsequently, DONG E & P A/S increased its share in the licence by 5%, effective 15 June 1998, as Amerada Hess and Denerco Oil reduced their shares by an additional 3% and 2%, respectively.

Denerco Oil A/S transferred a share of 30%, 20% and 17%, respectively, of licences 2/90, 3/95 and 16/98 to RWE-DEA AG. The shares of licences 2/90 and 3/95 were transferred with retroactive effect from 1 January 1998, while the share of licence 16/98 was transferred with effect from 15 June 1998. The areas comprised by these three licences are situated to the south and west of the Siri accumulations.

DONG E & P A/S and Denerco Oil A/S have both increased their shares of licence 4/95 east of the Siri accumulations. Thus, DONG E & P A/S took over 7.5% from EWE AG effective 1 January 1999, while Denerco Oil took over 8.5% from RWE-DEA AG effective 1 January 1998.

With effect from 1 January 1999, Pogo Denmark Inc. took over a 40% share of licence 13/98 from EDC (Denmark) Inc. Pogo, a subsidiary of the US company, Pogo Producing Company, has not previously participated in licences in the Danish area.

Fig. 1.3 Annual Seismic Surveying Activities



In addition, some companies have transferred their licence rights internally, from one subsidiary to another. Thus, as at 10 December 1999, Kerr-McGee Denmark Limited transferred its share of licence 8/98 to Kerr-McGee International ApS, a Danish private limited company. Likewise, Anschutz Overseas Corporation transferred its share of licence 3/99 to a Danish private limited company, Anschutz Denmark ApS, with effect from 26 March 1999.

On 15 September 1999, Sterling Resources Ltd., which is incorporated in Calgary, Canada, took over the operatorship under licence 5/97 from Odin Energi ApS.

On 1 January 1999, Dansk Operatørselskab i-s (Danop) took over the operatorship under licence 11/98 from Amerada Hess A/S.

With effect from the same date, Danop was appointed co-operator under licence 7/89, cooperating with the operator of the South Arne Field, Amerada Hess, in the drilling of production wells.

At the beginning of 2000, Denerco Oil A/S agreed to sell its 50% share of Dansk Operatørselskab i-s (Danop) to DONG. Upon the execution of the agreement, Danop will be wholly-owned by DONG and be incorporated as an independent division of DONG E & P A/S.

The composition of all existing licence groups in the Danish area appears from Appendix A. The Danish Energy Agency's homepage (www.ens.dk) contains a similar outline, which is continuously updated to reflect any changes in the composition of licence groups.

EXPLORATION ACTIVITY

Exploratory Surveys

In connection with the granting of licences in the Fifth Licensing Round in 1998, agreements were made with the licensees for the implementation of comprehensive 3D seismic programmes. Consequently, the acquisition of 3D seismic data reached the highest level to date in Danish territory in 1999; see Fig. 1.3. This development signifies that the oil companies generally prefer to carry out detailed 3D seismic surveys when initiating exploration activity in their licence areas, as opposed to the less detailed 2D seismic surveys.

These extensive seismic programmes were carried out as a result of good teamwork between the licensees involved. Wherever possible, the licensees shared a few seismic surveying vessels, consequently succeeding in spreading the activities

Fig. 1.4 Seismic Surveys in 1999

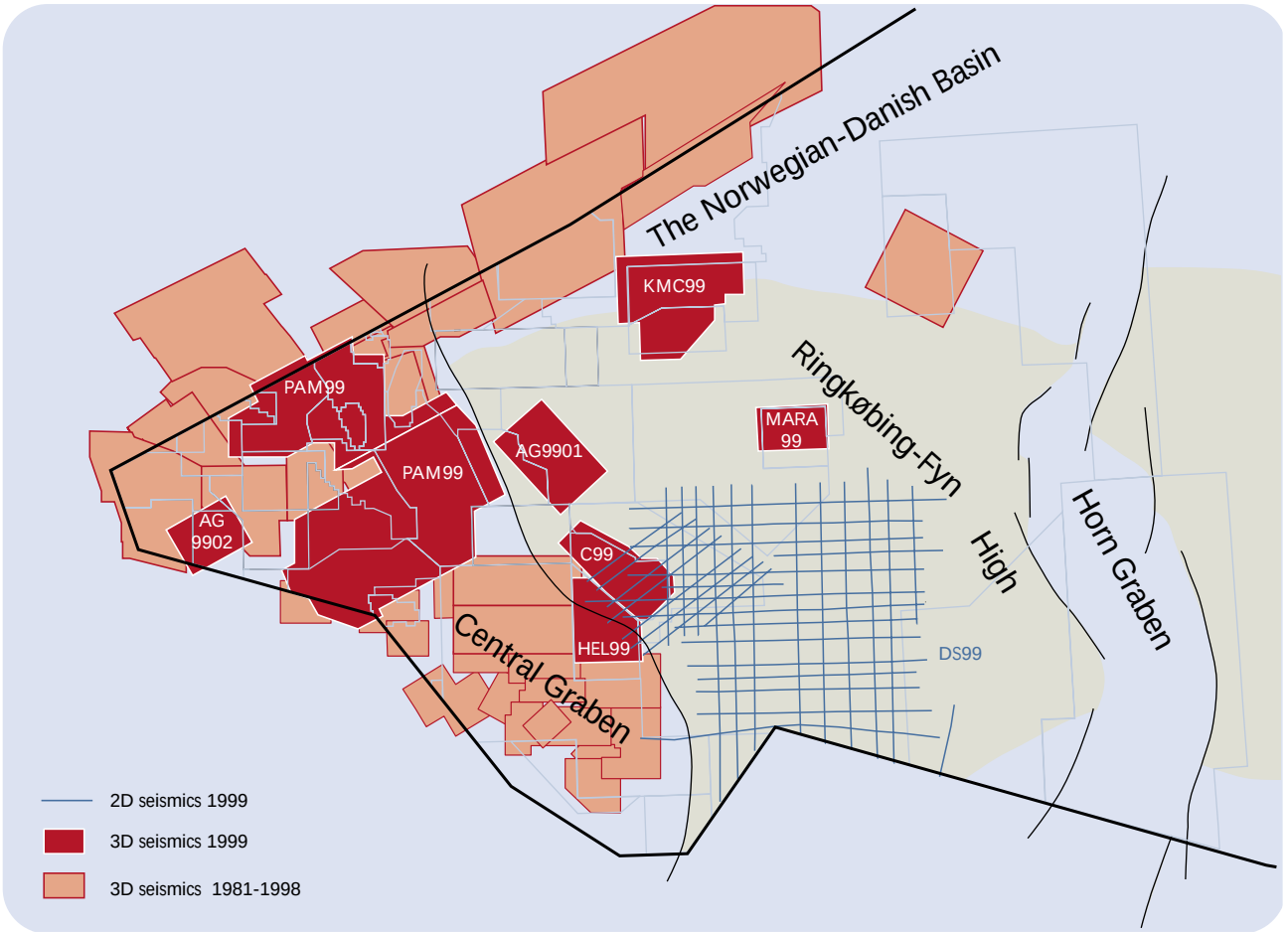
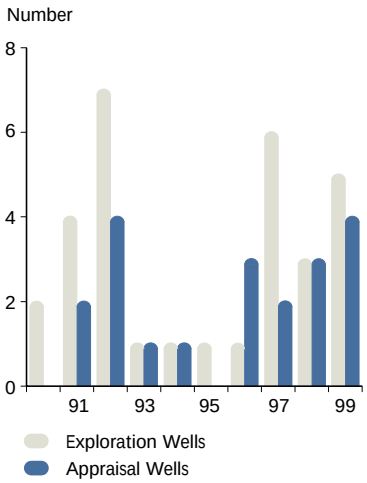


Fig. 1.5 Exploration and Appraisal Wells



so that interference from ongoing surveys could be minimized. Thus, several groups of companies in which Mærsk Olie og Gas AS, Phillips Petroleum Int. Corp. Denmark or Amerada Hess A/S is operator agreed to carry out one, extensive 3D seismic programme (PAM 99) covering their combined licence areas. Other licensees made agreements with seismic surveying companies which participated in the financing of the surveys in return for the right to sell the results of the surveys to other interested oil companies.

With the acquisition of the new seismic data, the major part of the Central Graben has now been covered by 3D seismic surveys; see Fig. 1.4.

Comprehensive 3D seismic programmes were also conducted on the Ringkøbing-Fyn High, which was also the object of one 2D seismic survey.

On shore, a geochemical survey of the subsoil near Salling in Northern Jutland was carried out. This survey was made in a joint venture between Corrit-Stiftung and the Technical University of Denmark. Soil samples were analyzed for traces of hydrocarbons. Such traces may indicate the presence of oil or gas in the subsoil.

Appendix B contains further information about the seismic surveys in 1999.

Wells

In 1999, five exploration wells were drilled, supplemented by four combined appraisal/production wells, in connection with field developments; see Figs. 1.5 and 1.6. The majority of these wells recorded positive results.

The results of exploration and appraisal wells, particularly in the Contiguous Area, have been successful because of the vastly improved possibilities of mapping and modelling the extent of high-porous hydrocarbon-bearing layers in the chalk.

Nana-1X (5505/13-2), Halfdan-2X (5505/13-4) and Halfdan-3X (5505/13-6)

Mærsk Olie og Gas drilled the Nana-1X well northwest of the Dan Field at the beginning of 1999. Oil was discovered, and, in connection with drilling the well, horizontal sidetracks were drilled to evaluate the extent of the accumulation.

In July 1999, the Concessionaires submitted a plan for developing the field, which was renamed the Halfdan Field at the same time. As part of the field development plan, which initially provides for the drilling of up to nine wells, the first two wells were drilled at the end of 1999. One objective of the two wells Halfdan-2X and -3X was also to collect further data about the extent of the Halfdan Field.

Sif-1X (5505/13-3)

The Sif-1X well also encountered hydrocarbons. Mærsk Olie og Gas drilled the well at a location west of the Igor Field and established the presence of gas in the chalk. In connection with drilling the well, a horizontal sidetrack was drilled to evaluate the extent of the gas accumulation more closely. At the end of 1999, the Concessionaires submitted a development plan for the Sif Field.

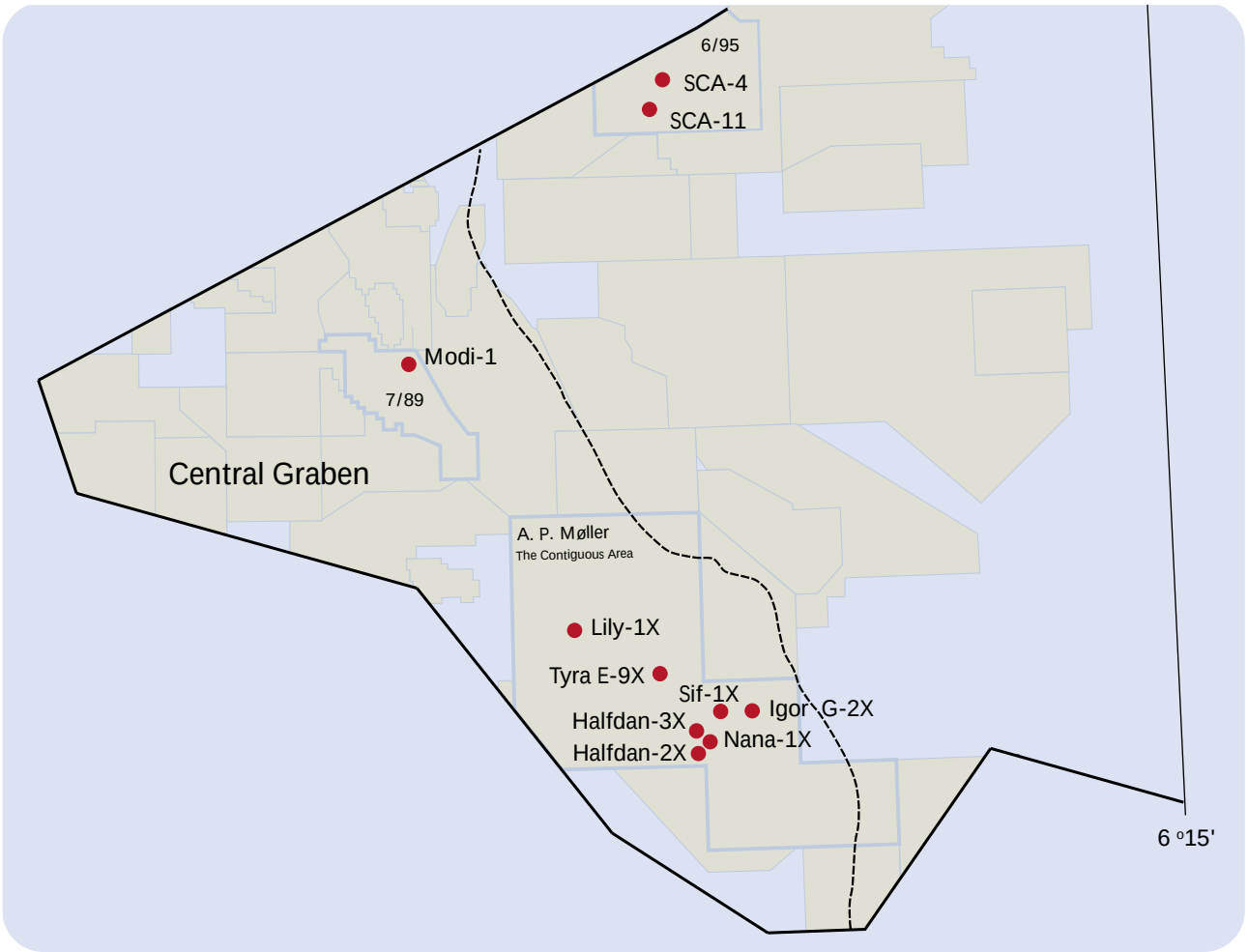
Igor G-2X (5505/13-5)
The Igor G-2X appraisal well was drilled about 2 ½ km west of the G-1X well, which in 1968 led to the discovery of the Igor gas accumulation in the chalk. The well confirmed the model of the gas accumulation, and was drilled by Mærsk Olie og Gas.

Tyra E-9X (5504/12-9)
The E-9X appraisal well was drilled by Mærsk Olie og Gas southeast of the Tyra Field in the area designated Tyra South East. The well encountered larger oil deposits than expected in the chalk. At the end of 1999, the Concessionaires submitted a development plan for this accumulation in the Tyra South East area.

SCA-4 (5604/20-3) and SCA-11 (5604/20-4)
In the Siri area, Statoil Efterforskning og Produktion A/S drilled two exploration wells with objectives close to the Siri Field.

The SCA-4 well was drilled horizontally from the Siri wellhead platform to investigate a structure north of the Siri Field. Oil was encountered in the Siri North structure, and a prolonged production test was carried out via the Siri production facilities. The well has subsequently been converted into a water- and gas-injection well serving the northern part of the Siri Field.

Fig. 1.6 Wells



Another well, SCA-11, was drilled to investigate a possible oil trap east of Siri. However, no oil was encountered by this well. Instead, Statoil drilled a sidetrack (SCA-11A), which was directed towards the Siri Field proper. This allowed the well to be utilized for production.

Modi-1 (5604/29-6)

This exploration well was drilled by Amerada Hess A/S in cooperation with Danop to investigate an area at the eastern flank of the South Arne Field, where seismic data had indicated a possibility of supplementary exploratory objectives. Modi-1 terminated in Maastrichtian chalk at a depth of 3,198 metres below sea level. The Modi-1 well encountered significant traces of oil. The commercial implications of these oil traces are now being evaluated more closely.

Lily-1X (5504/11-4)

In January 2000, Mærsk Olie og Gas drilled the Lily-1X exploration well at a location south of the Roar Field. However, the well did not confirm the expected hydrocarbon saturations in the chalk.

RELEASED WELL DATA

Generally, data collected under licences granted in pursuance of the Danish Subsoil Act are protected by a five-year confidentiality clause. However, the confidentiality period is limited to two years for licences which expire or are relinquished. In 1999, data regarding the following exploration wells were released:

Well	Well no.	Operator
Stenlille-12	5511/15-12	DONG E & P A/S
Stenlille-13	5511/15-13	DONG E & P A/S
E-8X	5504/12-7	Mærsk Olie og Gas AS

A list of all Danish exploration and appraisal wells is available on the Danish Energy Agency's homepage, www.ens.dk.

All information about released well data, including seismic surveying data, etc. collected in connection with exploration and production activities, is provided by the Geological Survey of Denmark and Greenland.

2. DEVELOPMENT AND PRODUCTION

In addition to a new production record, 1999 saw several major changes in the area of development and production. In the course of 1999, oil and gas production was initiated from three new fields, Siri, South Arne and Halfdan. In this connection, two new operators began operating oil and gas fields in Denmark, Statoil Efterforskning og Produktion A/S at the Siri Field and Amerada Hess A/S at the South Arne Field. The Halfdan Field is operated by Mærsk Olie og Gas AS, which is now in charge of production from a total of 14 fields.

Fig. 2.1 is a map showing the location of the Danish producing fields, as well as expected, future field developments (commercial fields).

In 1999, 17 wells were completed in the producing fields. All the wells were drilled with long horizontal sections in the reservoir horizons.

In December 1999, A.P. Møller submitted an application for developing new fields in the Contiguous Area, requesting permission to develop and start up production from the Sif, Lola and Tyra South East Fields, to further develop the Valdemar Field and the southern flank at the Tyra Field, as well as to initiate production from the Boje structure, situated at the Valdemar Field.

Fig. 2.1 Danish Oil and Gas Fields

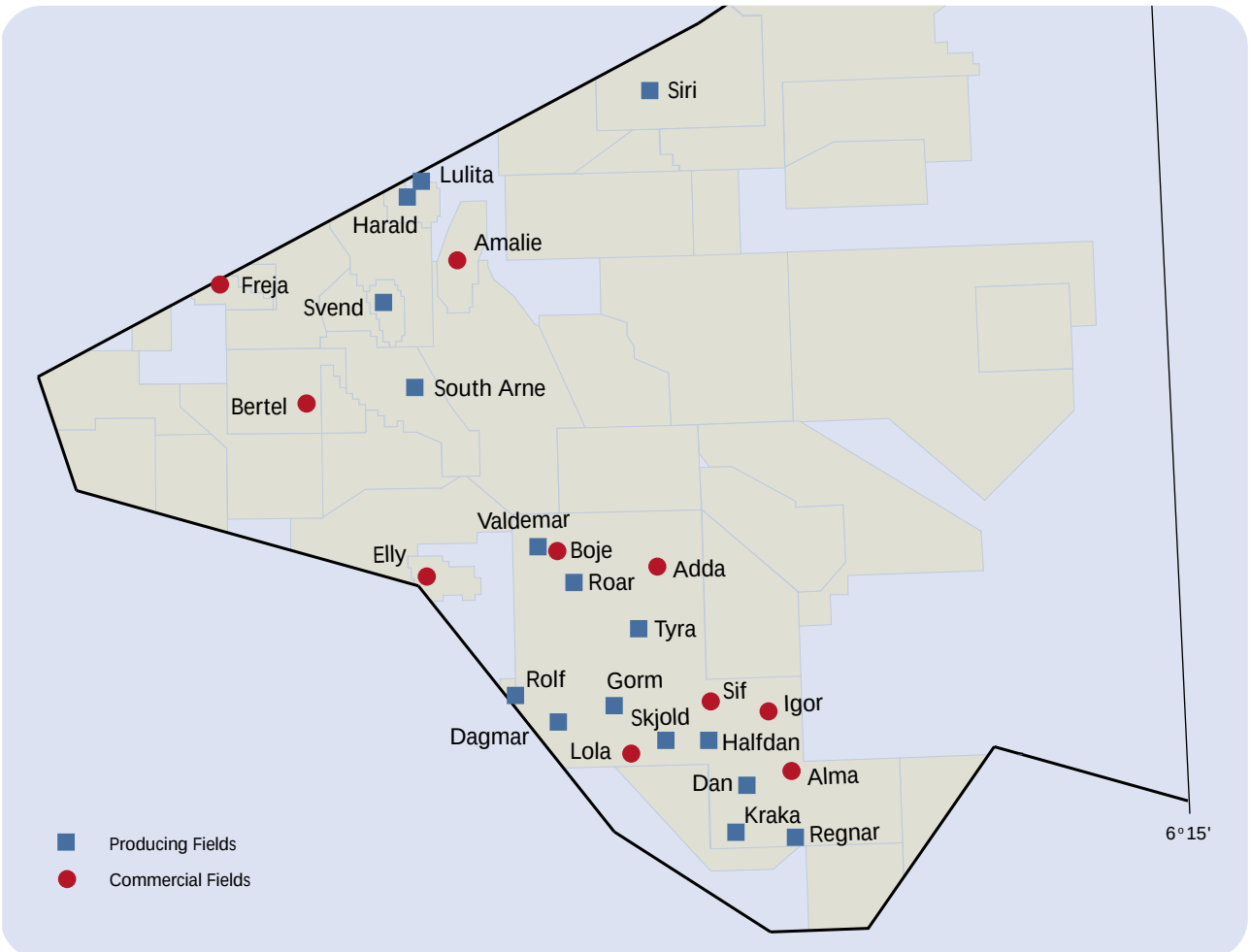
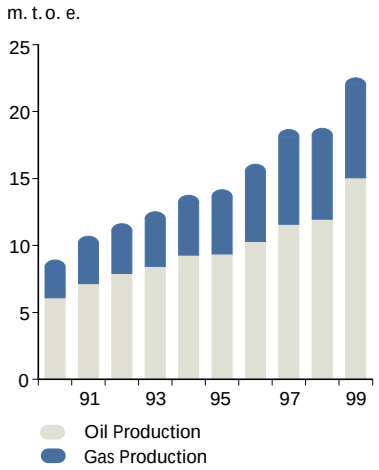


Fig. 2.2 Production of Oil and Natural Gas



In connection with the start-up of production from the South Arne Field, the new gas pipeline from the North Sea to shore was brought into operation. The gas pipeline emanates from the South Arne Field, and via a hook-up to the Harald Field, the gas is conveyed to the gas processing facilities at Nybro. The pipeline is owned and operated by DONG Naturgas A/S.

Oil produced from the South Arne and Siri Fields is temporarily stored in tanks placed on the sea bed at the fields. From here, the oil is regularly loaded on board tankers, which transport the oil to refineries in Northern Europe. About 25% of the total oil produced is loaded direct on board tankers from the South Arne and Siri Fields. The remaining 75% of oil production is transported to shore through the oil pipeline from the Gorm Field.

NEW PRODUCTION RECORD

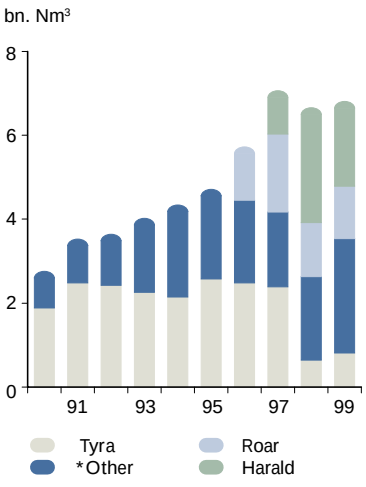
For quite some years now, the Danish production of oil and gas has continued to show an upward trend. Production in 1999 also exceeded the previous years' figures. The continued development of the existing fields, combined with production start-up from the two new fields, Siri and South Arne, meant that during the last months of 1999 more oil was produced than ever before in Denmark.

Fig. 2.2 shows the development of Danish oil and gas production in the period from 1990 to 1999. Appendix D contains an overview with oil and gas production figures in the period since 1972, when the first oil in Denmark was produced at the Dan Field. Moreover, this appendix sets out the monthly production figures for oil and condensate in 1999, broken down by field.

In 1999, oil production totalled 17.36 million m^3, a 26% increase over the 1998 production figure.

Gross gas production amounted to 10.90 billion Nm^3 in 1999, of which 3.12 billion Nm^3 was reinjected into the fields. Thus, net gas production amounted to 7.78 billion Nm^3 in 1999. Fig. 2.3 shows the development of natural gas supplies to DONG Naturgas A/S in the period from 1990 to 1999.

Fig. 2.3 Natural Gas Supplies Broken down by Field



** Dan, Gorm, Skjold, Rolf, Kraka, Regnar, Valdemar, Svend, Lulita, South Arne and Halfdan*

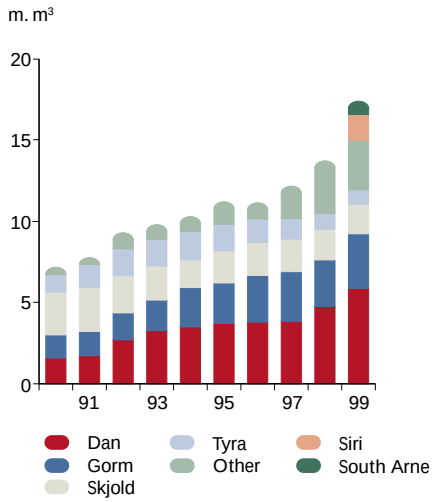
In 1999, 6.77 billion Nm^3 of gas was supplied to DONG Naturgas A/S. The difference between the net gas produced and the amount of gas sold (13% of the net gas) was either utilized or flared on the platforms. Gas is flared solely for safety and technical reasons. A fairly large volume of gas was flared without being utilized in 1999, due primarily to the commissioning of new production facilities in the Siri and South Arne Fields; see the section on Environment and Fig. 7.6.

PRODUCING FIELDS

Appendix E contains an outline of all producing fields. Appendix C contains information about the Halfdan Field, currently under development, as well as an outline of future field developments. Fig. 2.4 shows the distribution of oil production by field.

Highlights of the activities at the producing fields in 1999 are given below.

Fig. 2.4 Distribution of Oil Production by Field



The South Arne Field

The South Arne Field is an oil accumulation with a relatively high content of gas in Danian and Maastrichtian chalk. The field is situated in the northern part of the Central Graben. Amerada Hess A/S is the operator for the field.

The platform was installed in the summer of 1999, after which the field was brought on stream. The field produced 0.75 million m^3 of oil and 169 million Nm^3 of gas in 1999. The production capacity of the wells drilled exceeded expectations, meaning that the total production for 1999 came close to the production target despite an unforeseen delay in production start-up.

Initially, the oil produced is conveyed to a storage tank on the sea bed. From here, the oil is pumped on board tankers, which transport the oil to refineries in Northern Europe. The gas produced is transported to shore through a pipeline owned by DONG, which has also bought all gas produced from the field.

So far, production takes place from five horizontal wells, drilled by a mobile, jack-up drilling rig before the platform was installed. More production wells are envisaged. In spring 2000, water-injection tests will be performed in a new well, in order to investigate the potential for enhancing recovery from the field. The production facilities have been designed for this purpose.

The Siri Field

The Siri Field is an oil accumulation in Palaeocene sandstone. Siri is situated east of the Central Graben, where all commercial oil and gas discoveries have been made to date. The Siri Field is the only field in Denmark to produce oil and gas from Palaeocene sandstone layers. Statoil Efterforskning og Produktion A/S is operator for the field.

The platform was installed in the field in autumn 1998, and the field came on stream in March 1999. Production takes place from a total of five wells, and 1.59 million m^3 of oil and 83 million Nm^3 of gas were produced from the field in 1999. By means of buoy loading facilities, the oil produced is loaded on board tankers from a storage tank placed on the sea bed and transported to refineries in Northern Europe. To enhance recovery, the gas produced is reinjected into the reservoir together with water through two wells. The co-injection of gas and water in a single well is a novel technique, almost untested to date. In 1999, 59 million Nm^3 of gas and 1.21 million m^3 of water were injected into the field.

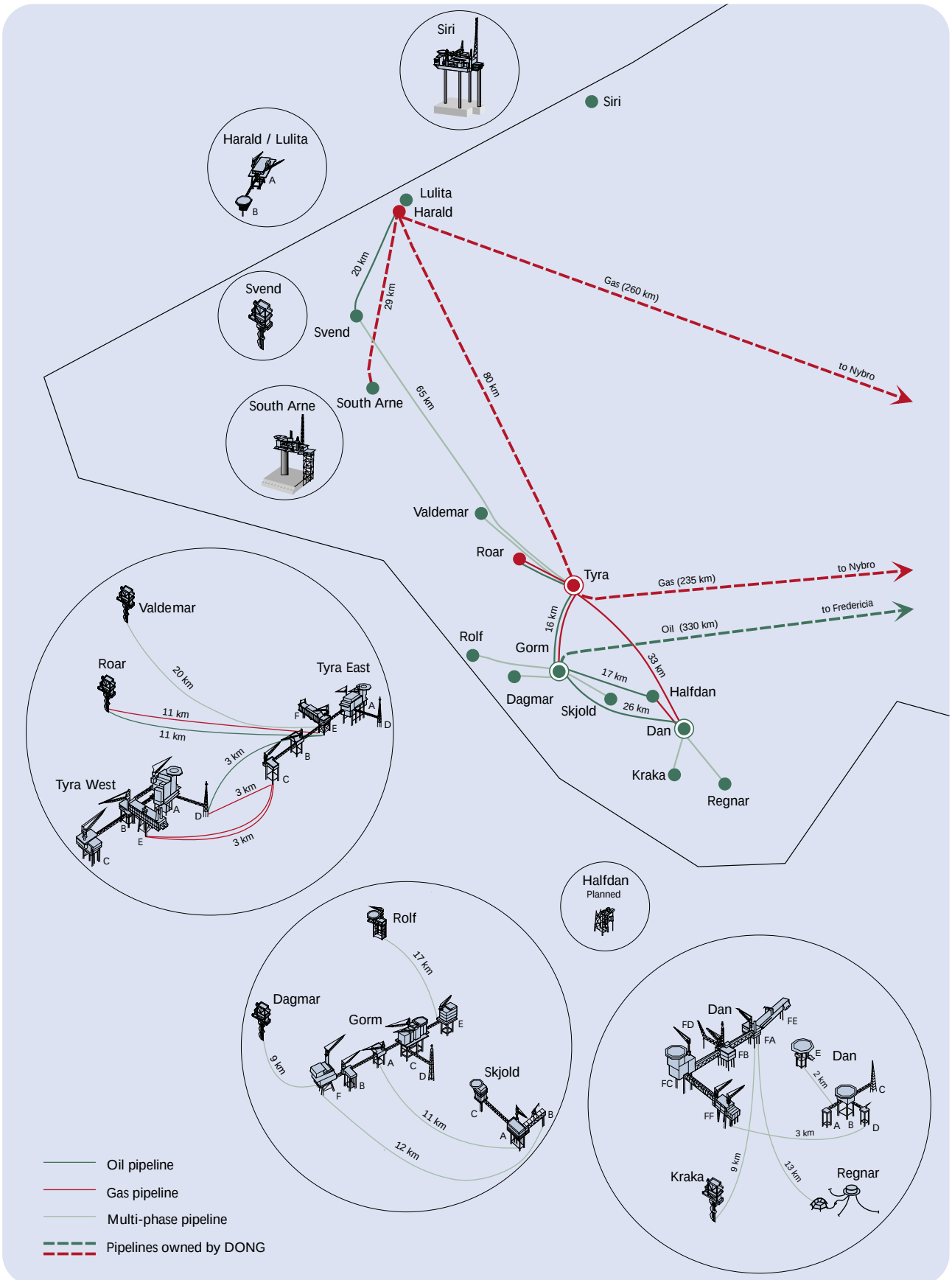
The Skjold Field

In the Skjold Field, four new wells, three production wells and one water-injection well, were completed as part of a further development plan for the field, which was approved by the Danish Energy Agency in spring 1999. As a result of this field development plan, more wells are to be drilled in the Skjold Field in 2000.

The Dan Field

In the Dan Field, two new production wells were completed in 1999. Oil production in 1999 exceeded the 1998 production figure by 20%. This increase is attributable to the start-up of production from new wells, including production from the northwestern flank of the field, as well as to sustained oil production from older wells as a result of water injection into the field. The production of water has also risen, meaning that water now accounts for 42% of the total liquids produced.

Fig. 2.5 Production Facilities in the North Sea 1999



The Svend Field

In 1999, a new production well was drilled in the Svend Field. The performance of this well is somewhat disappointing, and in 1999 oil production from this field declined by 17% relative to 1998. The production of water more than doubled in 1999 compared to 1998.

The Gorm Field

A former water injector was converted and now produces oil. This initiative, combined with the restimulation of several wells and continued water injection, resulted in an 18% increase in oil production from the Gorm Field relative to 1998.

The Halfdan Field

In autumn 1998, Mærsk Olie og Gas AS drilled a very long horizontal well (MFF-19) from the Dan Field in a northwesterly direction. This well penetrated layers beyond the existing well control of the oil zones. Based on the success of this well, an exploration well, Nana-1X, was drilled in summer 1999, confirming the presence of oil and gas in the Nana structure. In addition, the Skjold-23 well drilled from the Skjold Field encountered hydrocarbons in the western part of the structure. Subsequently, in autumn 1999, the Danish Energy Agency approved a development plan for the field, which was renamed Halfdan by Mærsk Olie og Gas AS in this connection. Production from the field was initiated through the MFF-19 well in the Dan Field and the Skjold-23 well in the Skjold Field; see Appendix C.

The oil in the Halfdan Field is found in porous chalk layers, as in the adjacent Dan and Skjold Fields. However, the oil zone in the Halfdan Field is not a structural closure as in the Dan and Skjold Fields.

The production drilling initiated in 1999 at the future platform site will continue in 2000. Production from new wells commenced in March 2000. Initially, production takes place through provisional facilities placed on the Mærsk Endeavour drilling rig. Oil and gas are conveyed through a pipeline to the Dan Field for processing. Later in 2000, a four-legged wellhead platform will be installed in the field. New pipelines will transport the oil produced to the Gorm Field and the gas produced to the Dan Field. In addition, a pipeline will import water from the Dan Field for injection in the Halfdan Field. The approved development plan provides for the drilling of up to nine wells. This field is expected to be further developed at a later date.

NEW DEVELOPMENT PLANS

As mentioned in the introduction to this section, the Danish Energy Agency received applications for the development of new fields in the Contiguous Area in December 1999.

One of these new fields, the Sif Field, is situated due west of the Igor Field. The Sif-1X exploration well (see the section on Exploration) encountered gas in porous chalk layers.

Another new field, the Lola Field, is situated west of the Skjold Field and consists of an accumulation of oil and gas in porous chalk layers. Hydrocarbons in Middle Jurassic layers have also been encountered in this field.

The third field, the Tyra South East Field, is situated at the southeastern flank of the Tyra Field. A development plan for this area has previously been approved. New data provided by the E-9X well (see the section on Exploration) have resulted in a reappraisal of this area, and thus the submission of a new development plan.

NATURAL GAS STORAGE FACILITIES

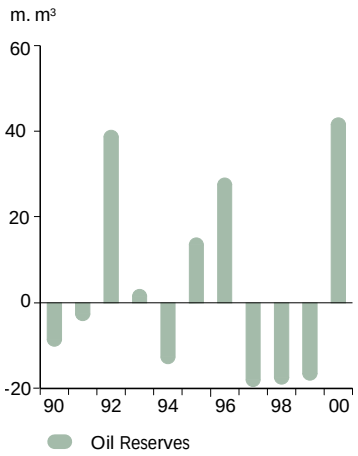
DONG Naturgas A/S has two natural gas storage facilities at its disposal, one at Lille Torup near Viborg in Jutland, and one at Stenlille on Zealand.

At the turn of the year 1999/2000, the Lille Torup and Stenlille storage facilities provided an extraction capacity of 410 million Nm^3 and 400 million Nm^3, respectively, totalling about 810 million Nm^3.

At the Stenlille storage facilities, DONG Naturgas A/S is establishing a new withdrawal processing train, expected to be operative at the end of 2000.

3. RESERVES

Fig. 3.1 Change in Oil Reserves



An assessment of Danish oil and gas reserves is made annually by the Danish Energy Agency.

The assessment made by the Danish Energy Agency at 1 January 2000 shows an increase in oil and gas reserves of 22% and 15%, respectively, in relation to the assessment at 1 January 1999. The write-up of reserves is attributable in part to expected production from the new Halfdan and Sif Fields. Moreover, the reserves of several fields have been reassessed, which has resulted in an upward adjustment of the possible recovery category.

Oil reserves have been estimated at 238 million m³. Compared to last year's assessment, total expected oil recovery has been written up by 60 million m³. Production in 1999, which was record high, amounted to 17.4 million m³. Thus, the increase in oil reserves totals about 43 million m³.

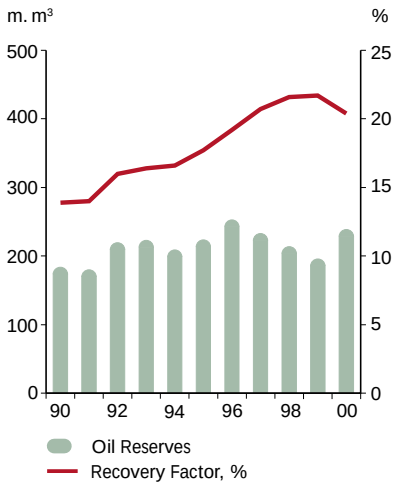
Largest Write-up of Oil Reserves in 15 Years

The 60 million m³ upward adjustment of expected oil recovery is the largest made by the Danish Energy Agency to date. However, the large volume of oil produced in 1999 means the write-up of reserves will not be record high. Nevertheless, the 43 million m³ upswing in oil reserves is the greatest since 1985, when reserves were written up by 46 million m³.

Fig. 3.1 shows the movements in oil reserves in the past decade. Major revaluations were made for the years 1992, 1996 and, of course, 2000. The upward adjustment in 1992 was mainly attributable to expected further field developments, including the drilling of horizontal wells and the use of water injection. The revaluation made in 1996 was based mainly on the expected development of discoveries made during the period ending on 31 December 1995.

In the past ten years, oil reserves have been estimated at 200 million m³, thus remaining fairly constant; see Fig. 3.2. This means that, on average, expected recovery has increased at the same rate as production, even though production has more than doubled over the same period. The increased recovery is chiefly attributable to further field developments, including the drilling of horizontal wells and the use of water injection, as well as new discoveries made.

Fig. 3.2 Oil Reserves and Recovery Factor



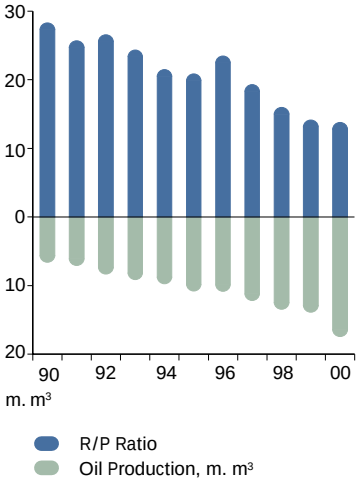
The overall recovery factor, the ratio of ultimate recovery to total oil in place, declined from 22% to 20% compared to the year before; see Fig. 3.2. The main reason for this decline is that the volume of oil in place has been reassessed and written up for several fields, including the Dan, Kraka and Tyra Fields.

Viewed in a greater perspective, the recovery factory has gone up from 14% to 20% in the past ten years, an increase of approx. 50% generated by the further development of fields through the drilling of horizontal wells and the use of water injection.

R/P Ratio and Production

Oil reserves can be put into perspective by calculating the ratio of reserves to the previous year's production. Such a calculation results in a so-called

Fig. 3.3 R/P Ratio and Oil Production



R(reserves)/P(production) ratio, which is an indicator of the number of years for which oil production is estimated to be sustained at the same level.

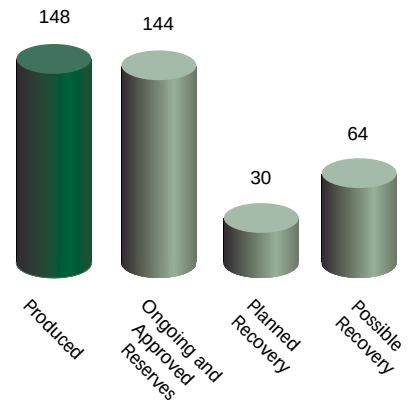
Based on the new assessment of reserves, the R/P ratio is 14, meaning that oil production is estimated to be sustainable at the 1999 level for the next 14 years.

The R/P ratio has dropped from 28 to 14 in the past decade. The declining R/P ratio is mainly attributable to increasing production, in that production has more than doubled in ten years as mentioned above; see Fig. 3.3.

If the reserves had not been reassessed since 1990, the depletion caused by production would have reduced reserves in 2000 to a mere 64 million m³. The R/P ratio for these reserves would have meant that production at the 1999 level could be upheld for only four years.

The R/P ratio is frequently used because it yields a comparable measure of how long reserves will last. However, this ratio cannot replace an actual forecast, especially not where large variations in future production are expected; see the section on the twenty-year production forecast and Fig. 3.7.

Fig. 3.4 Oil Recovery, m. m³



ASSESSMENT OF RESERVES

The reserves reflect the amounts of oil and gas that can be recovered by means of known technology under the prevailing economic conditions.

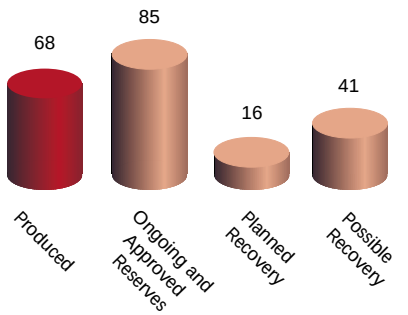
The volume of hydrocarbons in place that can be recovered over the life of a field is termed the ultimate recovery. Thus, the difference between ultimate recovery and the volume produced at any given time constitutes the reserves.

The method used by the Danish Energy Agency in calculating the reserves and preparing the production forecasts is described in Appendix H.

Table 3.1 shows the Danish Energy Agency's assessment of oil, condensate and gas reserves, broken down by field and category.

A low, expected and high estimate of reserves is given for each individual field, in order to illustrate the uncertainty attached to the assessment. In assessing Denmark's total reserves, it is not realistic to assume that either a high or a low figure will prove accurate for all fields. Therefore, for a large number of fields, the total assessment of reserves should be based on the expected value.

Fig. 3.5 Gas Recovery, bn. Nm³



It appears from Fig. 3.4 that the expected amount of oil reserves ranges from 174 to 238 million m³. The reserves assessed for the planned and possible recovery categories, respectively, reflect the increasing uncertainty as to whether such reserves can be exploited commercially.

For the first time, the volume produced exceeds ongoing and approved reserves.

Likewise, Fig. 3.5 illustrates that the expected amount of gas reserves ranges from 101 to 142 billion Nm³. Gas production figures represent the net production, i.e. produced gas less reinjected gas. It should be noted that the amounts of gas stated deviate from the amounts which can be marketed as natural gas. The difference (10-15%) represents the amounts consumed or flared on the platforms.

Table 3.1 Production and Reserves at 1 January 2000

	OIL, million m³				GAS, billion Nm³			
	Ultimate Recovery				Ultimate Recovery			
	Produced	Reserves			Produced	Reserves		
		Low	Exp.	High		Low	Exp.	High
Ongoing and Approved Recovery:					**Ongoing and Approved Recovery:**			
Dan	44	32	61	92	Dan	15	4	9	15
Kraka	3	1	3	6	Kraka	1	0	1	2
Regnar	1	0	0	0	Regnar	0	0	0	0
Halfdan	0	8	12	17	Halfdan	0	2	2	3
Alma	-	0	1	1	Alma	-	1	1	2
Gorm	37	7	14	22	Gorm	5	1	2	3
Skjold	29	7	13	20	Skjold	3	1	1	2
Rolf	4	0	1	2	Rolf	0	0	0	0
Dagmar	1	0	0	0	Dagmar	0	0	0	0
Tyra	18	5	9	13	Tyra	30	27	30	34
Valdemar	1	0	1	1	Valdemar	0	0	1	1
Roar	1	1	2	3	Roar	6	5	8	12
Svend	3	1	1	2	Svend	0	0	0	0
Elly	-	0	1	1	Elly	-	2	5	7
Igor	-	0	0	0	Igor	-	1	2	3
Adda	-	1	1	1	Adda	-	0	0	1
Harald	4	3	4	6	Harald	7	13	17	21
Lulita	0	0	1	1	Lulita	0	0	1	1
Siri	2	3	7	10	Siri	-	-	-	-
South Arne	1	7	14	27	South Arne	0	3	5	11
Subtotal	**148**		**144**		**Subtotal**	**68**		**85**	
Planned Recovery:					**Planned Recovery:**			
Tyra	-	2	3	4	Tyra	-	3	4	6
Valdemar	-	1	1	1	Valdemar	-	1	1	3
South Arne	-	*	19	*	South Arne	-	*	2	*
Lola	-	0	1	1	Lola	-	0	0	0
Boje	-	0	0	1	Boje	-	0	0	0
Sif	-	0	1	2	Sif	-	2	4	7
Freja	-	1	2	3	Freja	-	0	0	0
Amalie	-	1	2	3	Amalie	-	1	3	5
Bertel	-	1	1	2	Bertel	-	0	0	0
Subtotal			**30**		**Subtotal**			**16**	
Possible Recovery:					**Possible Recovery:**			
Prod.Fields	-	30	50	71	Prod.Fields	-	12	20	30
Other Fields	-	3	7	11	Other Fields	-	6	13	21
Discoveries	-	3	7	17	Discoveries	-	2	9	17
Subtotal			**64**		**Subtotal**			**41**	
Total	**148**		**238**		**Total**	**68**		**142**	
January 1999	131		195		January 1999	60		123	

* Not assessed

There have been several revisions of the Danish Energy Agency's assessment of reserves compared to the assessment made in January 1999. These revisions are attributable to new discoveries, more production experience and new reservoir models resulting from improved knowledge of the fields.

The areas where significant revisions have been made are described below.

Ongoing and Approved Recovery
The reserves of the Dan Field have been written up because additional wells have been drilled at the northwestern flank of the field.

The Halfdan Field has been included under the *ongoing and approved recovery* category, as a development plan for the field was approved in autumn 1999.

The reserves of the Gorm Field have been written up due to favourable production experience.

Based on a reassessment of the hydrocarbons in place, an upward adjustment of oil and condensate reserves and a downward adjustment of gas reserves have been made for the Tyra Field. These adjustments should be viewed in light of the fact that last year's assessment included reserves stemming from the development of the part of the Tyra Field which is called Tyra South East. In this year's assessment, these reserves have been included in the *planned recovery* category, as a revised plan for the development of this part of the field has been submitted.

The Svend Field reserves have been reassessed on the basis of production experience.

Planned Recovery
At the end of 1999, development plans had been submitted for the Lola, Boje and Sif Fields, as well as further development plans for the Tyra and Valdemar Fields.

Water injection is expected to be introduced in the South Arne Field, and the reserves of the field included in this category comprise the reserves generated by further development based on water injection. A plan for the establishment of water injection is expected to be submitted in the autumn.

Possible Recovery
The Danish Energy Agency has reviewed a number of options for enhancing recovery with the use of known technology, i.e. technology which is used today under conditions comparable to those prevailing in the North Sea.

Based on reservoir calculations and general estimates of investments, operating costs and oil price developments, it is assessed that the recoverable reserves can be augmented considerably by implementing water-injection projects in a number of fields.

The drilling of horizontal wells is considered to further increase the production potential of the Kraka, Halfdan, Tyra, Valdemar, Igor and Sif Fields. Finally, a number of discoveries that are under evaluation are included in this category, which also includes discoveries that are considered to be non-commercial based on current technology and prices.

Table 3.2 Oil Production Forecast, million m^3

	2000	2001	2002	2003	2004
	Ongoing and Approved:				
Dan	6.3	6.0	5.2	4.6	4.2
Kraka	0.4	0.3	0.3	0.3	0.3
Regnar	0.0	0.0	0.0	0.0	0.0
Halfdan	1.2	2.6	1.6	1.2	0.9
Alma	-	-	-	0.1	0.1
Gorm	2.8	2.3	1.4	1.0	0.8
Skjold	2.1	1.7	1.5	1.3	1.1
Rolf	0.1	0.1	0.1	0.1	0.1
Dagmar	0.0	0.0	0.0	0.0	0.0
Tyra	1.0	0.9	1.0	1.0	1.0
Valdemar	0.0	0.0	0.0	0.1	0.1
Roar	0.5	0.3	0.2	0.1	0.1
Svend	0.4	0.2	0.1	0.1	0.1
Elly	-	-	0.0	0.2	0.2
Igor	-	-	0.0	0.0	0.0
Adda	-	-	-	0.5	0.1
Harald	1.0	0.8	0.6	0.5	0.3
Lulita	0.2	0.1	0.1	0.1	0.1
Siri	2.5	1.8	1.1	0.6	0.4
South Arne	3.2	2.5	1.9	1.4	1.2
Total	**21.7**	**19.7**	**15.2**	**13.2**	**10.8**
Planned	**0.0**	**0.8**	**2.1**	**3.0**	**3.4**
Expected	**21.7**	**20.5**	**17.3**	**16.2**	**14.2**

The total amount of oil that is recoverable with the use of known technology corresponds to only approx. 20% of the hydrocarbons in place in Danish territory. In fields like Dan, Gorm and Skjold, where the production conditions are favourable, an average recovery factor of 34% of the oil in place is expected, based on the assumption that known methods are used, including water and gas injection. The total oil reserves also include contributions from the relatively large accumulations in the Tyra and Valdemar Fields, where the recovery factors are fairly low due to the difficult production conditions.

PRODUCTION FORECASTS

Based on the assessment of reserves, the Danish Energy Agency prepares production forecasts for the recovery of oil and natural gas in Denmark.

The present five-year forecast shows the Danish Energy Agency's expectations for production until the year 2004. In addition, the twenty-year forecast shows the Danish Energy Agency's assessment of the production potential for oil and natural gas in the longer term.

Five-Year Production Forecast

The five-year forecast uses the same categorization as the assessment of reserves, and includes only the categories ongoing, approved, and planned recovery.

Fields are incorporated into the production forecast from the time production start-up is approved or from the earliest date on which production can be commenced.

As appears from Table 3.2, oil production is expected to reach approx. 21.7 million m^3 in 2000, equal to about 373,000 barrels per day. After that time, production is expected to decline.

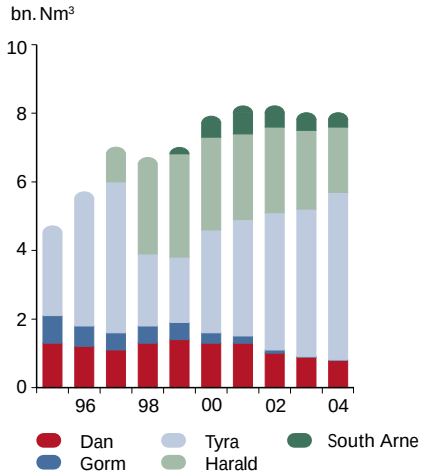
The forecast operates on the assumption that oil production will not be subject to any restrictions in terms of capacity or transportation. The capacity of DONG Olierør A/S's oil pipeline facilities has been estimated at 270,000 barrels per day.

The oil produced in the Siri and South Arne Fields is loaded on board tankers by means of buoy loading facilities, but, nevertheless, the transportation capacity earmarked for the remaining fields will exceed the capacity of the oil pipeline for a period of time, and plans to expand the capacity have therefore been initiated.

In relation to the forecast in the Danish Energy Agency's 1998 Report on Oil and Gas Production in Denmark, expected production figures have been written up by an average of 33% during the period covered by the forecast. The main reasons for the upward adjustment are that expected recovery from the Halfdan Field has been included in the forecast and that the reserves attributable to the establishment of water injection in the South Arne Field are included in the planned recovery category. In addition, the production estimates for several fields have been adjusted upwards. The revisions to the production forecast are dealt with below.

For the Dan and Tyra Fields, expected production figures have been written up due to the drilling of additional wells and a reassessment of the production potential.

Fig. 3.6 Natural Gas Production Broken down by Processing Centre



The expected production figures for the Gorm and Svend Fields have been reassessed based on production experience.

The Lulita production forecast has been written up on the basis of production experience and a development plan providing for water-processing facilities.

For Siri and South Arne, production estimates have been adjusted upwards because the well productivity is higher than initially foreseen.

The expectations for production from the remaining fields are largely unchanged in relation to last year's report.

The planned recovery category comprises the further development of the Tyra, Valdemar and South Arne Fields, as well as the future development of the Lola, Boje, Sif, Freja and Bertel Fields.

Natural gas production estimates are given in Fig. 3.6, broken down by processing centre.

Twenty-Year Production Forecast

The twenty-year forecast has been prepared according to the same method as the five-year forecast, and thus uses the same categorization as the assessment of reserves. However, unlike the five-year forecast, the possible recovery category is also included.

In preparing the forecast, it has been assumed that the course of production will be planned on the basis of the technical potential of the fields, without taking legal and operational constraints into account.

Fig. 3.7 illustrates two oil production scenarios. The curve illustrating planned recovery is simply a continuation of the curve shown in Table 3.2, while the second curve also includes possible recovery.

Within the category possible recovery, the production potential is based on the

Fig. 3.7 Oil Production Forecast

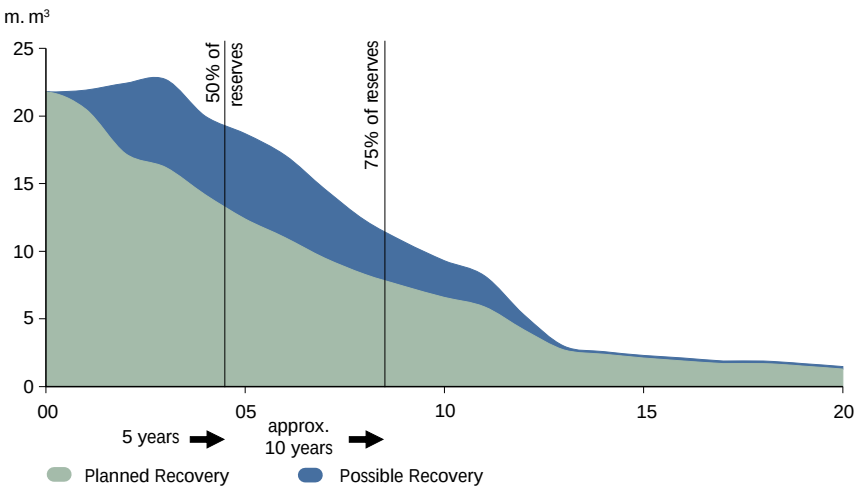
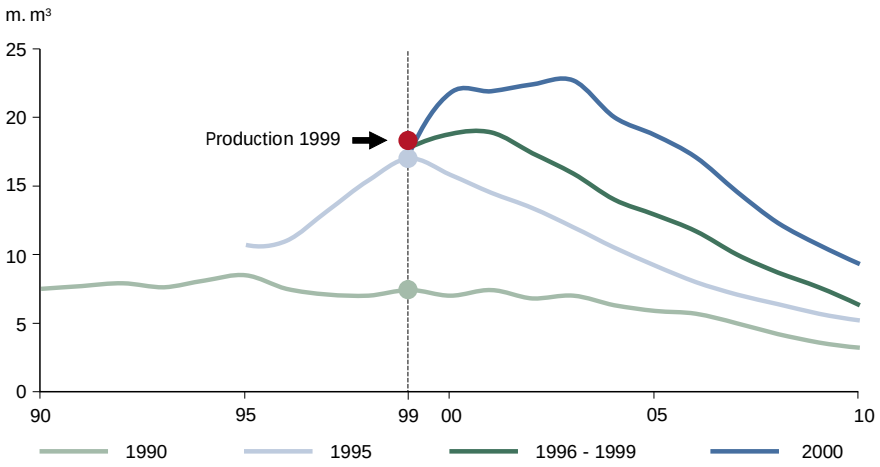


Fig. 3.8 Forecasts for the Period 1990-2000



Danish Energy Agency's assessment of possibilities for initiating further production not based on development plans submitted.

The Danish Energy Agency estimates that the increased use of water injection in several fields represents further oil production potential, and moreover, that a potential for enhancing recovery from the Kraka, Halfdan, Tyra, Valdemar, Igor and Sif Fields exists.

It appears from Fig. 3.7 that annual oil production for the planned recovery category will peak at a level of about 22 million m^3 in 2000, after which production is expected to decline. For the possible recovery category, production is projected to remain fairly constant at about 22 million m^3 through the year 2003 and to fall from then onwards.

If the assumptions underlying the forecasts prove correct, and if no new discoveries are made, 50% and 75% of Danish oil reserves will have been recovered in five and roughly ten years, respectively.

Previous Forecasts

Since 1989, the Danish Energy Agency has made twenty-year forecasts for Danish oil production.

To summarize how accurate or inaccurate the forecasts for previous years proved to be, some of the previous production estimates for 1999 are shown in Fig. 3.8. For example, in 1990 the 1999 production figure was estimated at 7.4 million m^3. The actual production figure in 1999 was 17.4 million m^3. Thus, production was estimated for 1999 made ten years ago at less than half the actual production figure.

The estimates made during the period from 1991 to 1994 approach the actual production figure, and it appears that the 1995 production estimate is very close to the actual amount produced.

Fig. 3.8 also illustrates the forecasts underlying the 1999 production estimate. The forecasts from the period 1990 to 1995 were based on expectations of

increasing production, due mainly to further development plans providing for horizontal wells and water injection. However, from 1995 to 1996 the revised estimates were grounded in the expected development of discoveries made during the period ending on 31 December 1995.

The forecasts for the period from 1996 through 1999 are almost identical. The course of production envisaged by these forecasts is characterized by production peaking at about 19 million m^3 around the year 2000, after which production was expected to decline.

The Danish Energy Agency has substantially revised its most recent forecast compared to previous years, as the production figure of about 22 million m^3 is expected to remain almost constant up to and including the year 2003, from which time production is expected to fall. The expectations for increased production are based mainly on the potential of the Halfdan Field.

Although the forecast covers a period of 20 years, it is only possible to predict the development for a few years ahead. For instance, the Halfdan Field was discovered at the beginning of 1999, and a mere one year later, the field was brought on stream. Thus, the methods used in making the forecasts imply that production must be expected to decline after a short number of years.

The downward plunge of oil production can hopefully be curbed as a result of new discoveries made in connection with the exploration activity initiated in the Fifth Licensing Round, as well as by advances in technological research and development.

As opposed to the production of oil, which can always be sold at the current market price, the production of natural gas requires that long-term sales contracts have been concluded.

Since the start of gas sales in 1984, natural gas produced under A.P. Møller's Sole Concession has been supplied under gas sales contracts concluded between DUC and DONG Naturgas A/S. The present gas sales contracts do not stipulate a fixed total volume, but rather a fixed annual volume that will be supplied for as long as DUC considers it technically and financially feasible to carry on production at this level.

In 1997, a contract was concluded between the Amerada Hess group and DONG Naturgas A/S for the sale of gas from the South Arne Field, and, in 1998, a provisional contract was concluded between the Statoil group and DONG Naturgas A/S for the sale of the Statoil group's share of the gas produced from the Lulita Field.

The Danish Energy Agency's forecast for the planned course of production is based on the contracts with DUC providing for a maximum gas production plateau of 7.5 billion Nm^3 a year and total gas supplies of approx. 130 billion Nm^3 until the year 2012. In addition, the planned course of production for the South Arne Field accounts for 5.5 billion Nm^3.

4. RESEARCH

The Government's involvement in oil and gas research is based on a desire to sustain a high degree of self-sufficiency in oil and natural gas for as long as possible, in an environmentally appropriate manner.

To help fulfil this objective, the Government coordinates research initiatives with public and private corporations.

State-subsidized research related to oil and natural gas is conducted under the Energy Research Programme (ERP) and under the auspices of the EU and the Nordic Council of Ministers. In addition, research is carried on within the framework of the Joint Chalk Research programme, which is financed by Norwegian and Danish oil companies, with the Danish and Norwegian energy authorities as participants.

ENERGY RESEARCH PROGRAMME (ERP)

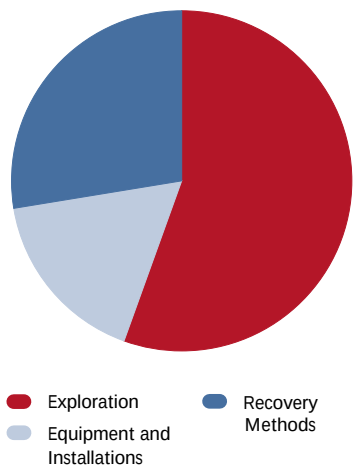
Support for research and development in the area of energy is granted under the Energy Research Programme (ERP). The principal criterion for funding is the importance of the projects to society and their relevance in terms of fulfilling the energy-policy objectives set.

Oil and gas research is one of the six programme areas under the ERP, and support is granted for research in the following areas: exploration, recovery methods, equipment and installations, as well as North Atlantic oil and gas issues. In granting funding to projects, the ERP attaches weight to how well a project ties in with other research initiated, both nationally and internationally. Another important consideration is the value of new research in the areas in question.

Companies, universities and research institutes also contribute to the financing of this research, meaning that energy research for about double the amount of the ERP funding is initiated annually.

Information about the research programme can be obtained from the Danish Energy Agency and on its homepage, www.ens.dk.

Fig. 4.1 ERP-2000 Funding Broken down by Area of Research

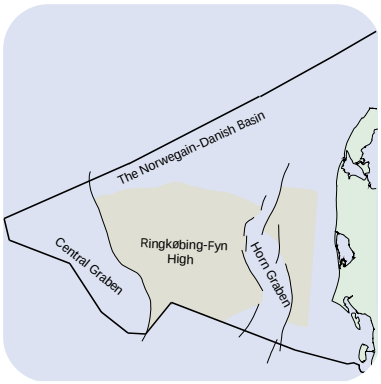


ENERGY RESEARCH PROGRAMME 2000 (ERP 2000)

In 1999, a new action plan was drawn up, *Research and Development within Oil and Natural Gas, 2000-2004*. The applications for ERP 2000 processed in 1999 were evaluated on the basis of this action plan and the material concerning *Call for Project Proposals for the 2000 Energy Research Programme*. Further information is available on the Internet address www.ens.dk/forskning/EFP/2000/ANS/index.htm.

Funding in the amount of DKK 68 million for 29 projects was applied for within the area of oil and natural gas. The total budgeted costs of these projects amounted to DKK 108 million. The selection made among the numerous applications resulted in funding for nine energy projects, totalling DKK 13.5 million. The implementation of these projects provides for research with total budgeted costs of DKK 28.0 million, including self-financing by the research institutes and industrial contributions. The projects funded appear from Appendix G, and the research topics of the individual projects are described in more detail below. Their numbering matches the project reference numbers stated in Appendix G. Of the projects funded, three projects concern exploration, three concern improved

Fig. 4.2 Danish North Sea



recovery methods and three concern equipment and installations. No support was granted for projects concerning arctic conditions. The breakdown of funding on the three areas of research appears from Fig. 4.1.

Exploration

The objective of the project *New Hydrocarbon Systems in the Eastern North Sea - Cenozoic Basin Evolution, Seismic Inversion and 3D Modelling (00-0001)* is to map and model the movement of hydrocarbons (migration paths) from the Central Graben into Palaeocene chalk and sandstone reservoirs east of the Central Graben. The project aims to illustrate the fundamental conditions of potential hydrocarbon accumulation in a number of areas east of the Central Graben; see Fig. 4.2. The study includes interpretation of existing seismic data, special processing, mapping of possible migration paths, palaeographic reconstruction, 3D tectonic modelling and integrated 3D modelling of hydrocarbon generation and migration. A positive outcome to the project will help maintain interest in exploring the area and improve the possibilities of such activities, perhaps even in areas closer to the coast.

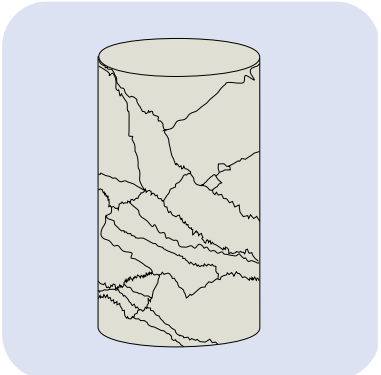
Another project, *A Stratigraphic Study of the Palaeogene Sediments in the Danish North Sea Sector, East of the Central Trough (00-0004),* seeks to develop methods for more accurate mapping and age determination of the sediments above the chalk. The project endeavours to improve and systematize existing knowledge on the exploration potential of this area through sequential investigation of the Palaeogene sediments east of the Central Graben. The project will focus on establishing a stratigraphic framework with emphasis on a new lithostratigraphic framework, supported by a detailed biostratigraphy. The project, which addresses regional aspects, is expected to reduce the risk element of future exploration activities.

The third exploration project is entitled *The Hydrocarbon Potential of the Norwegian-Danish Basin (00-0005).* This project will assess the quality and maturity of source rocks in the "Open Door" area, using an integrated geological/geophysical/geochemical approach that compares existing data and includes and generates new data. The main emphasis will be on the mapping of recognizable sequence-stratigraphic units, combined with studies of the source rock potential of recognizable sequences and their spatial variations. A positive outcome to this project will stimulate commercial interest in further exploring the area.

Recovery Methods

The recovery project *Displacement and Deformation Processes in Fractured Reservoir Chalk (00-0008)* is designed to examine and describe the rock mechanics of chalk in response to water injection. Fig. 4.3 shows an example of fractured chalk from the Rolf Field. Experiments on various scales will facilitate the upscaling of results from laboratory to reservoir level. The project is expected to contribute to a further understanding of the rock mechanics accompanying water injection into chalk. This, in turn, will help improve reservoir control, thus enhancing recovery and allowing a reduction in the number of wells.

Fig. 4.3 Drawing of Core Sampled from Fractured Chalk



Reservoir Simulation of Deformation Processes in Reservoir Chalk (00-0011) is yet another recovery project aimed at combining rock mechanical deformation models with reservoir simulation. The project includes an examination of scale dependence and attempts to set up a model illustrating pressure-, rate- and saturation dependence for use in practical reservoir simulation. The project will be carried out in close cooperation with the activities planned under project (0008), and the results will contribute to solving the problems shared by the two projects.

The objective of the third recovery project, *Mapping of Fracture Density in Chalk Reservoirs (00-0013)*, is to develop a geophysical model for predicting the fracture intensity variations in chalk reservoirs. To this end, fracture data recorded from core samples and in logs will be compared with seismic data. The project will be implemented in cooperation with the Priority Programme, using seismic data and well data from both the Upper and Lower Cretaceous. The project results are expected to contribute to improved recovery from Lower Cretaceous chalk fields.

Equipment and Installations

Under the heading 'Equipment and Installations', the project *Model forWax Inhibitors (00-0017)* is designed to improve our understanding of the working principle of wax inhibitors, in order to optimize the choice of wax inhibitors for the purpose of reducing wax formation in a specific oil. The results will be incorporated in an existing commercial flow programme simulating waxy oil transportation.

Finally, the project *"Free-Span Burial Inspection Pig - Phase B" (00-0020)* includes the design, construction and testing of a 30" Free-Span Burial Pig (FSB) for internal inspection of pipelines. The FSB pig is a cylindrical device, with built-in measuring instruments, that can be pumped with the gas or oil flowing through a pipeline. It may be used to determine free spans of pipelines installed on the sea bed, the amount of backfilling needed for a pipeline laid in an open trench or the condition of a protective concrete coating. The project is expected to provide a method for increasing the cost-effectiveness of pipeline operation.

ERP PROJECTS COMPLETED IN 1999

In 1999, five projects funded in whole or in part under the oil and natural gas programme were completed. The number of ERP projects completed in 1999 was therefore relatively low, but this should be related to the completion of a full 16 projects in 1998. The distribution of these projects on the areas covered by the action plan appears from Table 4.1. In addition, the table shows the year in which the projects were granted funds under the ERP programme.

Table 4.1 Completed Projects in 1999

	Explo-ration	Recovery Methods	Equipm. & Install.	East and Dev. Proj.
ERP-96	1		2	
ERP-97		1		1
Total	**1**	**1**	**2**	**1**

Appendix G indicates the project title and participating institutions/businesses for all projects completed in 1999.

Information about ongoing and completed ERP projects can be found at the Internet address www.risoe.dk/nei.

The results of the completed ERP projects are described below.

Exploration

The project *Improved Seismic Inversion for Mapping Pre-Chalk Reservoirs (96-0003)* dealt with developing, implementing and demonstrating a reservoir characterization for the Harald Field. It improved the seismic inversion technique by including a depth variation parameter. Two different approaches were used to characterize the reservoir: one omitting seismic data, the other integrating such parameters as seismic velocity. Using seismic data makes it possible to determine the degree of porosity and permeability in areas with low well density. The project has also demonstrated the possibility of mapping the individual strata of a geological structure in great detail, by including such information as seismic velocities. This improvement in characterization techniques will impact significantly on further exploration activities and production planning.

Recovery

Geophysical and Geostatical Reservoir Characterization of Chalk Fields and Use of Reservoir Simulation (97-0005) included a characterization of the Roar Field reservoir. A classification method was developed by which the production volume is determined on the basis of stochastic reservoir models, without the need for reservoir simulation. The project demonstrated the use of inverted seismic data in quantitative porosity determination. The variability caused by the variation in production volumes was shown on the basis of various stochastic-process models.

Equipment and Installations

The project *Wave Impact on Slender Offshore Structures (96-0008)* analyzes full-scale measurements of waves and currents and hydrodynamic forces carried out at the Tyra Field. This project has improved our knowledge of wave and current conditions in the North Sea and led to a better understanding of the response of slender structures in the wave impact zone. It demonstrates that high waves cause hydroelastic oscillations in slender structures. The vibrations may become so vigorous as to involve a risk of metal fatigue. Vortex-induced oscillations are another response, mainly due to the extreme velocities found at the crest of the waves. The project results were used as a basis for a design recommendation for slender structures, which may be used as an annex to the Danish code of practice for offshore structures (DS 449).

The project *Optimization of Pipelines for Marginal Fields (96-0009)* was designed for the purpose of developing and testing a sectionalized pipeline system for interconnecting existing fields/platforms and marginal fields. Pipeline sectionalizing will make it possible to exploit marginal fields in cases where conventional production technology is commercially unviable. A cost reduction has been achieved, particularly by the development of a diverless prototype system and by making the system recyclable. These improvements may be used to further develop the system for full offshore application and/or to develop simplified and stronger couplings for conventional pipeline systems.

Projects Targeted at Eastern European and Developing Countries

A project in this category, *Description of the Petroleum System in the Vietnamese Song Hong Basin (97-0034),* has led to an integrated geological study of the Tertiary Song Hong Basin in the Gulf of Tonking and adjacent parts of the South China Sea aimed at describing the petroleum systems and identifying exploration models. The object of the project was to assist in developing the country, one of the world's poorest in terms of GDP per inhabitant.

EU RESEARCH AND DEVELOPMENT PROGRAMMES

Funds of DKK 7.5 billion have been allocated to research under the fifth EU framework programme, Technological Development and Demonstration, which covers the period 1999-2003. Information about the programme sections relevant to energy and the respective deadlines for applications is available from the Danish Energy Agency's research division, from Energicenter Danmark, from EuroCenter or on the homepages www.cordis.lu/eesd/home.html and www.cordis.lu/growth/home.html.

In 1999, funding in the area of oil and natural gas of an amount totalling about DKK 6 million was granted to Danish research institutes.

THE NORDIC ENERGY RESEARCH PROGRAMME

In 1999, the Nordic Energy Research Programme (NERP) allocated funds for petroleum-related research to senior researchers and PhD scholarships, who are participating in research cooperation between Nordic universities. The following topics related to hydrocarbons are given priority: petroleum fluids, oil technology and petrophysics (upstream operations), as well as catalytic processes, separation processes and reactive distillation (downstream operations).

The programme section dealing with petroleum technology was originally planned to be withdrawn from the NERP programme, but in 1999 it was decided to carry on this research, subject to a high degree of funding from the industry.

The Energy Research Programme (ERP) finances the Danish participation in this cooperation. In 1999, grants were awarded for nine PhD scholarships (including four Danish).

Finally, an agreement has now been concluded with four Baltic researchers who have been granted scholarships within the programme section dealing with petroleum technology. This agreement is based on the decision made in 1999 to open up the NERP programme for participation from the Baltic countries and northwestern Russia.

JOINT CHALK RESEARCH IN 1999

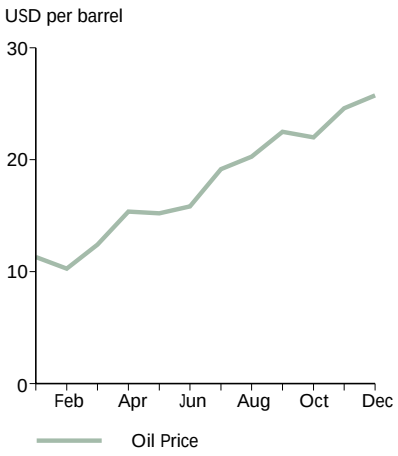
The fifth phase of the Joint Chalk Research programme was completed with the holding of a conference in Brighton, the UK, in March 2000. The final phase had an overall budget of about DKK 17 million.

The subjects of research can be given the following headings: geology, rock mechanics and recovery processes. The research topics are discussed in more detail in the Danish Energy Agency's report Oil and Gas Production in Denmark 1997.

In the months to come, the possibility of extending this research cooperation with a new phase will be investigated.

5. ECONOMY

Fig. 5.1 Oil Price Increase in 1999



Presumably, it is a well-known fact that the Danish economy benefits from the oil and gas production activities in the North Sea. But how do these activities affect the economy, and what do they add to the bottom line? This section describes the impact of this production on Denmark's self-sufficiency, balance of trade, balance of payments and state revenue in the form of taxes and fees.

CRUDE OIL PRICE ON THE REBOUND

The period from March until the end of 1999 was characterized by sharply increasing oil prices; see Fig. 5.1. From an average price that bottomed out at USD 12.8 per barrel in 1998, the price climbed to an average of USD 17.9 per barrel in 1999. These figures mask a price increase from less than USD 10 per barrel in December 1998 to more than USD 25 per barrel a year later, a trend that now appears likely to continue well into the year 2000.

In 1998, OPEC attempted to adapt the supply of crude oil to stagnating demand by imposing quotas on its members' production. This attempt failed. Lack of agreement and non-observance of the quotas led to the collapse of crude oil prices. The events of 1998 confirmed that limited overproduction can send oil prices plunging.

The very opposite happened in 1999. The sharp price increase in 1999 traces back to the reduction in supply ensuing from the OPEC member countries' successful agreement to limit production. The non-OPEC countries Norway and Mexico also downscaled production. At the same time, the prospects of increased growth in the world economy spurred growing demand for crude oil and thus further price increases. However, the main reason why oil prices skyrocketed in 1999 was that OPEC succeeded, for the first time in many years, in putting a quota agreement into practice.

At a meeting on 23 March 1999, OPEC decided to curtail oil production by 1.7 million barrels per day, equal to 2-3% of total supply on the world market. The fact that this comparatively small reduction had such a large impact on the oil price illustrates OPEC's dominant position in the market. In 1999, the OPEC countries accounted for about 40% of the world's total supply of oil. Moreover, the OPEC countries are estimated to control about 2/3 of the world's total oil reserves.

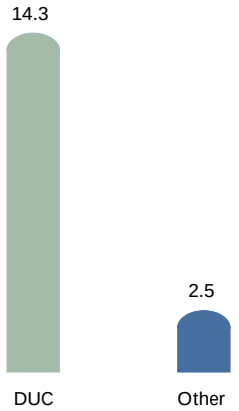
Whether prices will remain high therefore continues to depend on the ability of the OPEC countries to agree internally, and whether they are prepared to relax their quotas, and by how much.

DOUBLED PRODUCTION VALUE

From Denmark's point of view, the price of a barrel of oil is more than a question of the trend in international crude oil prices. The value of the oil produced in the North Sea is also influenced significantly by fluctuations in the USD exchange rate, as oil is traded in dollars. The average USD exchange rate was DKK 6.98 per USD in 1999. This is a slight increase over 1998, when the price of one USD was DKK 6.70.

The rising oil price and USD exchange rate had a major impact on the value of Danish oil production, which is estimated to have almost doubled from about DKK 7.6 billion in 1998 to about DKK 14.3 billion in 1999. However, the increase

Fig. 5.2 Value of Production in 1999, DKK billion



is also due to larger production stemming from the start-up of production from the two new fields, Siri and South Arne, in 1999.

The value of gas production has not followed the same curve as oil production. Thus, the value of gas production declined from about DKK 3.7 billion in 1998 to about DKK 2.5 billion in 1999. At a first glance, this decline may seem odd, as the volume of gas production was almost identical in the two years in question, and as the price of gas is normally assumed to mirror fluctuations in the oil price. One explanation is that changes in the price of gas are frequently "delayed" compared to the oil price, which is due to the specific wording of the contract made between the buyer and seller of natural gas. Therefore, in this context the "gas price" should be understood as the price that DONG (the sole buyer of natural gas in Denmark) pays the offshore producers for supplying a specific volume of natural gas. Thus, the value of gas in 1998 was affected by a relatively high oil price in 1997, and, in the same way, the value of gas in 1999 was influenced by the low oil price in 1998. This delayed effect made the value of gas develop inversely to the value of oil in 1999.

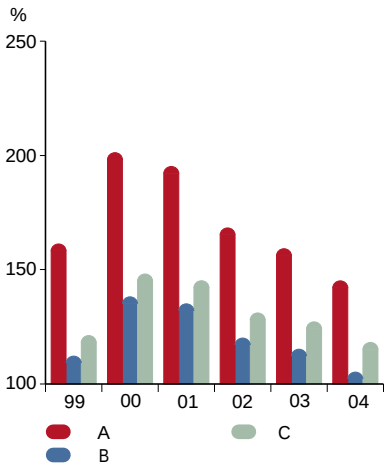
Fig. 5.2 shows the value of production from the new fields relative to the value of production from DUC's fields, approx. DKK 2.5 billion and approx. DKK 14.3 billion, respectively. Compared to 1998, the total value of the oil and gas produced in 1999 increased by 53% from DKK 10.9 billion to about DKK 16.7 billion. The cumulative value of Danish oil and gas production since 1972 is estimated at about DKK 188 billion in 1999 prices.

DEGREES OF SELF-SUFFICIENCY

Fig. 5.3 shows the expected development in the various degrees of self-sufficiency for the next five years. Since the oil crises in the 1970s, changing Danish governments have endeavoured to increase the degree of self-sufficiency in energy. At the same time, the aim has been to redistribute energy supplies on more types of energy, both in order to better withstand changes in the international energy market and to limit CO_2 emissions.

The figure shows three different degrees of self-sufficiency. Column A shows Denmark's degree of self-sufficiency in oil and natural gas. Since 1991, Denmark has produced more oil and natural gas than we have consumed. In 1999, the production of oil and gas exceeded total consumption by 61%, while the corresponding figure was 39% in 1998. This is the largest increase recorded for a 12-month period since production commenced in the North Sea.

Fig. 5.3 Degrees of Self-Sufficiency



Column B shows the production of oil and natural gas relative to domestic oil and gas consumption. If Denmark had utilized its entire production from the North Sea in 1998 for domestic supplies, 94% of the overall consumption in 1998 would have been covered by Danish oil and gas production. For the first time ever, production exceeded Denmark's total energy consumption in 1999. Denmark's production of oil and gas alone exceeded total Danish energy consumption by 12% in 1999.

Column C illustrates the "sum total", i.e. the extent to which Denmark is overall self-sufficient in energy, when including the energy produced from renewable energy resources. Denmark became self-sufficient in energy for the first time in 1997. In 1999, Denmark's energy production exceeded total energy consumption by 21%. Thus, in just a few years' time, we have ceased being a net importer of energy and have begun exporting a fair share of our production.

Table 5.1 Degrees of Self-Sufficiency

	2000	2001	2002	2003	2004
Production (PJ)					
Crude Oil	799	757	633	593	514
Gas	338	351	346	343	345
Renewable Energy	83	86	89	101	106
Energy Consumption (PJ) *					
Total	822	822	817	818	820
Degrees of Self-Sufficiency (%)					
A	201	195	168	159	145
B	138	135	120	115	105
C	148	145	131	127	118

A. Oil and gas production vs domestic oil and gas consumption.
B. Oil and gas production vs domestic energy consumption.
C. Total energy production vs total domestic energy consumption.

** Including fuel consumption offshore*

The Danish Energy Agency estimates that as a minimum, Denmark will be self-sufficient in energy for another five years, through the year 2004. Like oil production, the degree of self-sufficiency will peak during this period; see Table 5.1. However, experience has shown that production estimates and degrees of self-sufficiency are written up from year to year; see section 3 on Reserves.

IMPACT OF PRODUCTION ON THE DANISH ECONOMY

Sustained high oil prices may have a negative impact on the Danish economy, primarily as a result of rising inflation. However, combined with the increase in Danish production, the high oil price level also has several positive aspects. High energy prices encourage energy savings. Moreover, taxes and fees imposed on hydrocarbon production generate revenue for the state.

The production of oil and natural gas also has a favourable impact on Denmark's external balance. The Danish Energy Agency has illustrated this impact in the two charts "The Balance of Trade for Oil and Natural Gas" and "The Effect of Oil and Gas Production on the Balance of Payments".

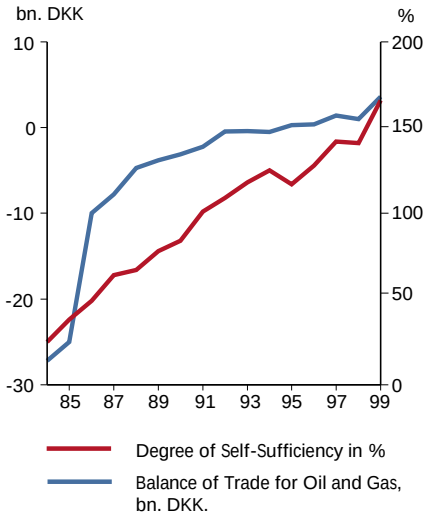
The balance of trade for oil and natural gas expresses the difference in DKK between the import and export of oil products and natural gas.

However, in order to evaluate the overall impact of oil and gas production on Denmark's external balance, it is insufficient merely to look at the balance of trade for oil products and natural gas. The effect on the balance of payments also incorporates estimates of such factors as the import content of the offshore companies' investments, operating costs and interest payments on loans raised abroad.

In addition, the effect on the balance of payments illustrates the savings that Denmark can generate in the current situation where we can produce oil and natural gas for our own consumption. Without the North Sea production, we would be compelled to purchase vast amounts of oil and natural gas abroad and thus burden the balance of payments.

While the balance of trade for oil and natural gas thus gives an impression of the impact the end-products from oil and gas production have on Denmark's trade with other countries, the effect on the balance of payments provides a more comprehensive picture of the impact of North Sea production on Denmark's external balance.

Fig. 5.4 The Balance of Trade for Oil and Gas and Degree of Self-Sufficiency, 1999 Prices



The Balance of Trade for Oil and Natural Gas

The balance of trade for oil and natural gas, the difference between total exports and imports, is closely tied to the degree of self-sufficiency. All other things being equal, a high degree of self-sufficiency will have a favourable impact on the balance of trade, as the need to import oil and gas products will diminish. Fig. 5.4 illustrates the correlation between the development in the degree of self-sufficiency (scenario A) and the balance of trade for oil and natural gas.

This figure shows how Denmark has gradually improved its foreign trade position in these products substantially within a relatively short period of time. From a DKK 15 billion deficit in the mid-1980s, the deficit on the balance of trade dropped to less than DKK 1 billion at the beginning of the 1990s. In 1995, Denmark recorded a surplus on the balance of trade for the first time, and in 1998 the surplus amounted to about DKK 1 billion. The surplus for 1999 was at a record high: it more than tripled, amounting to about DKK 3.5 billion, by far the largest figure to date.

The DKK 3.5 billion contribution from oil and gas production corresponds to about 10% of the total 1999 balance of trade surplus for all goods and services that crossed the Danish border. Oil exports account for DKK 2.3 billion of this surplus, while gas exports to Germany and Sweden account for DKK 1.2 billion. This situation is vastly different from 1998, when the balance of trade for crude oil and oil products alone yielded a deficit. In fact, the trade in crude oil and oil products generated a surplus for the first time in 1999.

One reason why the trade in oil products has historically yielded a deficit, even during periods with a high degree of self-sufficiency, is the composition of the type of products exported and imported. As distinct from the degree of self-sufficiency, the balance of trade depends on the composition and price of the products traded. Therefore, the surplus on the balance of trade is not attributable to larger exports exclusively.

Danish imports have traditionally been characterized by a relatively large share of refined products, which are fairly expensive, e.g. jet petroleum (JP1), which is used as aviation fuel. Conversely, the income from exports derives mainly from the sale of crude oil and similar, fairly cheap products. Although Denmark continued to import more expensive, refined products than we exported in 1999, imports fell, while our own export of refined products increased compared to 1998. This development has also had a positive impact on the balance of trade.

The Impact of Oil and Gas Production on the Balance of Payments

The production of hydrocarbons in the North Sea improves the Danish balance of payments. The balance of payments is a key indicator of the soundness of the Danish economy. A deficit on the balance of payments reflects an imbalance between investments and savings. If corporate investments exceed a country's savings, the portion of the investments that cannot be financed by national savings will instead be covered by loans raised abroad.

The result is a deficit on the balance of payments, increasing the national debt and foreign interest payments. Over time, a chronic deficit may lead to a loss of confidence in the Danish economy. Viewed in this perspective, the production of hydrocarbons in the North Sea aids in creating a strong Danish economy able to keep its competitive edge.

Table 5.2. Effect of Oil/Gas Activities on the Balance of Payments, DKK billion, 1999 Prices, "Normal" Price Scenario (USD 18/bbl).

	2000	2001	2002	2003	2004
Socio-Economic Production Value	22.6	22.7	20.2	19.3	1.5
Import Share	3.5	2.8	3.2	2.2	0.9
Balance of Goods and Services	19.1	19.9	17.0	17.1	16.5
Transfer of Interest and Dividends	6.1	6.5	7.1	4.8	2.6
Balance of Payments, Current Account	**13.0**	**13.4**	**9.9**	**12.3**	**13.9**
Balance of Payments, Current Account, "High" Price Scenario (USD 25/bbl)	**17.9**	**19.4**	**17.0**	**17.6**	**17.3**

The impact of oil and gas production on the balance of payments is calculated in three stages. First comes the socio-economic value of Danish production; see Table 5.2. Here, the effect of Danish oil and gas production is measured directly on the basis of the production exported, and indirectly on the basis of the production used to replace the energy imports otherwise required. Secondly, the import content of the companies' investments and operating costs, i.e. the share purchased abroad, is subtracted from the socio-economic value. Thirdly, the direct effect on the balance of payments on current account is calculated by deducting interest and dividends transferred abroad.

The Danish Energy Agency estimates that in isolation, Danish oil and gas activities in 1999 contributed DKK 8.9 billion to the balance of payments on current account. In 1999, the total Danish surplus on the balance of payments on current account amounted to DKK 13.9 billion. This is far from the situation in 1998, when the deficit totalled DKK 12.9 billion.

Based on the development in the oil price from 1998 to 1999, the Danish Energy Agency has chosen to use two different price scenarios in estimating the future impact on the balance of payments. The "high" price scenario is based on the assumption that the oil price will stabilize at USD 25 per barrel. The "normal" price scenario reckons with an oil price of USD 18 per barrel, the average oil price in the past 15 years. In both price scenarios, the price of natural gas is tied to the development in the crude oil price, and the USD exchange rate has been estimated at DKK 7.2/USD.

The results based on the "normal" price scenario reflect the expectations for rising production in the next few years. Based on approximately the same oil price as in 1999, the impact of oil and gas activities, seen in isolation, on the balance of payments will reach the DKK 13 billion mark in 2000. In the price scenario operating with a crude oil price of USD 25 per barrel, the impact approaches DKK 18 billion. Not surprisingly, the oil price has a significant influence on the balance of payments effect. As illustrated by Table 5.2, this trend appears to continue. If the oil price per barrel remains in the USD 18-25 interval, the Danish economy will benefit from a highly favourable balance of payments effect from North Sea production in the next four or five years.

State Revenue from Hydrocarbon Production

The state derives a direct share of North Sea oil and gas production via five different

Box 5.1 Taxes and Fees on Oil and Gas Production in the North Sea

The taxes and fees imposed on the production of oil and gas secure an income for the state. Corporate tax and hydrocarbon tax are collected by the Danish Ministry of Taxation, Central Customs and Tax Administration, while the collection of royalty, the oil pipeline tariff and the compensatory fee is administered by the Danish Energy Agency. Moreover, the Danish Energy Agency supervises the metering of the amounts of oil and natural gas produced, on which the assessment of state revenue is based.

Corporate tax payments are the state's most important source of income related to oil and natural gas. The DUC companies did not begin paying corporate tax until the beginning of the 1980s, because the oil and gas sector requires fairly heavy investments which are deductible as depreciation allowances over a number of years. With effect from 1 January 1999, the corporate tax rate was reduced from 34% to 32%.

Hydrocarbon tax was introduced in 1982. The objective is to tax windfall profits, for example as a result of high oil prices. In addition, the Hydrocarbon Tax Act provides an incentive for the companies to reinvest in further exploration and development activities in order to ensure increased and better exploitation of the resources in the subsoil. Hydrocarbon tax only became payable for a few years during the first half of the 1980s, with total hydrocarbon tax payments amounting to approx. DKK 850 million in 1999 prices.

Royalty
Under the terms of A.P. Møller's Sole Concession and a few other licences, royalty is payable on the basis of production. For the Sole Concession, royalty at the rate of 8.5% is payable on the total value produced after deducting transportation costs. For the Statoil/Danop group's share of the Lulita Field, royalty is payable according to a sliding scale, where the percentage payable depends on the size of production.

The oil pipeline tariff is a tax payable by DONG Olierør A/S, which owns the oil pipeline from the Gorm Field to Fredericia. The users of the oil pipeline pay a fee to DONG Olierør A/S, which includes a profit element of 5% of the value of the crude oil transported. DONG pays 95% of the income from the 5% profit element to the state, termed the oil pipeline tariff.

Compensatory fee
A licensee may apply for an exemption from the obligation to connect its production facilities to the oil pipeline from the Gorm Field to Fredericia, in order to transport the oil by tanker instead. The Danish Oil Pipeline Act was amended in June 1997. The amendment stipulated that any parties granted an exemption from the obligation regarding connection to and transportation through the oil pipeline are required to pay a fee amounting to 5% of the value of the crude oil and condensate comprised by the exemption. To date, the compensatory fee has been paid for the South Arne and Siri Fields.

Fig. 5.5 Total State Revenue from Oil/Gas Production 1972-1999, DKK billion, 1999 Prices

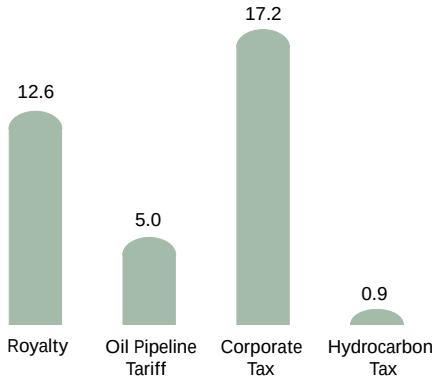


Table 5.3 State Revenue over the Past Five Years, DKK million, Nominal Prices

	1995	1996	1997	1998	1999
Hydrocarbon Tax	0	0	0	0	0
Corporate Tax	1,043	1,408	1,743	1,756	2,100
Royalty	663	944	1,097	854	1,138
Oil Pipeline Tariff	271	393	444	310	615*
Total	**1,977**	**2,745**	**3,284**	**2,920**	**3,853**

** Including compensatory fee*

taxes and fees: *corporate tax, hydrocarbon tax, royalty, oil pipeline tariff and compensatory fee.* See Box 5.1 for a more detailed description of the taxes and fees on hydrocarbon production.

As in 1998, oil prices greatly influenced state revenue, but in the opposite direction. The state's revenue totalled approx. DKK 3.9 billion in 1999, the highest figure to date. Thus, as illustrated by Table 5.3, the state revenue generated by oil and gas production rose by about DKK 0.8 billion compared to 1998. In contrast to previous years, the state has also received tax payments and fees from producers other than the DUC companies, viz. the Statoil groups (the Siri and Lulita Fields) and the Amerada Hess Group (the South Arne Field). The total taxes and fees deriving from these groups account for about 2.5% of the total revenue.

Since 1972, the state's proceeds from taxes and fees have totalled about DKK 36 billion. Most of this revenue, 83%, derives from corporate tax and royalty payments; see Fig. 5.5. Oil pipeline tariff payments have generally increased in step with rising production. However, hydrocarbon tax has not been paid since the first half of the 1980s. According to the Danish Energy Agency's calculations for the years up to and including 2004, the companies will not become liable to pay hydrocarbon tax.

State revenue through the year 2004 is estimated at DKK 4-5 billion per year based

Fig. 5.6 Taxes and Fees, 2000-2012, DKK billion, 1999 Prices

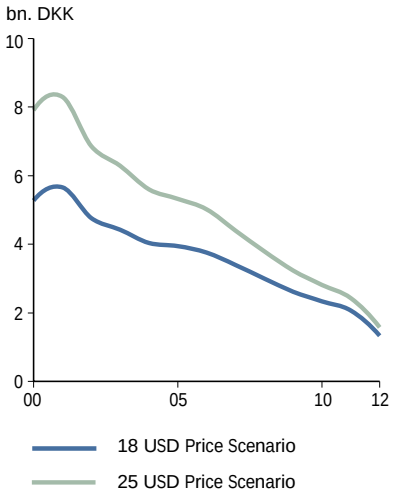
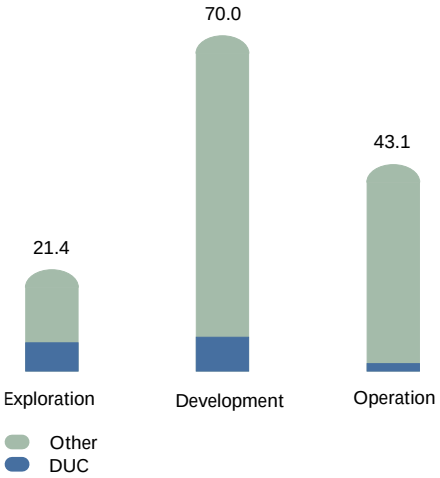


Table 5.4 Expected State Revenue from Oil and Gas Production, DKK billion, 1999 Prices*

	2000	2001	2002	2003	2004
Corporate Tax	3.0	3.4	2.8	2.5	2.3
	4.8	*5.3*	*4.3*	*3.8*	*3.4*
Hydrocarbon Tax	0	0	0	0	0
	0	*0*	*0*	*0*	*0*
Royalty	1.4	1.4	1.2	1.2	1.1
	1.9	*1.9*	*1.6*	*1.6*	*1.4*
Oil Pipeline Tariff**	0.8	0.8	0.7	0.7	0.6
	1.1	*1.1*	*0.9*	*0.9*	*0.7*
Total	**5.2**	**5.6**	**4.7**	**4.4**	**4.0**
	7.9	*8.2*	*6.8*	*6.2*	*5.6*

* Amounts levied ** Including compensatory fee USD 18 price scenario *USD 25 price scenario*

Fig. 5.7 Total Costs of all Licensees 1963-1999
DKK billion, 1999 prices



on the "normal" oil price scenario of USD 18 per barrel, and DKK 6-8 billion based on the "high" oil price scenario of USD 25 per barrel. Fig. 5.6 illustrates the difference between the two scenarios for the period until 2012. The figure shows that the effect of the two price scenarios on state revenue will gradually even out in step with the estimated decline in production. A more accurate calculation of the difference between the two scenarios for the period until 2004 appears from Table 5.4.

THE FINANCES OF THE LICENSEES

Fig. 5.7 and Appendix F show the total exploration, development and operating costs (including transportation costs) attributable to the licensees operating in the Danish part of the North Sea. They are described in more detail below.

Costs of Exploration

Total exploration costs in 1999 have been preliminarily estimated at DKK 0.8 billion. This figure reflects a sharp rise in the level of exploration activity relative to 1998, when exploration costs totalled DKK 350 million. This increase is attributable mainly to the drilling of more, and more expensive, exploration wells. The number increased from six wells in 1998 to a total of nine exploration and appraisal wells in 1999, six

Table 5.5 Investments in Development Projects, DKK million, Nominal Prices

	1995	1996	1997	1998	1999*
Dan	526	1,708	1,272	1,076	275
Halfdan	-	-	-	-	205
Kraka	3	1	99	118	0
Regnar	-	-	-	-	-
Gorm	632	336	73	167	25
Rolf	0	0	1	0	0
Skjold	266	35	1	16	400
Tyra	1,450	731	236	170	150
Valdemar	1	80	1	0	0
Roar	289	72	2	0	80
Svend	200	164	0	13	190
Adda	-	-	144	67	0
Harald	810	1,079	486	99	30
Lulita		11	81	0	0
Siri			760	1,538	850
South Arne			592	2,133	1,375
Not allocated	-12	40	75	28	
Total	**4,166**	**4,257**	**3,824**	**5,425**	**3,580**

** Estimate*

in the Contiguous Area, two under the Siri licence and one in the South Arne Field. The total cost of drilling these wells is about DKK 500 million. To this figure must be added the heavy costs associated with the acquisition of 3D seismics under several of the licences awarded in the Fifth Licensing Round and with geological investigations, as well as administrative costs. For a more detailed review of the high level of exploration activity in the Danish sector in 1999, see section 1 on Exploration.

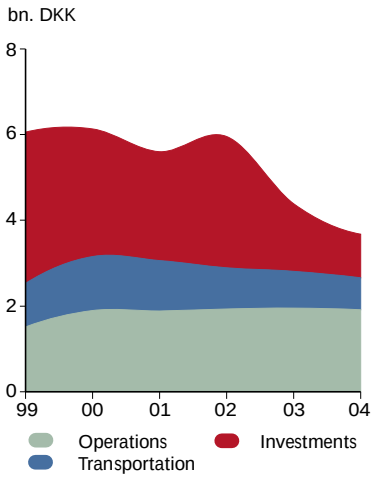
The Danish Energy Agency estimates that between seven and nine exploration and appraisal wells will be drilled in the year 2000, with total exploration costs running into about DKK 1 billion. This figure is much higher than previous estimates. The revision is due to an increase in the number of wells expected to be drilled, as several companies have accelerated their projected drilling activities, in order to benefit from the fairly low drilling rig rental at present.

In the next few years, the level of activity will be determined by exploration under the licences granted in the Fifth Licensing Round, as well as under the "old" licences and the licences currently issued by the Danish Energy Agency under the Open Door procedure. The Danish Energy Agency expects exploration costs to peak at just over DKK 1 billion in 2001, after which exploration activity is so far likely to diminish gradually.

Table 5.6 Investments in Development Projects, DKK billion, 1999 Prices

	2000	2001	2002	2003	2004
Ongoing and Approved					
Dan	0.2	-	-	-	-
Halfdan	1.2	0.2	-	-	-
Alma	-	-	0.4	0.2	-
Igor	-	0.1	0.3	-	-
Skjold	0.2	-	-	-	-
Tyra	0.2	0.3	0.6	0.7	0.9
Valdemar	-	0.1	0.1	0.1	-
Svend					
Adda	0.1	-	0.1	-	-
Elly	-	0.2	0.4	-	-
Harald	0.1	0.1	-	-	-
South Arne	0.6	0.6	0.2	-	-
Siri	0.1	-	-	-	-
Total	**2.7**	**1.6**	**2.1**	**1.0**	**0.9**
Planned	0.3	0.9	1.0	0.6	0.1
Expected	**3.0**	**2.5**	**3.1**	**1.6**	**1.0**

Fig. 5.8 Investments in Fields, and Operating and Oil Transportation Costs, DKK billion, 1999 Prices



Since 1963, the licensees have incurred aggregate exploration costs of about DKK 21 billion in 1999 prices, of which the DUC companies account for about DKK 15 billion.

Investments in Field Developments

In 1999, the companies invested in 17 new production wells, and the total investments in the North Sea are estimated at DKK 3.6 billion; see Table 5.5. Investments are almost DKK 2 billion lower than in 1998, when the highest investment level since 1983 was recorded.

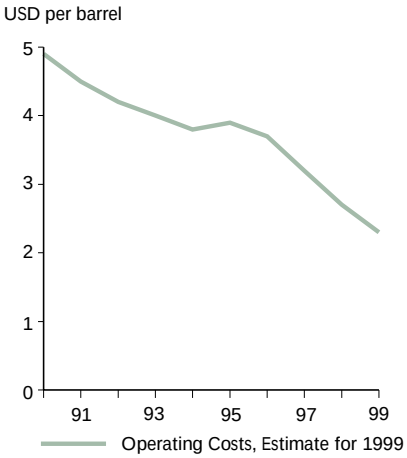
The investment estimate for 1999 tallies with the forecast made in the report for 1998. However, one major departure from the forecast is the investment in the Halfdan Field development. Minor upward adjustments of the investment estimates for the Dan, Svend and Siri Fields have been made. As opposed to this, investment estimates have been written down for other fields, including the Elly, Harald and Skjold Fields.

The general decline in investments from 1998 to 1999 occurred because no new investments were made in major field developments, apart from the Halfdan Field development. The greatest costs of construction for the South Arne and Siri Field installations were incurred in 1998, although the investments in precisely these fields still weighed heavily in 1999. Moreover, the development of the Tyra Field has been postponed, for which reason the large investments projected for this field will not manifest themselves in earnest until 2001.

The investment forecast from the year 2000 and onwards has been written up substantially in relation to the forecast in the report for 1998. As shown by Table 5.6, investments are expected to peak in 2001, due to not only the Tyra and Halfdan Field developments, but also to relatively heavy investments in some of the minor fields.

In aggregate, investments of about DKK 70 billion in 1999 prices have been made on the Danish continental shelf in the North Sea since the first field developments in 1971. This is about four times the cost of establishing the Copenhagen-Malmö fixed link.

Fig. 5.9 Operating Costs per Unit Sold



Costs of Operations and Transportation

Through the 1990s, annual operating and administration costs ranged between DKK 1.5 billion and 2.0 billion. Operating and administration costs comprise such diverse areas as personnel, supply vessel services and helicopter transportation in connection with repairs and maintenance. There is every indication that these costs will again amount to about DKK 1.5 billion in 1999, and that they will climb to about DKK 2 billion over the next five years because of new field developments.

The oil pipeline from the Gorm Field to Fredericia was established and is operated in accordance with the 1981 Oil Pipeline Act. The oil pipeline is owned by DONG Olierør A/S. The users pay the costs associated with the establishment and operation of the oil pipeline. As described in Box 5.1, the users also pay a profit element of 5% of the value of the crude oil transported.

Fig 5.8 illustrates the companies' estimated future costs of production. It appears from the figure that investments will gradually account for a diminishing share of the companies' total costs, while operating and transportation costs are estimated

Table 5.7 Pretax Results of the DUC Companies, DKK million, Nominal Prices

	1994	1995	1996	1997	1998
Income	8,723	8,615	11,632	14,048	11,089
Operating Costs*	2,209	1,988	2,164	2,538	2,172
Interest Expenses	314	337	419	475	433
Exc.-Rate Adj.	632	472	-491	-1.074	773
Gross Income	6,833	6,762	8,558	9,961	8,957
Depreciation	2,716	2,554	2,850	3,309	3,719
Pretax Result	**4,117**	**4,208**	**5,708**	**6,652**	**5,237**

**Incl. transportation costs and exploration costs charged to expense*

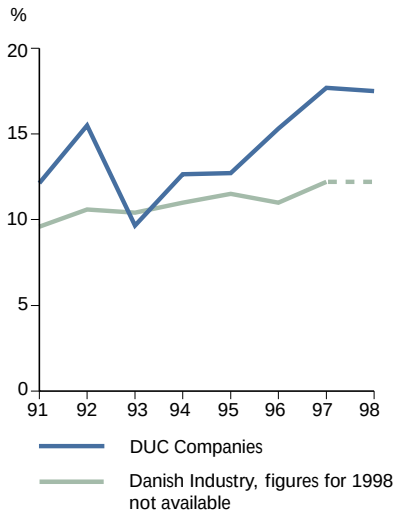
to remain fairly stable. However, what the figure fails to show is that the operating and transportation costs per produced unit of oil and gas have declined over a number of years. This trend can be explained in part by greater experience in handling existing production facilities and by the investments made in new and more efficient facilities. Fig. 5.9 shows the drop in the companies' operating costs (including transportation costs) per barrel. For the purpose of calculating this figure, the gas sold was converted into barrels of oil. As the figure shows, the operating costs per barrel have been halved in the past ten years, declining from about USD 5 to about USD 2.5 per barrel.

The DUC companies' historical operating and transportation costs totalled about DKK 42 billion in 1999 prices. By comparison, the remaining licensees have incurred total costs of about DKK 0.75 billion.

Financial Results of the DUC Companies

In recent years, the annual accounts of the three DUC companies have recorded growing profits; see Table 5.7. The profit in 1997 set a preliminary record, while the result for 1998 plunged, primarily because of the low oil price. The financial results recorded by the DUC companies for 1999 had not been published at the time this report went to press, but there are many indications of yet a prosperous year.

Fig. 5.10 Rates of Return (after Tax) for the DUC Companies and Other Danish Industries



The figures in Table 5.7 show that in recent years, the profit before taxes and fees has constituted 47-49% of the companies' income. In other words, operating costs, depreciation, etc. account for slightly more than half the total income. If taxes and fees are deducted from the balance, the companies' ultimate rate of return can be calculated. The rate of return is a ratio reflecting the companies' ability to yield a return on the capital invested.

It appears from Fig. 5.10 that through the 1990s, the DUC companies had a higher rate of return than other Danish industries. Furthermore, the rate of return has shown a general upward trend since 1993.

On average, the DUC companies' rate of return in the 1990s was about 3 percentage points higher than for other Danish industries. Because of the size of the investments required and the great uncertainty generally attached to resources in the subsoil, the risk and consequences of a "no-go" are generally higher than in other sectors. The larger return could therefore be considered an extra bonus for the companies that risk vast amounts of money in the North Sea.

6. HEALTH AND SAFETY

The Danish Energy Agency supervises health, safety and environmental matters in connection with the exploration and production of oil and natural gas in the Danish part of the North Sea. The Danish Maritime Authority handles the safety supervision relating to the strength, buoyancy and layout of mobile offshore installations and any equipment of a maritime nature, as well as life-saving appliances and launching systems on board fixed offshore installations.

The Danish Environmental Protection Agency is responsible for the environmental aspects of the supervision relating to emergency preparedness in case of pollution of the sea from offshore operations, and monitors discharges into the sea of substances and materials from offshore installations.

FIXED OFFSHORE INSTALLATIONS

1999 was marked by the work involved in establishing the new offshore installations at the Siri and South Arne Fields.

Following the installation of the subsea oil storage and buoy loading facilities in the Siri Field in 1998, the wellhead platform housing production facilities and accommodation for the personnel operating the field was installed at the beginning of 1999. Production commenced in March 1999.

In the South Arne Field, subsea oil storage and buoy loading facilities and a wellhead platform with production plant and accommodation for the operations personnel were installed in June 1999. Following the completion of the installation works and the tie-in of the first production well to the production facilities, the field was brought on stream in July 1999.

In addition, the new gas pipeline conveying gas from the South Arne Field to the west coast of Jutland via DUC's Harald facilities was put into service. In this connection, construction and tie-in works were carried out at Harald and Tyra East, enabling the gas produced in DUC's production facilities to be transported to shore through the new gas pipeline in case of any shutdown of the gas pipeline between Tyra and Nybro.

Moreover, in 1999 the Danish Energy Agency approved a plan for the development of DUC's newest oil field, Halfdan, situated between the Dan and Skjold Fields. The plan provides for the installation of a four-legged platform as well as a pipeline for transporting oil to the Gorm Field, a pipeline for transporting gas to the Dan Field and a pipeline supplying injection water from the Dan Field. The field development has been planned in such a way that a number of wells are drilled before the wellhead platform is installed in the field. According to the plan, production from the field installations is scheduled to commence immediately after the pipelines and platform have been installed at the beginning of 2001.

The Danish Energy Agency has subsequently approved a project which involves further accelerating the production start-up from the Halfdan Field. Thus, by stepping up the installation of the pipelines, making minor alterations to the pipeline project and establishing temporary production facilities on the *Mærsk Endeavour* drilling rig, which is being used to drill the Halfdan wells, it was already possible to start up production from the first wells in March 2000, less than one year after the first exploration well was drilled in the field.

In connection with these and other projects, in 1999 the Danish Energy Agency considered and issued a substantial number of permits for new construction projects, as well as permits for offshore installation works and the commissioning of new installations.

As in its previous approval work, the Danish Energy Agency has especially focused on environmental, health and safety aspects, some of which are documented in the operator's safety management systems and in the environmental impact assessments and safety assessments made by the operator.

The Danish Energy Agency's Supervision

In 1999, the Danish Energy Agency continued its efforts to ensure a satisfactory working environment on the North Sea installations and paid inspection visits to selected, fixed offshore production installations. Further, the Danish Energy Agency inspected the fiscal metering systems on the offshore installations in the North Sea, at DONG Olierør's terminal facilities at Fredericia and at the oil reception facilities in the ports where the oil cargoes from the South Arne Field are unloaded.

MOBILE OFFSHORE INSTALLATIONS

In cooperation with such authorities as the Danish Maritime Authority, the Danish Energy Agency supervises health and safety matters on the mobile offshore installations used in the Danish sector. This supervision is based on evaluating the physical and organizational layout of the installations before permitting them to be used in the Danish area (permission for use). In addition to international certificates, documentation prepared by the owner or user for other countries' authorities (such as a UK "Safety Case") is also accepted as part of the background material underlying an application for permission for use in Danish territory.

Danish rules and regulations on safety, working environment and accommodation facilities aim at upholding the same health and safety standards as on shore. Therefore, in several areas, Danish regulations are more demanding than their international counterparts, and complying with them may require major alterations to the installations. The administration has been arranged so that the scope of any alterations required can be determined sufficiently early to allow the companies involved to make efficient, economically viable physical changes before they begin operating in Danish territory.

At the beginning of 1999, oil prices were low, which must be assumed to have contributed to the low level of activity in part of the year. Thus, at one point in the middle of the year, Mærsk Olie og Gas only operated one drilling rig, *Mærsk Exerter.* However, activity subsequently increased, so that at the end of the year, the drilling rigs *Mærsk Endeavour, Mærsk Exerter, Noble Byron Welliver and Transocean Shelf Explorer* were employed for Mærsk Olie og Gas. Throughout 1999, the drilling rig *Kolskaya* drilled exploration and production wells at the South Arne Field, operated by Amerada Hess. Likewise, Statoil employed the drilling rig *Noble George Sauvageau* for the whole of 1999 in connection with the development of the Siri Field.

Amerada Hess employed the crane barge *Thialf* and the flotel *Polyconcord* in connection with the hook-up and commissioning of the South Arne wellhead platform. Several other vessels and pipe-laying barges were employed for field developments and pipe-laying operations in the course of the year. They were typically employed for relatively short periods of time, and only in one case were major alterations required before a permit for the use of the vessel in Danish territory was issued.

In connection with considering applications for permission to use mobile offshore installations in the Danish sector, the Danish Energy Agency paid inspection visits to such installations. Moreover, in the course of the year, as part of its current supervisory work, the Danish Energy Agency also inspected some of the drilling rigs operating under long-term contracts in Danish territory.

STATUTES AND EXECUTIVE ORDERS IN 1999

In 1999, Executive Orders were drawn up in cooperation with representatives from the oil industry serving on the Coordination Committee, e.g. to implement various EU Directives:

Executive Order No. 408 of 12 May 1999 on Health and Safety Work on Fixed Offshore Installations.

This Executive Order updates the previous rules on the safety organization of such installations.

The main objective was to introduce simpler and more manageable rules in this area, making it possible to group several areas of work together and have the same safety representative in the safety organization represent them.

This Executive Order entered into force on 1 November 1999, six months after its publication, thus leaving enough time to elect new safety representatives.

Executive Order No. 303 of 10 May 1999 on Noise on Mobile Offshore Installations.
Executive Order No. 304 of 10 May 1999 on Noise on Fixed Offshore Installations.

These Executive Orders, which apply to drilling rigs, flotels, etc. and the North Sea production facilities, respectively, replace the rules previously applicable in this area.

The most important change introduced by the above Executive Orders is a reduction in the maximum daily noise level by 5 decibels from 88 dB(A) to 83 dB(A), calculated on the basis of a 12-hour working day, the standard number of working hours per day in the offshore sector. This corresponds to a daily noise level of 85 dB(A) calculated on the basis of an eight-hour working day. This means that the maximum daily noise level permitted on offshore installations has been reduced to the level applicable on shore.

The two new Executive Orders on noise levels came into force on 1 June 1999. The Danish Energy Agency has issued guidelines amplifying the provisions of the Executive Orders and recommending procedures for measuring noise and calculating the daily noise level.

In addition, in 1999 the Danish Energy Agency issued the following Executive Order in pursuance of Act No. 310 of 17 May 1995 on the Use of the Danish Subsoil and Act No. 187 of 12 March 1997 to amend the Act on the Continental Shelf.

Executive Order No. 748 of 19 September 1999 on the Environmental Impact Assessment of Projects for the Recovery of Hydrocarbons in Danish Sea Territory and the Danish Continental Shelf and Projects for the Establishment of Transit Pipelines.

Table 6.1 Accident Frequency on Offshore Installations per million Working Hours

Year	Fixed Installation	Mobile Installation
1990	7.9	9.9
1991	9.0	7.4
1992	7.1	11.5
1993	8.9	5.7
1994	5.5	13.5
1995	3.3	5.3
1996	6.3	5.4
1997	0.8	6.3
1998	8.8	5.9
1999	4.0	4.5

The new Executive Order on the Environmental Impact Assessment of Projects for the Recovery of Hydrocarbons in Danish Sea Territory and the Danish Continental Shelf and projects for the establishment of transit pipelines lays down more detailed rules on the offshore projects which must undergo environmental impact assessment.

The Executive Order includes two schedules. Schedule 1 sets out the minimum information to be given in an environmental impact assessment. Schedule 2 indicates the selection criteria to be used by the Danish Energy Agency in determining whether an environmental impact assessment is to be made for projects which are assumed to impact considerably on the environment.

Information about the contents of the application and environmental impact assessment will be printed in a notice inserted by the Danish Energy Agency in three national newspapers. This information will include details about the time frame during which the information will be available to the public and the place where any reports, background material, etc. are available for inspection by the public. This will ensure that the general public has the possibility of lodging objections against the project within a specific time limit.

NOTIFICATION OF INDUSTRIAL INJURIES

The statistics on industrial injuries on fixed and mobile offshore installations fall into two categories: statistics of work-related accidents reported and statistics of presumed or recognized work-induced conditions reported.

Work-Related Accidents

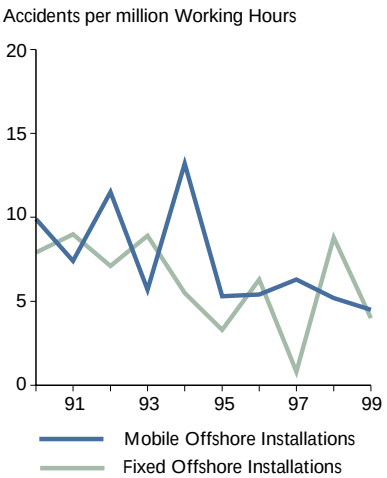
All industrial injuries sustained offshore must be reported to the Danish Energy Agency. Thus, a work-related accident must be reported if the injured person is unfit for work for one day or more in addition to the day of the accident.

In 1999, the Danish Energy Agency received 17 reports on accidents offshore, broken down as nine accidents on fixed offshore installations, and eight on mobile offshore installations. None of the accidents reported were fatal or involved serious personal injury.

Accidents on Mobile Offshore Installations

Mobile offshore installations comprise drilling rigs, pipe-laying barges, crane barges, as well as any other vessels from which oil and gas exploration or recovery operations take place.

Fig. 6.1 Accident Frequency on Offshore Installations



Eight accidents occurred on mobile offshore installations: seven on drilling rigs and one on a pipe-laying barge. Of the seven accidents on drilling rigs, three were reported to have occurred during work on drill floors and in derricks and one in an engine room, while the particulars of the last three accidents have not been disclosed. Nor did the report on the accident on the pipe-laying barge state in which part of the barge the accident occurred. The majority of the accidents occurred in connection with the manual handling of drill piping and other equipment.

For the mobile offshore installations, the expected periods of incapacity for work break down as follows:

4-14 days:	1 report
2-5 weeks:	5 reports
More than 5 weeks:	2 reports

Accidents on Fixed Offshore Installations

The reports on accidents occurring on board fixed offshore installations comprise accidents sustained in connection with the hook-up, operation and maintenance of existing installations. In addition, accidents reported for flotels are attributed to fixed offshore installations, but no accidents on flotels were reported in 1999.

Of the nine accidents on fixed offshore installations, two are attributable to tripping and falling incidents on board the installations, while the rest can be attributed to heavy lifting operations (1), colliding with (4) or being jammed against (1) various objects and other causes (1).

For these accidents, the following periods of incapacity for work were reported:

1-3 days:	1 report
4-14 days:	4 reports
2-5 weeks:	2 reports
More than 5 weeks:	2 reports

Accident Frequency

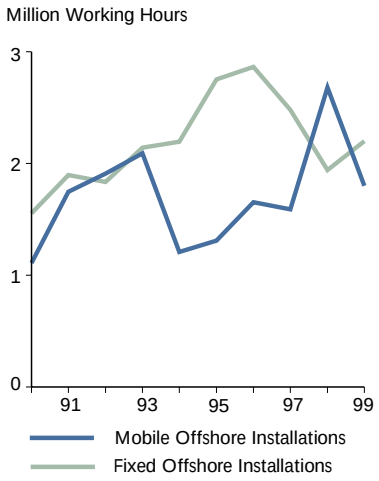
When the work-related accidents reported for fixed offshore installations are related to the number of hours worked (2.23 million hrs.), it yields an accident frequency of 4.0 per million working hours.

Likewise, when the work-related accidents on mobile offshore installations, excluding flotels, reported in 1999 are related to the number of hours worked on these installations (1.77 million hrs.), it yields an accident frequency of 4.5 per million working hours. The accident frequency for drilling rigs was 4.7 per million working hours and 3.5 per million working hours for other installations.

Table 6.2 Classification of Presumed or Recognized Work-Induced Conditions Reported in 1999

Type of installation	Diagnosis	Cause
Drilling rig	Degenerative arthritis in knee	Work on drill floor
Undisclosed	Lumbago	Scaffolding work, heavy lifting in inexpedient working postures
Undisclosed	Neoprene rubber allergy	Survival suit for use during helicopter transport
Drilling rig	Neoprene rubber allergy	Survival suit for use during helicopter transport
Fixed offshore installation	Allergy to paint	Skin contact with paint
Fixed offshore installation	Raised red patches on the skin	Contact with drilling mud
Fixed offshore installation	None. Risk of subsequent radiation injuries	Ionizing radiation from scaling in connection with work on the internals of a pump

Fig. 6.2 Number of Working Hours on Offshore Installations



The number of working hours is based on information received from the companies (about 12 hours per day).

Table 6.1 and Fig. 6.1 show the accident frequency for each year in the period from 1990 to 1999 for fixed offshore installations, including flotels, and for mobile offshore installations. Compared to the accident frequency for comparable industries on shore, the accident frequency offshore is very low. Fig. 6.2 shows the number of hours worked on fixed and mobile offshore installations in the Danish sector of the North Sea.

Work-Induced Conditions

If a doctor suspects or ascertains that a condition has been induced by work on offshore installations, the Danish Energy Agency must be notified. The number of such notifications is very low. Since 1993, the Danish Energy Agency has been notified of 36 presumed or recognized work-induced conditions, of which seven were notified in 1999. The work-induced conditions reported in 1999 are described in more detail in Table 6.2.

Fig. 6.3 shows the distribution of these 36 conditions on main diagnostic groups. Notifications have been received for both fixed and mobile offshore installations, but the majority relate to fixed offshore installations. The National Board of Industrial Injuries has also been notified of a number of the conditions reported for the purpose of recognizing them as industrial injuries.

INTERNATIONAL COOPERATION

As part of the international cooperation on health and safety on offshore installations in the North Sea, the Danish Energy Agency held meetings with the offshore authorities of several North Sea countries in 1999. In this connection, the Danish Energy Agency also participated in cooperation within the North Sea Offshore Authorities Forum (NSOAF) on safety training and issues concerning mobile offshore installations.

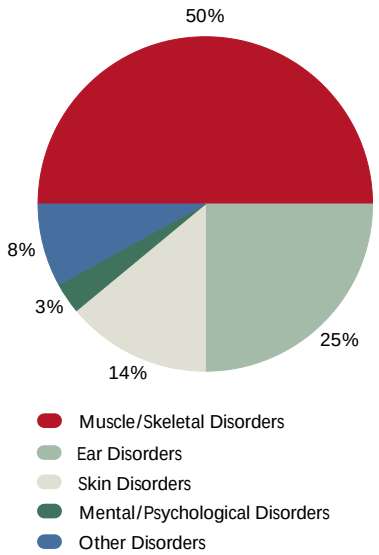
In 1999, NSOAF completed the joint audit of the drilling company Transocean's maintenance system initiated in 1998. The audit covered the company's onshore organization and selected drilling rigs in the UK, Norway and Denmark, as well as the company's head offices in Houston. Like the audit aimed at Noble Drilling in 1997-98, this project was considered successful from the authorities' point of view. NSOAF has not decided on any new joint audits for the year to come, but is attempting to clarify how the joint activities can continue with the use of fewer resources, as this type of international cooperation frequently demands considerable resources.

Moreover, in 1999 the North Sea countries agreed on reciprocal recognition of their basic safety training. At the same time, they initiated cooperation aimed at reciprocal recognition of more specialized training courses (fire teams, lifeboat captains, etc.).

The Danish Energy Agency is also a member of the OMHEC (Offshore Mechanical Handling Equipment Committee), an international group that discusses issues relating to lifting equipment and common training standards with other offshore authorities, classification societies and experts in these areas.

Finally, the Danish Energy Agency continued its work under the auspices of the Safety and Health Commission for the Mining and Other Extractive Industries under the European Commission (SHCMOEI).

Fig. 6.3 Work-Induced Conditions Reported, 1993-1999



7. ENVIRONMENT

In recent years, environmental considerations have had an increasing impact on the decisions made by society. Consequently, greater emphasis has been placed on environmental considerations in connection with awarding licences and approving the location, design and operation of offshore installations.

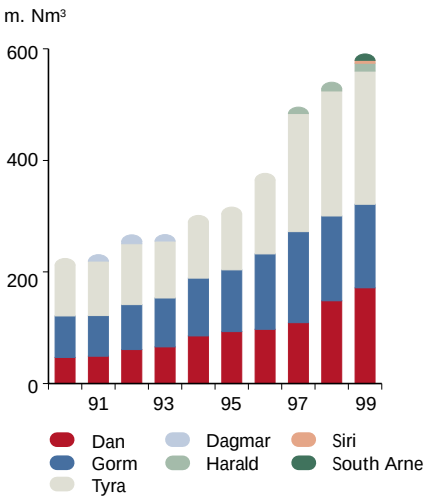
Denmark's regulation of environmental conditions on offshore installations is first and foremost based on the Danish Subsoil Act, the Danish Marine Environment Act and the Danish Marine Installations Act. Both the Danish Environmental Protection Agency and the Danish Energy Agency are required by legislation to perform specific tasks to protect the environment.

The tasks of the Danish Environmental Protection Agency are mainly related to discharges from the platforms and the effect of such discharges on the environment, as well as oil spill contingency plans. The Danish Energy Agency's tasks focus on the design, equipment and operation of the installations.

As a result of the amendments to the Danish Subsoil Act in 1995 and to the Danish Continental Shelf Act in 1997, i.a. introduced to implement the EU Council Directive on the Effects of Certain Public and Private Projects on the Environment, an environmental impact assessment must be made before installations for the recovery of oil and gas may be established. In 1999, the Danish Energy Agency issued an Executive Order laying down rules regarding the submission of environmental impact assessments for all offshore projects to be approved under the provisions of the Danish Subsoil Act and the Danish Continental Shelf Act.

The growing interest in the environmental aspects of offshore activities transcends national borders. In recent years, environmental regulation has been the source of greater international focus, with a view to reducing the environmental impact of offshore installations.

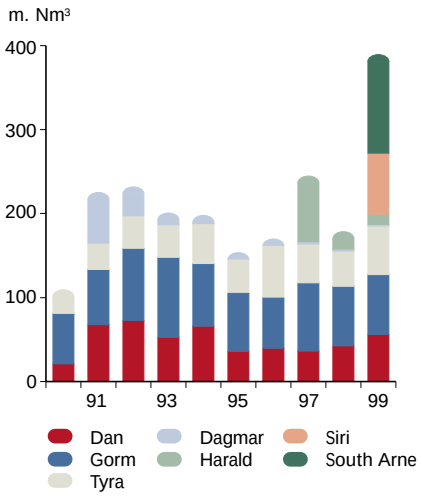
Fig. 7.1 Fuel Consumption



In this context, Denmark makes its contribution in cooperation between several institutions, coordinated by the Danish Environmental Protection Agency. The Danish Energy Agency assists in this work within its areas of expertise and participates in the international bodies relevant to Danish oil and gas activities, including the Oslo/Paris Commission's working group on Seabased Activities (SEBA).

In step with the trend in other areas of society, the methods used to regulate environmental matters are undergoing change. Where environmental regulation previously took the form of imposing specific limits on the nature and amount of emissions, a greater priority is now to ensure that the impact on the environment is limited to the extent possible by getting the companies involved to select the environmentally best available technology (BAT) and working methods.

Fig. 7.2 Gas Flaring



DEVELOPMENT IN CO_2 EMISSIONS FROM DANISH OFFSHORE INSTALLATIONS

Gas Used for Energy Production and Flaring

Producing and transporting oil and natural gas requires substantial amounts of energy. Furthermore, the gas that cannot be utilized for safety or technical reasons has to be flared. Therefore, the installations in the North Sea emit CO_2 in quantities that hinge upon the scale of production, the technical design of the installations and natural conditions.

The share of gas production used as fuel in gas turbines driving electric generators, gas compressors and water-injection pumps contributes heavily to the emission of CO_2.

Relative to the scale of production, the Danish sector of the North Sea has many production facilities, which limits the possibility of improving energy efficiency.

The amounts of gas used as fuel in the processing facilities and the gas flared in the past ten years are illustrated by Figs. 7.1 and 7.2.

It appears from these figures that during the past decade, rising production has escalated the use of gas as fuel on the Danish production facilities in the North Sea, and that after the downward trend of previous years, the flaring of gas soared in 1999 due to the commissioning of the new production facilities at Siri and South Arne.

CO_2 Emissions in 1999

The production facilities in the North Sea account for about 3.5% of total CO_2 emissions in Denmark. The development in the emission of CO_2 from the North Sea production facilities since 1990 appears from Fig. 7.3. This figure shows that total CO_2 emissions in 1999 amounted to about 2.2 million tonnes. This is an increase of about 0.6 million tonnes as compared to the past few years.

This trend in CO_2 emissions must be viewed in light of the sharp rise in oil and natural gas production in recent years. Thus, the production of oil and gas increased by about 150% from approx. 8.7 million t.o.e. in 1990 to approx. 21.5 million t.o.e. in 1999. This climb in production is attributable in part to the commissioning of the new installations in the Siri and South Arne Fields, and in part to the significant improvement in the production figures for DUC's fields throughout the 1990s following the introduction of improved recovery methods. Another contributory factor is that the annual export of gas from the fields in the North Sea now totals about 7 billion Nm^3 against about 2.8 billion Nm^3 in 1990.

The improved recovery methods, which require substantial amounts of energy, involve the injection of large volumes of water into the reservoirs at the Dan, Gorm and Skjold Fields, and most recently at the Siri Field. Water injection was initiated at the Skjold Field in 1986, and was introduced on a minor scale at the Dan and Gorm Fields in 1989.

Moreover, as a result of the recent major expansion of the Tyra Field, the injection of gas, a very energy-intensive recovery method, has more than doubled in this field since the beginning of the 1990s.

Fig. 7.3 CO_2 Emissions from Production Facilities in the North Sea

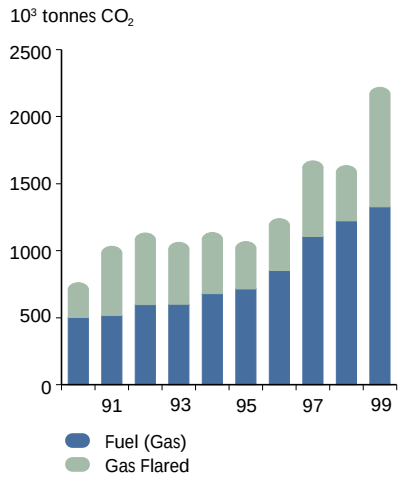
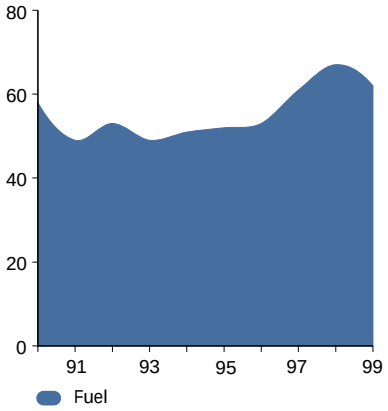


Fig. 7.4 CO_2 Emissions from Consumption of Fuel



At the Siri Field, the development concept now initiated involves injecting both water and gas into the reservoir right from the start-up of production.

The successful use of water injection as a means of improving recovery from DUC's chalk fields has led to rapidly increasing water injection in these fields. Thus, in 1999 the volume of water injected in the three fields concerned totalled about 30.8 million m^3 compared to a mere 4.5 million m^3 in 1990.

CO_2 Emissions Relative to Production

Fig. 7.4 shows the development in the consumption of fuel on the North Sea processing facilities and the associated CO_2 emissions.

It appears from this figure that CO_2 emissions from fuel consumption relative to the size of hydrocarbon production in the period 1990-1996 averaged about 52,000 tonnes of CO_2 per million t.o.e., with minor fluctuations from year to year.

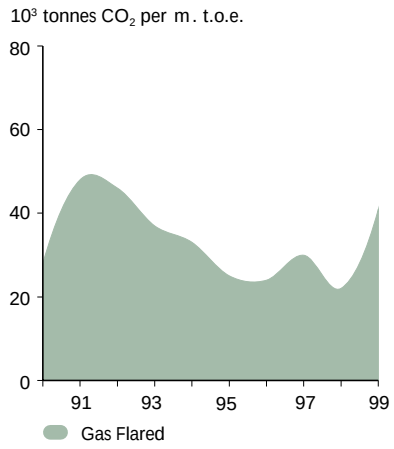
From 1997, the considerable increase in oil production and in gas production especially resulted in a relative increase in CO_2 emissions from energy production of about 20%, due to the more energy-intensive recovery methods and, in particular, the greater load on the natural gas export compressors.

If a similar correlation is made between the flaring of gas on offshore installations and the resulting CO_2 emissions, Fig. 7.5 shows a steady downward trend in CO_2 emissions from the flaring of gas relative to the volume of hydrocarbon production since the beginning of the 1990s, reaching a level of about 20,000 tonnes of CO_2 per million t.o.e. at the end of the 1990s.

However, the commissioning of new production facilities, such as Harald in 1997 and Siri and South Arne in 1999, has resulted in extraordinary amounts of gas being flared. The upsurge in oil and gas production and the associated heavier load on the production facilities are not expected to occasion a similar increase in gas flaring once the relevant installations are fully commissioned.

Fig. 7.6 shows the trend in gas flaring in 1999 at the new Siri and South Arne production facilities. As far as Siri is concerned, the figure shows that after a six-month commissioning period, gas flaring stabilized at a low level as from October 1999. Moreover, the figure shows a similar trend in the flaring of gas at South Arne. After the turn of the year 1999/2000, gas flaring at South Arne has thus gradually normalized at a low level.

Fig. 7.5 CO_2 Emissions from Gas Flaring

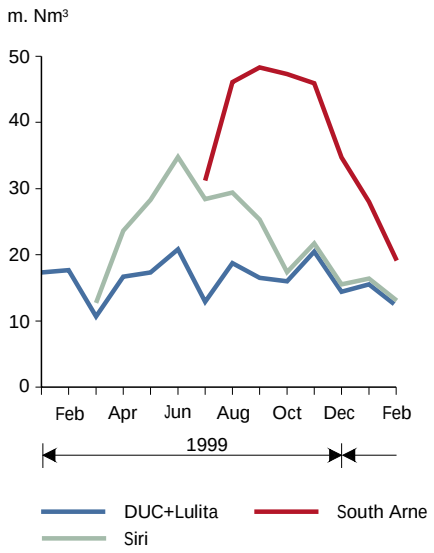


CO_2 Emissions Offshore and Energy-Policy Goals

One of the paramount Danish energy-policy goals is to reduce the level of CO_2 emissions. The substitution of oil and coal with natural gas and renewable energy as a means of achieving this goal has played an important role in recent years.

The aim to reduce CO_2 emissions from Danish territory has a direct bearing on the heavy increase in consumption and thus production of natural gas in Denmark. In the period from 1988 to 1998, it proved possible to reduce CO_2 emissions by about 5 million tonnes per year by redistributing consumption among the various types of fuel. As mentioned above, the production of oil and gas almost tripled in the same period, resulting in an increase in CO_2 emissions offshore of about 0.9 million tonnes per year, of which a significant share is attributable to the rise in natural gas production.

Fig. 7.6 Gas Flaring in Danish North Sea Fields



A large volume of the gas produced has been used as fuel in replacement of coal. As mentioned previously, the production and transportation of oil and natural gas require large amounts of energy, and the possibility of reducing CO_2 emissions offshore is restricted by these energy requirements and the basic design of the existing installations.

However, in connection with the construction of new production facilities or major alterations to existing installations, there are good opportunities for ensuring use of the best possible technology. Nevertheless, the assessment of new technology in this sector cannot be based on CO_2 emissions exclusively; the safety and reliability of operations, manning and maintenance conditions, investments and operating costs must also be taken into account.

As mentioned below, major alterations and the construction of new production facilities offshore require the submission of an environmental impact assessment prior to approval. Relevant information about the emission of CO_2 from the projected installations must be included in this assessment, in line with other matters relevant to the environment.

Therefore, a careful evaluation of proposed projects and relevant alternatives, as well as their impact on CO_2 emissions will also form part of the approval procedure in future. This will ensure that future installations are designed to meet the requirement of using the best available technology (BAT) at all times.

For example, in connection with designing and planning the new production facilities for the Tyra, Harald, Siri and South Arne Fields, emphasis was placed on minimizing energy consumption on the installations. Moreover, it was stressed that the need for flaring gas under normal operating conditions should be curtailed to the extent possible, with due regard to the matters mentioned above.

The modification of existing installations and the commissioning of new installations will be followed by a period, frequently lasting several months, during which the installations function less than optimally. The reason for this is that, e.g., gas turbines and gas compressors are highly sensitive to the type and pressure of the gas used. Therefore, it is not possible to commission all the systems immediately after the completion of installation works. The systems have to be put into operation gradually, so that the adjustments vital to reliable operations and safety can be made currently. As the gas compressors required as a drive mechanism to force the gas through a pipeline to the point of sale or into the reservoir are not available until late in the commissioning phase, much more gas will be flared during this phase than during normal operations. This factor highly influenced the flaring of gas in 1999, when both the Siri and South Arne Fields were brought on stream.

ASSESSMENT OF EFFECTS ON THE ENVIRONMENT

New Regulations

The new Executive Order on the Environmental Assessment of Projects for the Recovery of Hydrocarbons in Danish Sea Territory and the Danish Continental Shelf and Projects for the Establishment of Transit Pipelines lays down rules on assessing the environmental impact of offshore projects and the establishment of transit pipelines traversing the Danish continental shelf.

For offshore projects comprised by the Danish Subsoil Act, an application for permission to produce more than 500 tonnes of crude oil per day or more than 500,000 m^3 of natural gas per day must include an environmental impact assessment. An environmental impact assessment must also be prepared in connection with establishing gas, oil or chemical pipelines more than 800 mm in diameter and more than 40 km long.

Finally, installations for storing oil products and petrochemical or chemical products with a capacity of 200,000 tonnes or more require the submission of an environmental impact assessment.

The installation of oil and gas pipelines without the above-mentioned dimensions, the modification or extension of offshore projects or of transit pipelines is also subject to an environmental impact assessment where such projects have a potential detrimental impact on the environment. The Danish Energy Agency will decide in each individual case whether an environmental impact assessment is to be made. If the Danish Energy Agency decides that no environmental impact assessment is required, it must publicize this decision at the time of granting an approval or permit to the applicants.

The Executive Order includes schedules setting out the minimum information to be given in an environmental impact assessment. The project description must include an indication of the physical characteristics and the area required for the construction and operation phases. In addition, a description must be given of the production processes including, e.g., specifications on the type and quantity of materials to be used. Finally, estimates must be given of the volume of residue and emissions connected with the operation of the project, including a proposed plan for the decommissioning of the installations in question.

The description must also set out the principal alternatives investigated by the developer, and the consequences of not implementing the relevant project. The reasons for choosing the specific development concept must be described in detail.

Moreover, the environmental impact assessment must include a description of the environment, both in and outside Danish territory, that may be affected significantly by the proposed project and a description of the environmental conditions existing prior to the proposed development, for the purpose of assessing predictable changes in the environment.

Further, the environmental impact assessment must describe the measures that will be taken to eliminate, reduce and, where possible, neutralize any substantial, detrimental impact on the environment and evaluate the consequences of the technical solutions chosen.

Finally, a non-technical summary must be prepared, which will be made available to the public together with the environmental impact assessment.

In order to give the public an opportunity to lodge objections against the relevant project within a specific time limit, information about the contents of the application and environmental impact assessment will be printed in a notice inserted by the Danish Energy Agency in three national newspapers. This information will include

details about the time frame during which the information will be available to the public and the place where any reports, background material, etc. prepared in connection with the environmental impact assessment are available for inspection by the public. The application and environmental impact assessment will also be submitted to the authorities and organizations involved for an opinion.

Overall Environmental Impact Assessment for North Sea Area

In spring 1999, Mærsk Olie og Gas AS submitted an "Assessment of the impact of additional wells on the environment" to the Danish Energy Agency. This environmental impact assessment concerns the development of existing and new fields in the North Sea through the drilling of up to 69 wells and the associated modification of production facilities, as well as the subsequent operation of both existing and new wells in the period 1999-2006. The majority of the 69 wells will be drilled from existing production facilities situated west of 6°15' East longitude. Thus, the environmental impact assessment concerns the whole area in which DUC is entitled to explore for and produce hydrocarbons in Denmark under the Sole Concession. The effects on the environment have been assessed on the basis of the combined production, i.e. from both existing and new wells. Finally, the environmental impact assessment considers the possible effects on the environment of unforeseen discharges and emissions during the drilling phase and subsequent operational phase.

Later in 1999, the Danish Energy Agency made decisions on four applications for the approval of development projects in the North Sea in pursuance of section 10 of the Danish Subsoil Act. All four applications were based on the above-mentioned environmental impact assessment.

LICENCES IN DENMARK

Licence	Sole Concession of 8 July 1962
Operator	Mærsk Olie og Gas AS
Licence granted	8 July 1962
Blocks	Area (km²)
5504/7, 8, 11, 12, 15, 16	
5505/13, 17, 18	
(The Contiguous Area)	1934.0
5504/5, 6 (Elly)	64.0
5603/27, 28 (Freja)	44.8
5504/10, 14 (Rolf)	8.4
5604/25 (Svend)	48.0
5604/21, 22 (Harald)	55.7

Company	Share (%)
Shell Olie- og Gasudvinding Danmark BV	46.000
A.P. Møller (Concessionaires)	39.000
Texaco Denmark Inc.	15.000

Licence	7/86 (the Amalie share)
Operator	Dansk Operatørselskab i-s, Amerada Hess A/S is co-operator
Licence granted	24 June 1986 (2nd Round)
Blocks	5604/22, 26
Area (km²)	106.8

Company	Share (%)
Amerada Hess Energi A/S	42.758
DONG Efterforskning og Produktion A/S	25.317
Denerco Oil A/S	20.731
LD Energi A/S	11.194

Licence	7/86 (the Lulita share)
Operator	Dansk Operatørselskab i-s, Statoil Efterforskning og Produktion A/S is co-operator
Licence granted	24 June 1986 (2nd Round)
Block	5604/22
Area (km²)	2.6

Company	Share (%)
Statoil Efterforskning og Produktion A/S	37.642
DONG Efterforskning og Produktion A/S	27.184
Denerco Oil A/S	24.260
LD Energi A/S	10.914

Licence	7/89
Operator	Amerada Hess A/S, Dansk Operatørselskab i-s is co-operator
Licence granted	20 December 1989 (3rd Round)
Blocks	5504/2; 5604/25, 29, 30
Area (km²)	261.6

Company	Share (%)
Amerada Hess A/S	65.690
DONG Efterforskning og Produktion A/S	25.000
Denerco Oil A/S	7.500
Danoil Exploration A/S	1.810

Licence	7/89 (the South Arne share)
Operator	Amerada Hess A/S, Dansk Operatørselskab i-s is co-operator
Licence granted	20 December 1989 (3rd Round)
Blocks	5604/29, 30
Area (km²)	93.3

Company	Share (%)
Amerada Hess A/S	57.479
DONG Efterforskning og Produktion A/S	34.375
Denerco Oil A/S	6.563
Danoil Exploration A/S	1.584

Licence	8/89
Operator	Dansk Operatørselskab i-s, Amerada Hess A/S is co-operator
Licence granted	20 December 1989 (3rd Round)
Blocks	5603/32; 5604/29
Area (km²)	234.0

Company	Share (%)
Amerada Hess A/S	63.263
DONG Efterforskning og Produktion A/S	23.624
Denerco Oil A/S	10.564
Danoil Exploration A/S	2.549

Licence	10/89
Operator	Mærsk Olie og Gas AS
Licence granted	20 December 1989 (3rd Round)
Block	5603/27
Area (km²)	27.1

Company	Share (%)
A.P. Møller	26.667
Shell Olie- og Gasudvinding Danmark BV	26.667
Texaco Denmark Inc.	26.667
DONG Efterforskning og Produktion A/S	20.000

Licence	1/90
Operator	Dansk Operatørselskab i-s, Statoil Efterforskning og Produktion A/S is technical assistant
Licence granted	3 July 1990
Block	5604/18
Area (km²)	1.2

Company	Share (%)
Statoil Efterforskning og Produktion A/S	37.642
DONG Efterforskning og Produktion A/S	27.184
Denerco Oil A/S	24.260
LD Energi A/S	10.914

Licence	2/90
Operator	Dansk Operatørselskab i-s
Licence granted	3 July 1990
Blocks	5604/23, 24
Area (km²)	430.5

Company	Share (%)
RWE-DEA AG	30.000
Denerco Oil A/S	28.500
Amerada Hess Energi A/S	19.000
LD Energi A/S	12.500
DONG Efterforskning og Produktion A/S	10.000

Licence	3/90
Operator	Mærsk Olie og Gas AS
Licence granted	13 July 1990
Block	5603/28
Area (km²)	29.6

Company	Share (%)
Shell Olie- og Gasudvinding A/S	36.800
A.P. Møller	31.200
DONG Efterforskning og Produktion A/S	20.000
Texaco Denmark Inc.	12.000

Licence	1/95
Operator	Amerada Hess A/S, Dansk Operatørselskab i-s is co-operator
Licence granted	15 May 1995 (4th Round)
Blocks	5503/2, 3; 5603/30, 31
Area (km²)	187.8

Company	Share (%)
Amerada Hess A/S	40.000
Premier Oil BV	20.000
Denerco Oil A/S	20.000
DONG Efterforskning og Produktion A/S	20.000

Licence	2/95
Operator	Dansk Operatørselskab i-s, Amerada Hess A/S is co-operator
Licence granted	15 May 1995 (4th Round)
Blocks	5503/3, 4; 5603/31; 5604/29
Area (km²)	331.1

Company	Share (%)
Amerada Hess A/S	63.263
DONG Efterforskning og Produktion A/S	23.624
Denerco Oil A/S	10.564
Danoil Exploration A/S	2.549

Licence	3/95
Operator	Dansk Operatørselskab i-s
Licence granted	15 May 1995 (4th Round)
Blocks	5604/19, 20; 5605/21
Area (km²)	178.7

Company	Share (%)
Denerco Oil A/S	28.500
RWE-DEA AG	20.000
DONG Efterforskning og Produktion A/S	20.000
Amerada Hess Energi A/S	19.000
LD Energi A/S	12.500

Licence	4/95
Operator	Dansk Operatørselskab i-s
Licence granted	15 May 1995 (4th Round)
Blocks	5604/20; 5605/7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17
Area (km²)	1087.5

Company	Share (%)
Mobil Erdgas-Erdöl GmbH	27.500
DONG Efterforskning og Produktion A/S	27.500
RWE-DEA AG	11.500
Enterprise Oil Denmark Ltd.	20.000
Denerco Oil A/S	8.500

Licence	5/95
Operator	Phillips Petroleum International Corporation Denmark
Licence granted	15 May 1995 (4th Round)
Blocks	5603/30, 31
Area (km²)	233.2

Company	Share (%)
Phillips Petroleum International Corporation Denmark	35.000
Amerada Hess Efterforskning A/S	20.000
DONG Efterforskning og Produktion A/S	20.000
Pelican A/S Danmark	15.000
Denerco Oil A/S	5.000
Premier Oil BV	5.000

Licence	6/95
Operator	Statoil Efterforskning og Produktion a/s, Dansk Operatørselskab i-s is co-operator
Licence granted	15 May 1995 (4th Round)
Blocks	5604/16, 20; 5605/13, 17
Area (km²)	414.1

Company	Share (%)
Statoil Efterforskning og Produktion A/S	40.000
Enterprise Oil Denmark Ltd.	20.000
DONG Efterforskning og Produktion A/S	20.000
Phillips Petroleum Int. Corp. Denmark	12.500
Denerco Oil A/S	7.500

Licence	7/95
Operator	Mærsk Olie og Gas AS
Licence granted	15 May 1995 (4th Round)
Block	5505/22
Area (km²)	195.9

Company	Share (%)
A.P. Møller	26.667
Shell Olie- og Gasudvinding Danmark BV	26.667
Texaco Denmark Inc.	26.667
DONG Efterforskning og Produktion A/S	20.000

Licence	8/95
Operator	Mærsk Olie og Gas AS
Licence granted	15 May 1995 (4th Round)
Blocks	5504/3, 4
Area (km²)	326.0

Company	Share (%)
Shell Olie- og Gasudvinding Danmark BV	36.800
A.P. Møller	31.200
DONG Efterforskning og Produktion A/S	20.000
Texaco Denmark Inc.	12.000

Licence	9/95
Operator	Mærsk Olie og Gas AS
Licence granted	15 May 1995 (4th Round)
Blocks	5604/21, 22, 25, 26
Area (km²)	218.5

Company	Share (%)
Shell Olie- og Gasudvinding Danmark BV	36.800
A.P. Møller	31.200
DONG Efterforskning og Produktion A/S	20.000
Texaco Denmark Inc.	12.000

Licence	1/97
Operator	Norsk Agip A/S
Licence granted	15 September 1997 (Open Door)
Blocks	5606/14, 18
Area (km²)	428.6

Company	Share (%)
Agip Denmark B.V.	80.000
DONG Efterforskning og Produktion A/S	20.000

Licence	4/97
Operator	Mærsk Olie og Gas AS
Licence granted	15 September 1997 (Open Door)
Blocks	5506/4, 8, 12, 16, 20, 24; 5507/ 1, 2, 5, 6, 9, 10, 13, 14, 17, 18, 21, 22, 25, 26
Area (km²)	3335.7

Company	Share (%)
A.P. Møller	40.000
Shell Olie- og Gasudvinding Danmark BV	40.000
DONG Efterforskning og Produktion A/S	20.000

Licence	5/97
Operator	Sterling Resources Ltd.
Licence granted	15 September 1997 (Open Door)
Blocks	5512/2; 5612/30
Area (km²)	406.8

Company	Share (%)
Odin Energi ApS	80.000
DONG Efterforskning og Produktion A/S	20.000

Licence	1/98
Operator	CLAM Petroleum Danske B.V.
Licence granted	15 June 1998 (5th Round)
Blocks	5505/1, 5, 6
Area (km²)	285.5

Company	Share (%)
CLAM Petroleum Danske B.V.	80.000
DONG Efterforskning og Produktion A/S	20.000

Licence	2/98
Operator	CLAM Petroleum Danske B.V.
Licence granted	15 June 1998 (5th Round)
Blocks	5605/18, 19, 22, 23
Area (km²)	231.9

Company	Share (%)
CLAM Petroleum Danske B.V.	80.000
DONG Efterforskning og Produktion A/S	20.000

Licence	3/98
Operator	Marathon Petroleum Denmark, Ltd
Licence granted	15 June 1998 (5th Round)
Blocks	5605/28; 5605/32
Area (km²)	216.4

Company	Share (%)
Marathon Petroleum Denmark, Ltd	80.000
DONG Efterforskning og Produktion A/S	20.000

Licence	4/98
Operator	Phillips Petroleum International Corporation Denmark
Licence granted	15 June 1998 (5th Round)
Blocks	5604/26, 27, 30, 31; 5504/2, 3
Area (km²)	604.4

Company	Share (%)
Phillips Petroleum International Corporation Denmark	30.000
Saga Petroleum Danmark AS	25.000
Veba Oil Denmark GmbH	25.000
DONG Efterforskning og Produktion A/S	20.000

Licence	5/98
Operator	Phillips Petroleum International Corporation Denmark
Licence granted	15 June 1998 (5th Round)
Blocks	5603/24, 28; 5604/21, 25
Area (km²)	232.6

Company	Share (%)
Phillips Petroleum International Corporation Denmark	30.000
Saga Petroleum Danmark AS	25.000
Veba Oil Denmark GmbH	25.000
DONG Efterforskning og Produktion A/S	20.000

Licence	6/98
Operator	Phillips Petroleum International Corporation Denmark
Licence granted	15 June 1998 (5th Round)
Blocks	5504/1, 2; 5604/29
Area (km²)	213.8

Company	Share (%)
Phillips Petroleum International Corporation Denmark	30.000
Saga Petroleum Danmark AS	25.000
Veba Oil Denmark GmbH	25.000
DONG Efterforskning og Produktion A/S	20.000

Licence	7/98
Operator	Enterprise Oil Denmark, Dansk Operatørselskab i-s is co-operator
Licence granted	15 June 1998 (5th Round)
Blocks	5505/1, 2, 3, 6, 7, 10
Area (km²)	583.4

Company	Share (%)
Enterprise Oil Denmark	60.000
Denerco Oil A/S	20.000
DONG Efterforskning og Produktion A/S	20.000

Licence	8/98
Operator	Kerr-McGee International ApS
Licence granted	15 June 1998 (5th Round)
Blocks	5605/18, 19
Area (km²)	359.1

Company	Share (%)
Kerr-McGee International ApS	40.000
ARCO Denmark Limited	40.000
DONG Efterforskning og Produktion A/S	20.000

Licence	9/98
Operator	Norsk Agip A/S
Licence granted	15 June 1998 (5th Round)
Blocks	5604/28, 32; 5605/25, 29
Area (km²)	721.2

Company	Share (%)
Agip Denmark B.V.	80.000
DONG Efterforskning og Produktion A/S	20.000

Licence	10/98
Operator	Norsk Agip A/S
Licence granted	15 June 1998 (5th Round)
Blocks	5503/3, 7
Area (km²)	169.5

Company	Share (%)
Agip Denmark B.V.	80.000
DONG Efterforskning og Produktion A/S	20.000

Licence	11/98
Operator	Dansk Operatørselskab i-s
Licence granted	15 June 1998 (5th Round)
Blocks	5503/8; 5504/1, 2, 5, 6
Area (km²)	352.8

Company	Share (%)
Amerada Hess A/S	42.000
Veba Oil Denmark GmbH	20.000
DONG Efterforskning og Produktion A/S	25.000
Denerco Oil A/S	13.000

Licence	12/98
Operator	Amerada Hess A/S
Licence granted	15 June 1998 (5th Round)
Blocks	5604/27, 28, 31, 32
Area (km²)	276.2

Company	Share (%)
Amerada Hess A/S	50.000
Denerco Oil A/S	30.000
DONG Efterforskning og Produktion A/S	20.000

Licence	13/98
Operator	EDC (Europe) Ltd.
Licence granted	15 June 1998 (5th Round)
Blocks	5505/5, 9
Area (km²)	328.0

Company	Share (%)
EDC (Denmark)	40.000
Pogo Denmark Inc.	40.000
DONG Efterforskning og Produktion A/S	20.000

Licence	14/98
Operator	Mærsk Olie og Gas AS
Licence granted	15 June 1998 (5th Round)
Blocks	5505/3,4; 5605/26, 27, 28, 30, 31, 32; 5606/25
Area (km²)	1355.9

Company	Share (%)
A.P. Møller	26.667
Shell Olie- og Gasudvinding Danmark B.V.	26.667
Texaco Denmark Inc.	26.667
DONG Efterforskning og Produktion A/S	20.000

Licence	15/98
Operator	Mærsk Olie og Gas AS
Licence granted	15 June 1998 (5th Round)
Block	5604/25
Area (km²)	70.5

Company	Share (%)
Shell Olie- og Gasudvinding Danmark B.V.	36.800
A.P. Møller	31.200
DONG Efterforskning og Produktion A/S	20.000
Texaco Denmark Inc.	12.000

Licence	16/98
Operator	Dansk Operatørselskab i-s
Licence granted	15 June 1998 (5th Round)
Blocks	5604/15, 18, 19, 20
Area (km²)	194.1

Company	Share (%)
Denerco Oil A/S	38.000
LD Energi A/S	25.000
DONG Efterforskning og Produktion A/S	20.000
RWE-DEA AG	17.000

Licence	17/98
Operator	Mærsk Olie og Gas AS
Licence granted	15 June 1998 (5th Round)
Blocks	5505/19, 23
Area (km²)	146.1

Company	Share (%)
Shell Olie- og Gasudvinding Danmark B.V.	36.800
A.P. Møller	31.200
DONG Efterforskning og Produktion A/S	20.000
Texaco Denmark Inc.	12.000

Licence	1/99
Operator	Norsk Agip A/S
Licence granted	15 February 1999 (Open Door)
Blocks	5506/4, 7, 8, 10, 11, 12, 14, 15, 16, 18, 19, 22, 23
Area (km²)	1792.1

Company	Share (%)
Agip Denmark B.V.	80.000
DONG Efterforskning og Produktion A/S	20.000

Licence	2/99
Operator	Gustavson Associates Inc.
Licence granted	20 March 1999 (Open Door)
Blocks	5707/16,19,20,22,23,24,26,27,30,31
Area (km²)	1329.4

Company	Share (%)
Gustavson Associates Inc.	80.000
DONG Efterforskning og Produktion A/S	20.000

Licence	3/99
Operator	The Anschutz Overseas Corporation
Licence granted	20 March 1999 (Open Door)
Blocks	5606/10, 11, 12, 15, 16, 20, 24; 5607/9, 13, 17, 21, 25, 29
Area (km²)	2791.2

Company	Share (%)
Anschutz Denmark Aps	80.000
DONG Efterforskning og Produktion A/S	20.000

Licence	4/99
Operator	Amerada Hess A/S
Licence granted	1 May 1999 (Open Door)
Blocks	5610/19, 20 23, 24, 2; 5611/21, 22, 25, 26, 30; 5610/29
Area (km²)	2372.1

Company	Share (%)
Courage Energy Inc.	32.000
Odin Energi ApS	20.000
DONG Efterforskning og Produktion A/S	20.000
Amerada Hess A/S	16.000
Emerald Energy Denmark Ltd.	12.000

Licence	5/99
Operator	Mærsk Olie og Gas AS
Licence granted	27 November 1999
Blocks	5504720, 24; 5505/21
Area (km²)	187.3

Company	Share (%)
A.P. Møller	80.000
DONG Efterforskning og Produktion A/S	20.000

Please note that the figures showing the licence shares have been rounded off. The list will be updated on the Danish Energy Agency's homepage www.ens.dk. Reference is made to the maps of the Danish licence area at the back of the report.

EXPLORATORY SURVEYS 1999

Survey Licence	Operator Contractor	Type	Initiated Completed	Area Block no.	Acquired in 1999
C99-5505	Fugro-Geoteam A/S	Offshore	16-02-1999	RFH (Licence 1/98)	323 km^2
Spec.	Fugro-Geoteam A/S	3D	02-04-1999	5504, 5505	
KMC99-5605	Fugro-Geoteam A/S	Offshore	02-04-1999	NDB/RFH (Licences 2/98, 8/98)	552 km^2
Spec.	Fugro-Geoteam A/S	3D	09-05-1999	5605	
MARA99	Fugro-Geoteam A/S	Offshore	09-05-1999	RFH (Licence 3/98)	174 km^2
Spec.	Fugro-Geoteam A/S	3D	25-05-1999	5605	
AG9901	Fugro-Geoteam A/S	Offshore	25-05-1999	RFH (Licence 9/98)	347 km^2
Spec.	Fugro-Geoteam A/S	3D	21-06-1999	5504, 5604, 5605	
PAM99 (northern part)	Mærsk Olie og Gas AS	Offshore	07-07-1999	CG	813 km^2 *)
9/95, 5/98, 15/98	PGS Exploration A/S	3D	09-08-1999	5603, 5604	
PAM99 (southern part)	Phillips Petroleum Int. Co.	Offshore	05-03-1999	CG	1465 km^2 *)
4/98, 6/98, 8/98	PGS Exploration A/S	3D	09-07-1999	5503, 5504, 5604	
HEL99/1936	Horizon Exploration Ltd.	Offshore	29-04-1999	CG	250 km^2
Spec.	Horizon Exploration Ltd.	3D	16-09-1999	5505	
AG9902	Norsk Agip A/S	Offshore	21-03-1999	CG	201 km^2 *)
10/98	Geco-Prakla	3D	04-04-1999	5505, 5603	
DS99	TGS Nopec	Offshore	22-03-1999	RFH	2080 km
Spec.	TGS Nopec	2D	12-04-1999	5505, 5506, 5605, 5606	
Corrit-Stiftung	Corrit-Stiftung Technical University of	Onshore	09-04-1999	NDB	163 samples
	Denmark	Geochemical	01-05-1999	Salling, Rold, North Zealand	

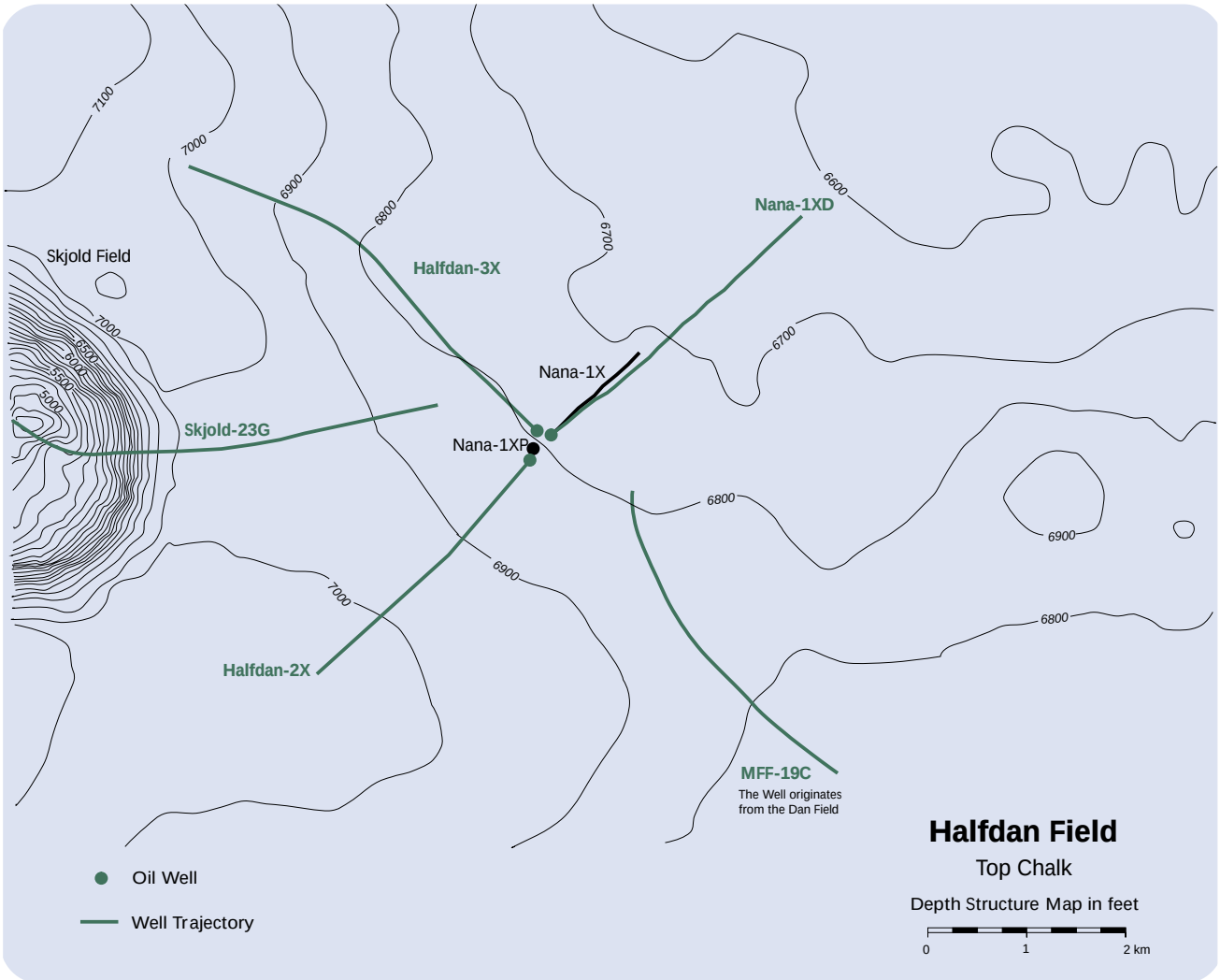
CG=Central Graben, NDB=Norwegian-Danish Basin, RFH=Ringkøbing-Fyn High

**) Only the Danish share of the survey has been included.*

NEW FIELDS

New Field Developments

Field name	Halfdan
Location:	Blocks 5505/13 and 5504/16
Licence:	Sole Concession of 8 July 1962
Operator:	Mærsk Olie og Gas AS
Discovered:	1999
Dev. plan approved:	1999
Year on stream:	2000
Water depth:	43 m
Reservoir depth:	2,100 m
Reservoir rock:	Chalk
Geological age:	Danian and Upper Cretaceous
Type of hydrocarbons:	Oil/gas



Future Field Developments

Field name	Adda
Location	Block 5504/8
Licence:	Sole Concession of 8 July 1962
Operator:	Mærsk Olie og Gas AS
Discovered:	1977
Dev. plan approved:	1990
Year on stream:	2003
Water depth:	38 m
Reservoir depth:	2,200 m and 2,300 m
Reservoir rock:	Carbonates
Geological age:	Upper and Lower Cretaceous
Type of hydrocarbons:	Oil/gas

Field name	Igor
Location:	Block 5505/13
Licence:	Sole Concession of 8 July 1962
Operator:	Mærsk Olie og Gas AS
Discovered:	1968
Dev. plan approved:	1990
Year on stream:	2002
Water depth:	50 m
Reservoir depth:	2,000 m
Reservoir rock:	Chalk
Geological age:	Danian and Upper Cretaceous
Type of hydrocarbons:	Gas

Field name	Elly
Location:	Block 5504/6
Licence:	Sole Concession of 8 July 1962
Operator:	Mærsk Olie og Gas AS
Discovered:	1984
Dev. plan approved:	1995
Year on stream:	2002
Water depth:	40 m
Reservoir depth:	3,200 m and 4,000 m
Reservoir rock:	Chalk and Sandstone
Geological age:	Upper Cretaceous and Jurassic
Type of hydrocarbons:	Gas

Field name	Freja (former Gert)
Location:	Blocks 5603/27 and 28
Licence:	Sole Concession of 8 July 1962
Operator:	Mærsk Olie og Gas AS
Discovered:	1984
Water depth:	70 m
Reservoir depth:	4,900 m
Reservoir rock:	Sandstone
Geological age:	Upper Jurassic
Type of hydrocarbons:	Oil

Field name	Alma
Location:	Block 5505/17
Licence:	Sole Concession of 8 July 1962
Operator:	Mærsk Olie og Gas AS
Discovered:	1990
Dev. plan approved:	1995
Year on stream:	2003
Water depth:	43 m
Reservoir depth:	3,600 m
Reservoir rock:	Sandstone
Geological age:	Middle Jurassic
Type of hydrocarbons:	Gas

AMOUNTS PRODUCED AND INJECTED

OIL thousand cubic metres

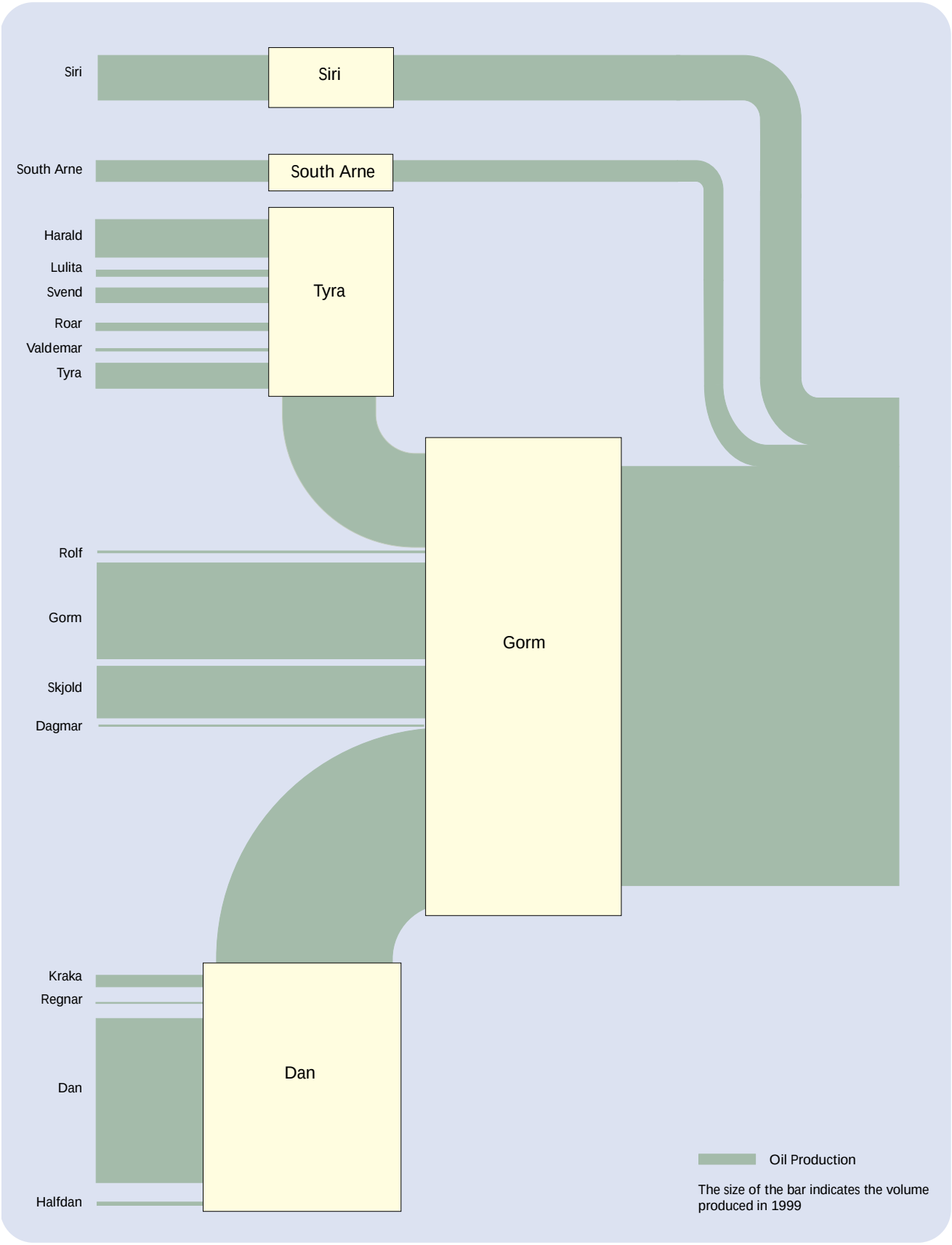
Monthly Production in 1999

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	1999
Dan	422.8	420.1	486.3	476.1	461.2	477.2	496.1	482.6	500.5	524.8	491.4	504.8	5,744.0
Gorm	339.3	285.2	321.2	287.9	265.6	270.4	285.2	275.2	267.7	270.9	251.1	264.8	3,384.4
Skjold	161.6	127.9	151.0	135.8	139.0	136.6	121.5	130.3	154.1	191.7	186.5	189.1	1,825.2
Tyra	96.9	84.3	90.9	75.8	76.1	66.1	52.5	57.6	58.8	70.9	75.3	81.2	886.4
Rolf	7.5	6.5	7.3	4.7	4.4	5.9	7.4	7.2	7.0	7.0	6.1	6.3	77.3
Kraka	35.5	32.0	36.6	34.6	34.1	35.6	35.9	31.6	29.5	31.1	33.6	35.6	405.6
Dagmar	0.8	0.7	1.1	0.8	1.0	1.0	1.0	0.8	0.8	0.6	1.0	0.2	9.6
Regnar	3.3	3.0	3.1	3.0	0.8	1.2	2.9	3.4	2.7	2.9	2.7	0.2	29.1
Valdemar	8.4	7.4	8.2	8.5	8.5	8.8	8.1	8.3	7.6	5.8	3.7	3.2	86.5
Roar	36.0	27.1	30.4	26.2	23.5	14.5	15.5	15.8	16.8	23.6	13.9	22.0	265.3
Svend	38.3	28.3	18.2	15.2	45.8	68.3	64.9	53.5	51.8	48.1	49.4	44.4	526.0
Harald	118.9	109.4	122.5	114.4	86.8	100.4	110.6	113.1	106.1	120.7	110.2	109.9	1,323.1
Lulita	24.8	19.4	19.0	18.9	13.4	19.4	19.1	19.4	17.2	18.3	19.1	18.8	227.0
Halfdan	-	20.8	22.9	21.4	19.9	20.6	24.1	24.1	18.2	17.6	16.8	16.2	222.5
Siri	-	-	27.0	87.6	135.6	177.9	193.0	180.7	196.3	222.1	209.1	163.8	1,593.1
South Arne	-	-	-	-	-	-	11.6	64.1	90.2	160.5	218.7	208.9	754.0
Total	**1,294.0**	**1,172.0**	**1,345.7**	**1,310.9**	**1,315.8**	**1,403.7**	**1,449.4**	**1,467.8**	**1,525.2**	**1,716.6**	**1,688.6**	**1,669.4**	**17,359.1**

Production and Sales

	1972-88	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total
Dan	7,629	1,472	1,580	1,723	2,699	3,262	3,496	3,713	3,799	3,858	4,768	5,744	43,743
Gorm	12,008	1,349	1,439	1,501	1,661	1,889	2,421	2,494	2,879	3,045	2,865	3,384	36,935
Skjold	5,581	2,214	2,630	2,734	2,281	2,103	1,715	1,979	2,023	2,011	1,896	1,825	28,991
Tyra	2,785	1,049	1,080	1,386	1,669	1,639	1,748	1,631	1,447	1,263	931	886	17,515
Rolf	1,498	395	271	293	304	176	92	216	218	96	92	77	3,727
Kraka	-	-	-	144	205	390	490	469	340	315	314	406	3,073
Dagmar	-	-	-	475	305	67	33	35	23	17	13	10	978
Regnar	-	-	-	-	-	145	429	86	41	27	43	29	800
Valdemar	-	-	-	-	-	53	304	165	161	159	95	86	1,024
Roar	-	-	-	-	-	-	-	0	319	427	327	265	1,338
Svend	-	-	-	-	-	-	-	0	836	1,356	635	526	3,353
Harald	-	-	-	-	-	-	-	-	0	794	1,688	1,323	3,805
Lulita	-	-	-	-	-	-	-	-	-	-	145	227	372
Halfdan	-	-	-	-	-	-	-	-	-	-	-	222	222
Siri	-	-	-	-	-	-	-	-	-	-	-	1,593	1,593
South Arne	-	-	-	-	-	-	-	-	-	-	-	754	754
Total	**29,501**	**6,480**	**6,999**	**8,256**	**9,125**	**9,724**	**10,727**	**10,788**	**12,087**	**13,367**	**13,810**	**17,359**	**148,223**

WHERE DOES THE OIL ORIGINATE



GAS million normal cubic metres

Production

	1972-88	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total
Dan	2,637	706	804	879	1,056	1,336	1,263	1,331	1,249	1,116	1,342	1,410	15,130
Gorm	4,563	892	805	843	844	775	922	761	674	609	633	537	12,858
Skjold	476	191	220	233	212	195	185	188	160	189	146	154	2,549
Tyra	9,024	3,519	3,296	3,672	3,944	3,853	3,646	3,839	3,843	4,229	3,638	3,878	50,382
Rolf	64	17	11	12	12	8	4	9	9	4	4	3	157
Kraka	-	-	-	56	88	125	119	128	95	85	106	149	951
Dagmar	-	-	-	65	46	13	8	5	4	3	2	2	148
Regnar	-	-	-	-	-	8	25	7	4	2	4	2	52
Valdemar	-	-	-	-	-	29	96	52	57	89	54	49	426
Roar	-	-	-	-	-	-	-	0	1,327	1,964	1,458	1,249	5,998
Svend	-	-	-	-	-	-	-	0	85	152	84	65	386
Harald	-	-	-	-	-	-	-	-	0	1,092	2,741	2,877	6,709
Lulita	-	-	-	-	-	-	-	-	-	-	69	181	250
Halfdan	-	-	-	-	-	-	-	-	-	-	-	37	37
Siri	-	-	-	-	-	-	-	-	-	-	-	142	142
South Arne	-	-	-	-	-	-	-	-	-	-	-	169	169
Total	**16,765**	**5,324**	**5,137**	**5,760**	**6,203**	**6,342**	**6,269**	**6,321**	**7,506**	**9,534**	**10,281**	**10,903**	**96,342**

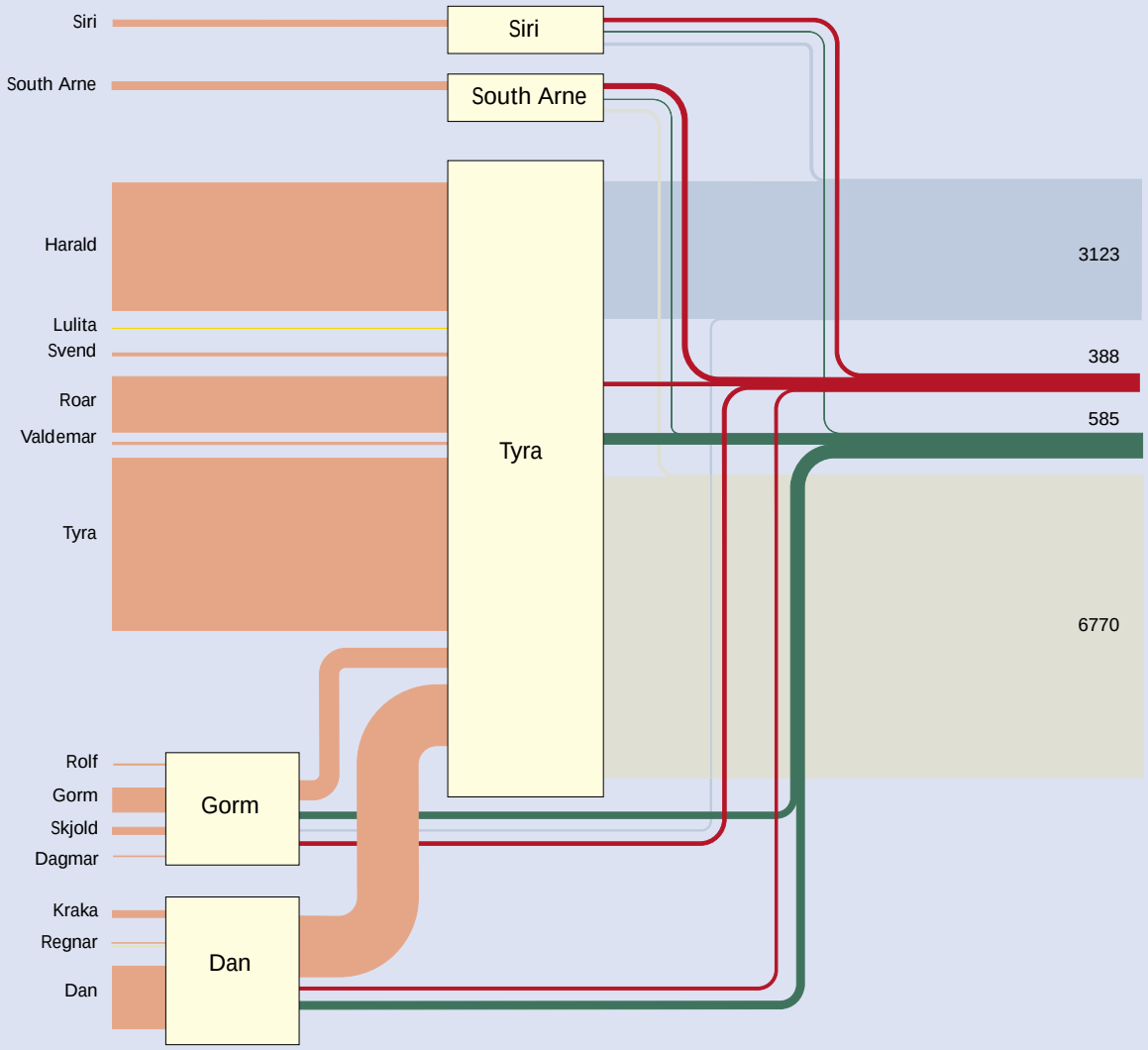
Fuel

	1972-88	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total
Dan	74	45	47	49	61	66	85	93	97	109	148	172	1,046
Gorm	408	72	74	73	81	87	104	111	135	164	152	149	1,610
Tyra	313	111	100	98	109	110	110	111	142	210	224	239	1,879
Dagmar	-	-	-	7	13	1	0	0	0	0	0	0	21
Harald	-	-	-	-	-	-	-	-	-	5	14	14	32
Siri	-	-	-	-	-	-	-	-	-	-	-	8	8
South Arne	-	-	-	-	-	-	-	-	-	-	-	3	3
Total	**795**	**228**	**222**	**227**	**264**	**264**	**299**	**314**	**375**	**488**	**539**	**585**	**4,599**

Flaring

	1972-88	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total
Dan	1,120	21	21	68	73	53	66	36	40	36	43	56	1,632
Gorm	428	68	60	65	86	95	75	69	60	81	71	71	1,229
Tyra	218	23	27	31	39	39	48	42	67	46	42	58	679
Dagmar	-	-	-	58	33	12	8	5	2	3	2	2	125
Harald	-	-	-	-	-	-	-	-	-	77	19	12	108
Siri	-	-	-	-	-	-	-	-	-	-	-	73	73
South Arne	-	-	-	-	-	-	-	-	-	-	-	116	116
Total	**1,767**	**112**	**108**	**223**	**230**	**199**	**196**	**152**	**168**	**243**	**177**	**388**	**3,962**

WHERE DOES THE GAS ORIGINATE



Gas Production

Gas Sales

Gas Injection

Gas Flaring

Fuel (Gas)

Figures in normal cubic metres

The size of the bar indicates the volume produced in 1999

GAS million normal cubic metres

Injection

	1972-88	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total
Gorm	4,319	892	775	735	711	420	70	28	26	62	24	21	8,085
Tyra	2,223	1,408	1,280	1,066	1,370	1,451	1,371	1,132	1,225	1,778	2,908	3,042	20,254
Siri	-	-	-	-	-	-	-	-	-	-	-	59	59
Total	**6,542**	**2,300**	**2,055**	**1,801**	**2,081**	**1,871**	**1,441**	**1,160**	**1,251**	**1,840**	**2,933**	**3,123**	**28,398**

Sales

	1984-88	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total
Dan*	1,444	639	736	818	1,010	1,350	1,256	1,338	1,211	994	1,261	1,369	13,426
Gorm*	351	68	127	215	191	375	863	750	622	495	535	450	5,042
Tyra*	5,866	1,977	1,888	2,476	2,426	2,279	2,208	2,607	3,878	4,417	2,060	1,870	33,953
Harald	-	-	-	-	-	-	-	-	-	1,058	2,777	3,032	6,866
South Arne	-	-	-	-	-	-	-	-	-	-	-	50	50
Total	**7,661**	**2,685**	**2,752**	**3,509**	**3,628**	**4,005**	**4,327**	**4,695**	**5,710**	**6,963**	**6,633**	**6,770**	**59,338**

***Estimated*

CO_2 EMISSIONS thousand tonnes

	1972-88	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total
Fuel	1,805	516	503	515	598	600	679	713	850	1,107	1,222	1,366*	10,439
Flaring	4,010	253	246	506	522	452	445	345	381	552	401	880	8,993
Total	**5,815**	**770**	**748**	**1,021**	**1,121**	**1,052**	**1,125**	**1,058**	**1,231**	**1,659**	**1,624**	**2,247**	**19,433**

**Including diesel oil*

WATER thousand cubic metres

Production

	1972-88	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total
Dan	438	119	163	276	513	781	1,117	1,275	1,543	1,845	2,977	4,233	15,281
Gorm	2,827	488	518	522	583	557	824	948	1,921	2,906	3,177	3,468	18,740
Skjold	0	13	0	17	339	817	889	1,337	2,679	3,635	3,938	3,752	17,416
Tyra	349	182	245	395	671	1,005	1,290	1,749	2,161	2,215	2,020	2,051	14,333
Rolf	193	216	248	197	350	265	161	443	490	390	411	366	3,729
Krakak	-	-	-	46	130	195	188	251	272	287	345	330	2,043
Dagmar	-	-	-	21	206	395	367	464	507	408	338	246	2.952
Regnar	-	-	-	-	-	0	244	396	299	164	407	364	1,874
Valdemar	-	-	-	-	-	1	24	20	34	61	52	56	246
Roar	-	-	-	-	-	-	-	0	14	96	146	202	458
Svend	-	-	-	-	-	-	-	0	2	64	272	591	930
Harald	-	-	-	-	-	-	-	-	0	0	5	15	21
Lulita	-	-	-	-	-	-	-	-	-	-	3	6	9
Halfdan	-	-	-	-	-	-	-	-	-	-	-	56	56
Siri	-	-	-	-	-	-	-	-	-	-	-	319	319
South Arne	-	-	-	-	-	-	-	-	-	-	-	13	13
Total	**3,808**	**6,480**	**6,999**	**8,256**	**9,125**	**9,724**	**10,727**	**10,788**	**12,087**	**13,367**	**13,810**	**17,359**	**122,530**

Injection

	1972-88	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total
Dan	0	76	183	180	865	1,534	3.808	5,884	8,245	8,654	11,817	14,964	56,209
Gorm	0	362	892	1,015	1,598	2,141	4,612	5,749	8,112	8,642	8,376	8,736	50,234
Skjold	3,047	2,905	3,377	3,238	2,791	2,836	3,511	3,985	5,712	6,320	6,291	5,866	49,879
Siri	-	-	-	-	-	-	-	-	-	-	-	1,209	1,209
Total	**3,047**	**3,343**	**4,452**	**4,433**	**5,253**	**6,511**	**11,931**	**15,618**	**22,069**	**23,616**	**26,484**	**30,775**	**157,532**

PRODUCING FIELDS

DAGMAR

Prospect:	East Rosa
Location:	Block 5504/15
Licence:	Sole Concession
Operator:	Mærsk Olie og Gas AS
Discovered:	1983
Year on stream:	1991
Producing wells:	2
Water depth:	34 m
Area:	9 km^2
Reservoir depth:	1,400 m
Reservoir rock:	Chalk and Carbonates
Geological age:	Danian, Upper Cretaceous and Zechstein

Reserves at 1 Jan. 2000:

Oil:	0.1 million m^3
Gas:	0.0 billion Nm^3

Cum. production at 1 Jan. 2000:

Oil:	0.98 million m^3
Gas:	0.15 billion Nm^3
Water:	2.95 million m^3

Production in 1999:

Oil:	0.01 million m^3
Gas:	0.00 billion Nm^3
Water:	0.25 million m^3

Tot. investments at 1 Jan. 2000:

99 prices	DKK 0.4 billion

REVIEW OF GEOLOGY

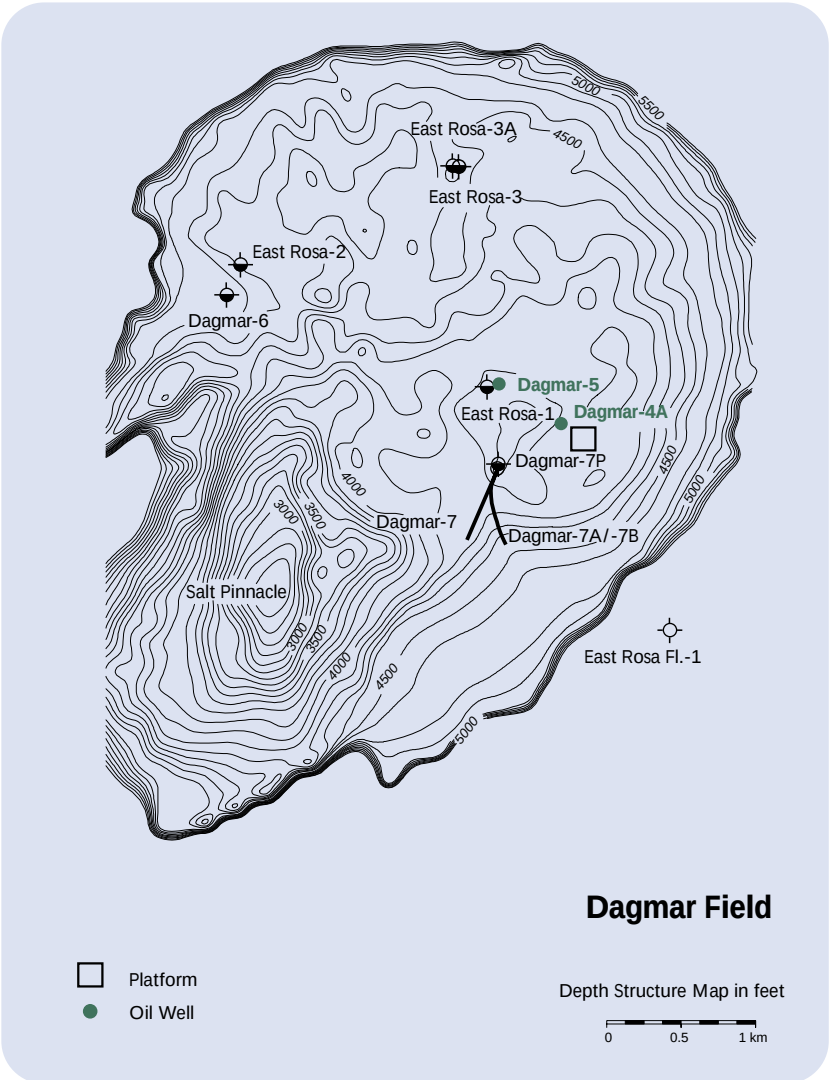
The Dagmar field is an anticlinal structure, induced through Zechstein salt tectonics. The uplift is so pronounced that the Dagmar reservoir is situated closer to the surface than any other hydrocarbon reservoirs in Danish territory. The reservoir is heavily fractured (compare Skjold, Rolf, Regnar and Svend). However, the water zone does not appear to be particularly fractured.

PRODUCTION STRATEGY

Initially, the oil production rates were high in the Dagmar Field, but it has not been possible to sustain the good production performance characterizing the Skjold, Svend and Rolf Fields.

PRODUCTION FACILITIES

The Dagmar Field is a satellite development to Gorm including one unmanned production platform of the STAR type. The unprocessed production is transported to the Gorm F platform in the Gorm Field, where special facilities for handling the sour gas from the Dagmar Field have been installed. The relatively small amount of gas produced from Dagmar is flared due to the high content of hydrogen sulphide.



DAN

Prospect:	Abby
Location:	Block 5505/17
Licence:	Sole Concession
Operator:	Mærsk Olie og Gas AS
Discovered:	1971
Year on stream:	1972
Producing wells:	52 (47 horizontal)
Water-injection wells:	40 (22 horizontal)
Water depth:	40 m
Area:	20 km^2
Reservoir depth:	1,850 m
Reservoir rock:	Chalk
Geological age:	Danian and Upper Cretaceous
Reserves at 1 Jan. 2000:	
Oil:	61.3 million m^3
Gas:	8.8 billion Nm^3
Cum. production at 1 Jan. 2000:	
Oil:	43.74 million m^3
Gas:	15.13 billion Nm^3
Water:	15.28 million m^3
Cum. injection at 1 Jan. 2000:	
Water:	56.21 million m^3
Production in 1999:	
Oil:	5.74 million m^3
Gas:	1.41 billion Nm^3
Water:	4.23 million m^3
Injection in 1999:	
Water:	14.96 million m^3
Tot. investments at 1 Jan. 2000:	
99 prices	DKK 18.9 billion

REVIEW OF GEOLOGY

Dan is an anticlinal structure partly induced through salt tectonics of the Zechstein/Triassic. A major fault divides the field into two reservoir blocks, which, in turn, are intersected by a number of minor faults. The chalk reservoir has high porosity, although low permeability. There is a gas cap in the field.

PRODUCTION STRATEGY

Recovery from the field is based on the simultaneous production of oil and injection of water. Water injection was initiated in 1989. The most recent development plan from 1995 provides for the introduction of high-rate water injection. The high pressure involved causes the injected water to fracture the chalk, ensuring the rapid distribution of water throughout the reservoir. Injecting large amounts of water quickly stabilizes and builds up the reservoir pressure in the oil zone. The recovery of oil is optimized by flooding the largest possible reservoir volume with water.

PRODUCTION FACILITIES

The Dan field installations comprise six wellhead platforms (DA, DD, DE, DFA, DFB and DFE), two processing/accommodation platforms (DB and DFC) and two gas flare stacks (DC and DFD), as well as a combined wellhead and processing platform (DFF).

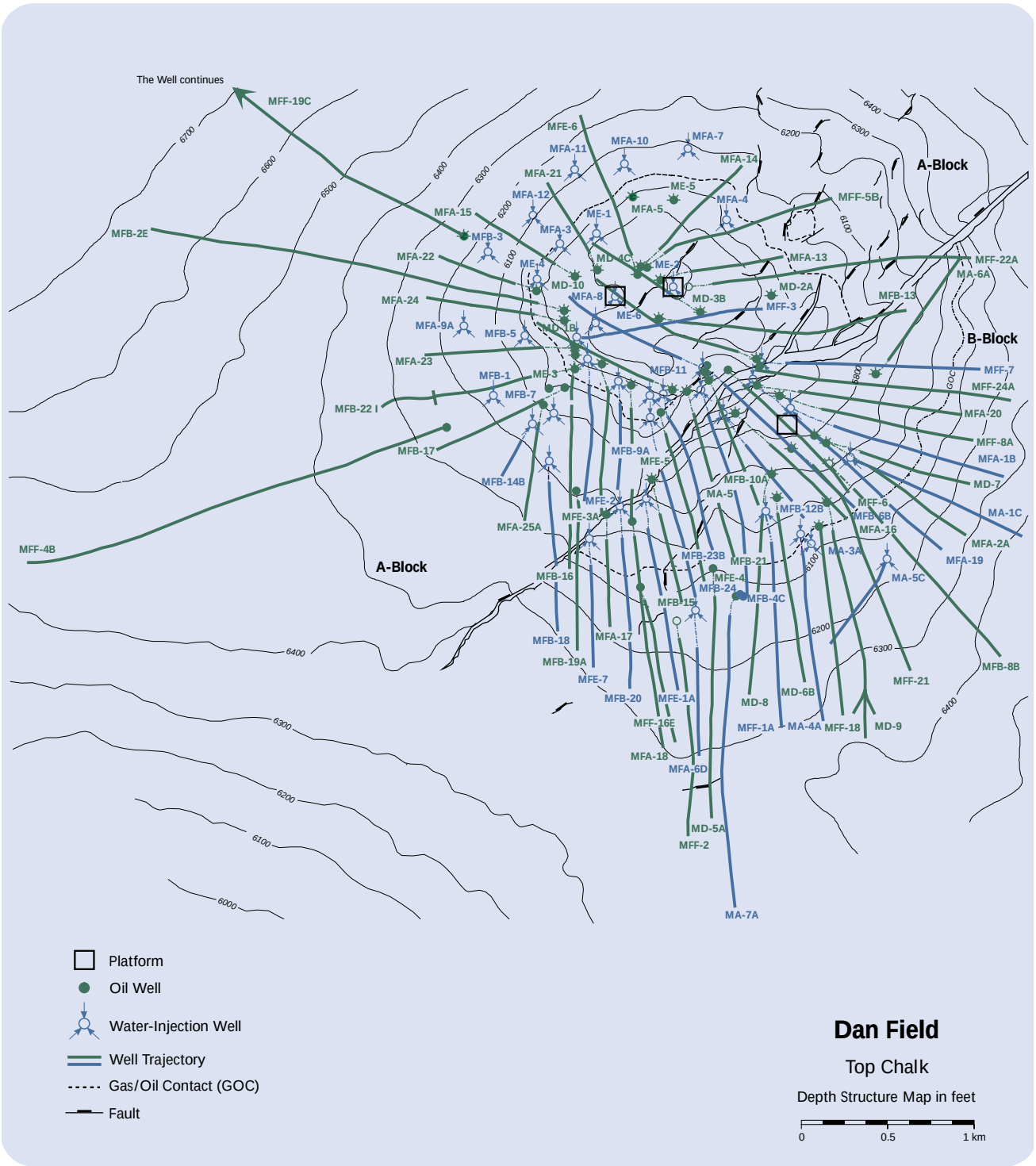
At the Dan Field, there are receiving facilities for the production from the Kraka and Regnar satellite fields.

The processing facilities on the DFC platform and on the new DFF platform handle production from the Dan, Kraka and Regnar Fields. The processing facilities include an oil stabilization plant and a gas dehydration plant, as well as gas compression facilities.

The water-injection capacity at the Dan Field is about 20 million m^3 per year (360,000 bbls per day).

After final processing, the oil is transported to shore via the booster platform, Gorm E. The gas is pre-processed and transported to Tyra East for final processing.

In the Dan Field, there are accommodation facilities for 86 persons on the DFC platform and five persons on the DB platform.


The Well continues
MFF-19C
MFB-2E
MFF-4B
A-Block
B-Block
A-Block
MFE-6
MFA-10
MFA-7
MFA-11
MFA-14
MFA-21
MFA-12
ME-5
MFA-4
MFF-5B
MFA-15
ME-1
MFA-5
MFB-3
MFA-3
MFA-22
ME-4
MD-4C
ME-2
MFA-13
MFF-22A
MA-6A
MD-10
MD-2A
MFA-24
MFA-8
MD-3B
MFB-13
MFF-3
ME-6
MFA-9A
MFB-5
MD-1B
MFA-23
MFB-1
ME-3
MFB-11
MFF-7
MFF-24A
MFB-7
MFB-22 I
MFA-20
MFB-17
MFF-8A
MFB-9A
MFA-1B
MFE-5
MFB-14B
MFB-10A
MD-7
MA-5
MFE-2
MFB-12B
MFF-6
MA-1C
MFE-3A
MFB-6B
MFA-25A
MFA-16
MFA-2A
MFB-23B
MFB-21
MA-3A
MFA-19
MFB-16
MFE-4
MA-5C
MFB-24
MFB-4C
MFB-15
MFB-18
MFA-17
MFB-19A
MFB-8B
MFE-7
MFF-21
MFB-20
MFE-1A
MD-8
MD-6B
MFF-16E
MFF-1A
MA-4A
MFF-18
MD-9
MFA-18
MFA-6D
MD-5A
MFF-2
MA-7A
6700
6600
6500
6400
6300
6200
6100
6000
GOC
Platform
Oil Well
Water-Injection Well
Well Trajectory
Gas/Oil Contact (GOC)
Fault
Dan Field
Top Chalk
Depth Structure Map in feet
0
0.5
1 km

GORM

Prospect:	Vern
Location:	Blocks 5504/15 and 16
Licence:	Sole Concession
Operator:	Mærsk Olie og Gas AS
Discovered:	1971
Year on stream:	1981
Producing wells:	31 (10 horizontal)
Gas-injection wells:	2
Water-injection wells:	14 (8 horizontal)
Water depth:	39 m
Area:	12 km^2
Reservoir depth:	2,100 m
Reservoir rock:	Chalk
Geological age:	Danian and Upper Cretaceous
Reserves at 1 Jan. 2000:	
Oil:	13.6 million m^3
Gas:	1.6 billion Nm^3
Cum. production at 1 Jan. 2000:	
Oil:	36.94 million m^3
Net gas:	4.77 billion Nm^3
Water:	18.74 million m^3
Cum. injection at 1 Jan. 2000:	
Gas:	8.09 billion Nm^3
Water:	50.23 million m^3
Production in 1999:	
Oil:	3.38 million m^3
Net gas:	0.52 billion Nm^3
Water:	3.47 million m^3
Injection in 1999:	
Gas:	0.02 billion Nm^3
Water:	8.74 million m^3
Tot. investments at 1 Jan. 2000:	
99 prices	DKK 9.8 billion

REVIEW OF GEOLOGY

Gorm is an anticlinal structure partly due to Zechstein salt tectonics. A major fault extending north-south divides the field into two reservoir blocks. The western reservoir block is intersected by numerous, minor faults.

PRODUCTION STRATEGY

In 1989, water injection was initiated in the reservoir. Oil production from the field is based on extending the use of water injection to the whole field. In the western reservoir block, oil is recovered from the mid-flank areas of the reservoir, with simultaneous water injection in the flanks. In a later phase, recovery will be moved towards the crest of the structure, while water injection will be initiated in the areas where oil was produced previously. In the eastern reservoir block, oil is recovered from the mid-flank areas of the reservoir, with simultaneous water injection in the water zone under the reservoir. The recovery of oil is optimized by flooding the largest possible reservoir volume with as much water as possible.

If gas exports to Tyra are interrupted, the gas is injected into the Gorm Field.

PRODUCTION FACILITIES

The Gorm Field consists of two wellhead platforms (Gorm A and Gorm B), one processing/accommodation platform (Gorm C), one gas flare stack (Gorm D), one riser/booster platform (Gorm E), owned by DONG Olierør A/S, and one combined wellhead/processing/booster platform (Gorm F).

Gorm receives production from the satellite fields, Skjold, Rolf and Dagmar. The Gorm Field installations supply the Skjold Field with injection water and lift gas and the Rolf Field with lift gas. Most of the gas produced is sent to Tyra East. The stabilized oil from the processing facilities at the Dan, Tyra and Gorm Centres is transported ashore via the booster platform Gorm E.

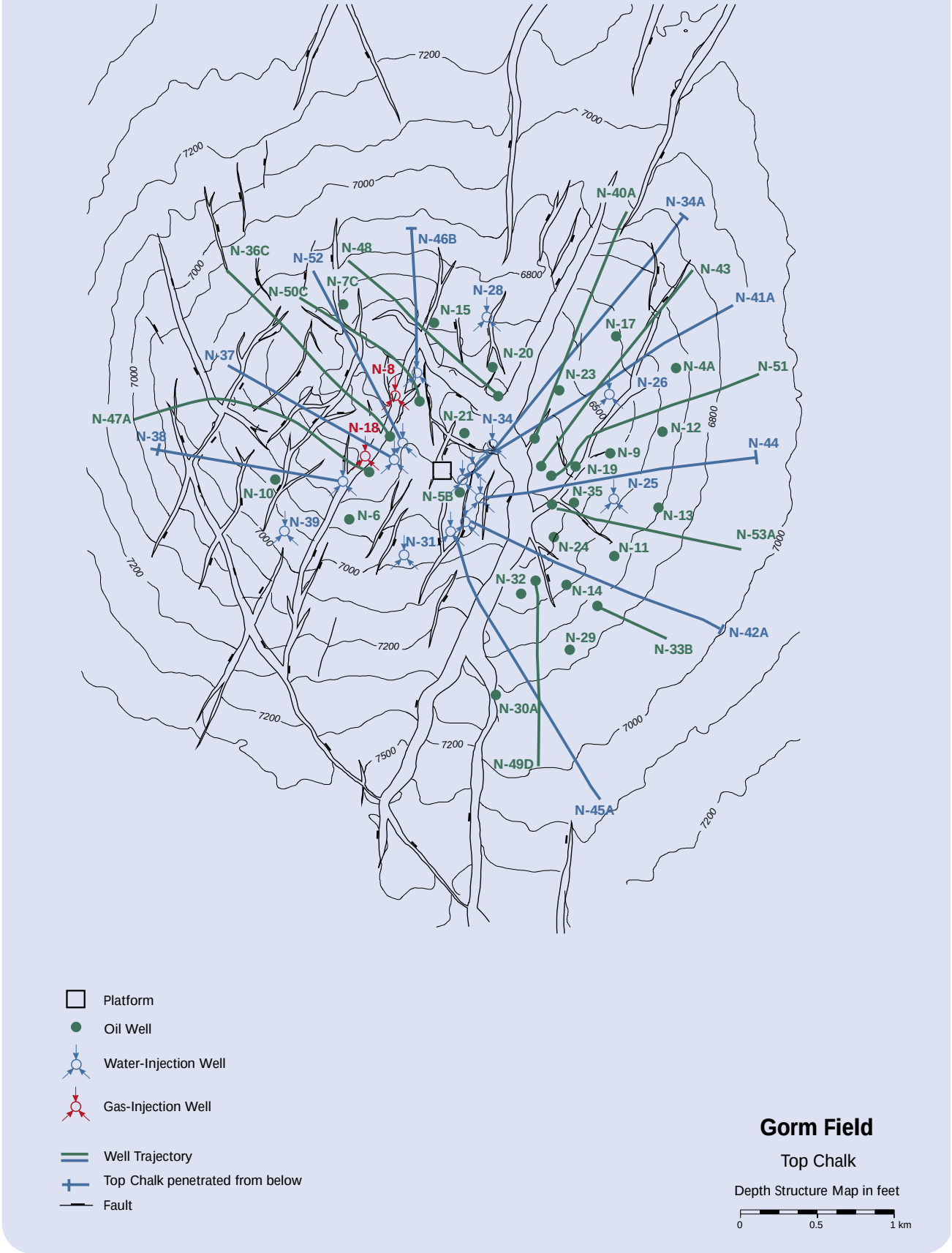
The processing facilities on the Gorm C platform consist of an oil stabilization plant, where the oil from the Rolf Field is processed, plants for the final processing of gas and for purifying the water produced, as well as facilities for processing and compressing the gas produced.

The processing facilities on the Gorm F platform consist of two oil stabilization plants, one receiving the sour oil and gas from the Dagmar Field, and the other receiving the production from the Gorm and Skjold Fields.

The Gorm F platform houses wellhead compression facilities to reduce the wellhead pressure in the Gorm and Skjold wells.

The water-injection capacity at the Gorm Centre constitutes about 17 million m^3 per year (300,000 bbls per day).

There are accommodation facilities on the Gorm C platform for 98 persons.


7200
7000
6800
7500
N-40A
N-34A
N-46B
N-36C
N-52
N-48
N-43
N-7C
N-50C
N-28
N-41A
N-15
N-17
N-37
N-20
N-8
N-4A
N-51
N-23
N-26
N-47A
N-21
N-34
N-12
N-18
N-38
N-9
N-44
N-19
N-10
N-5B
N-35
N-25
N-39
N-6
N-13
N-53A
N-31
N-24
N-11
N-32
N-14
N-42A
N-29
N-33B
N-30A
N-49D
N-45A
Platform
Oil Well
Water-Injection Well
Gas-Injection Well
Well Trajectory
Top Chalk penetrated from below
Fault
Gorm Field
Top Chalk
Depth Structure Map in feet
0
0.5
1 km

HARALD

Prospect:	Lulu/West Lulu
Location:	Blocks 5604/21 and 22
Licence:	Sole Concession
Operator:	Mærsk Olie og Gas AS
Discovered:	1980(Lulu)
	1983(West Lulu)
Year on stream:	1997
Producing wells:	1 (Lulu), 2 (West Lulu)
Water depth:	64 m
Area:	25 km^2
Reservoir depth:	2,700 m (Lulu)
	3,650 m (West Lulu)
Reservoir rock:	Chalk (Lulu)
	Sandstone (West Lulu)
Geological age:	Danian/
	Upper Cretaceous (Lulu)
	Middle Jurassic
	(West Lulu)
Reserves at 1 Jan. 2000:	
Condensate:	4.2 million m^3
Gas:	17.0 billion Nm^3
Cum. production at 1 Jan. 2000:	
Condensate:	3.81 million m^3
Gas:	6.71 billion Nm^3
Water:	0.02 million m^3
Production in 1999:	
Condensate:	1.32 million m^3
Gas:	2.88 billion Nm^3
Water:	0.02 million m^3
Tot. investments at 1 Jan. 2000:	
99 prices **:**	DKK 2.8 billion

REVIEW OF GEOLOGY

The Harald East structure is an anticline induced through Zechstein salt tectonics. The gas zone is up to 75 metres thick and extends over an area of 6.5 km^2.

The Harald West structure is a tilted Jurassic fault block. The sandstone reservoir in the Middle Jurassic Bryne Formation contains gas under such pressure conditions that production will result in precipitation of condensate (retrograde gas/condensate). The structure is situated at a depth of about 3,600 metres. The effective thickness of the sandstone is 100 metres.

PRODUCTION STRATEGY

Recovery from both the Harald East and the Harald West reservoir takes place by letting the gas expand, supplemented by a moderate, natural influx of water into the reservoir.

PRODUCTION FACILITIES

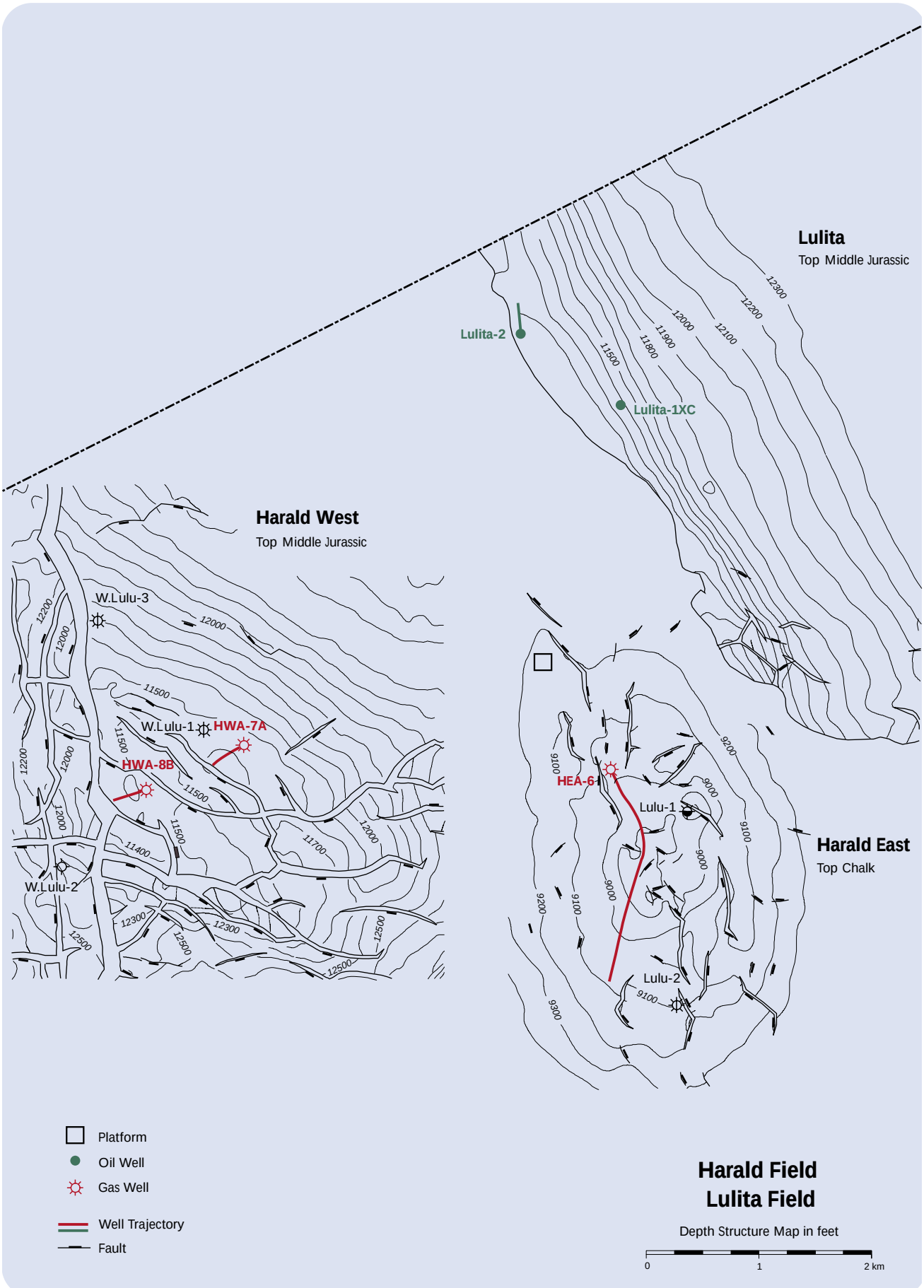
The Harald Field installations comprise a combined wellhead and processing platform (Harald A) and an accommodation platform (Harald B).

The processing facilities consist of a plant that separates the hydrocarbons produced, as well as a plant for the final processing of the gas produced.

The unprocessed condensate and the processed gas are transported to Tyra East.

The Harald Field is hooked up to the gas pipeline that conveys gas from the South Arne Field to Nybro. Normally, no gas is exported from Harald through the pipeline.

The Harald Field has accommodation facilities for 16 persons.


Lulita
Top Middle Jurassic
Lulita-2
Lulita-1XC
12300
12200
12100
12000
11900
11800
11500
Harald West
Top Middle Jurassic
W.Lulu-3
W.Lulu-1
HWA-7A
HWA-8B
W.Lulu-2
12200
12000
11500
11400
11700
12300
12500
Harald East
Top Chalk
HEA-6
Lulu-1
Lulu-2
9100
9200
9000
9300
Platform
Oil Well
Gas Well
Well Trajectory
Fault
Harald Field
Lulita Field
Depth Structure Map in feet
0
1
2 km

KRAKA

Prospect:	Anne
Location:	Block 5505/17
Licence:	Sole Concession
Operator:	Mærsk Olie og Gas AS
Discovered:	1966
Year on stream:	1991
Producing wells:	7 (all horizontal)
Water depth:	45 m
Area:	20 km²
Reservoir depth:	1,800 m
Reservoir rock:	Chalk
Geological age:	Danian and Upper Cretaceous
Reserves at 1 Jan. 2000:	
Oil:	3.1 million m³
Gas:	1.0 billion Nm³
Cum. production at 1 Jan. 2000:	
Oil:	3.07 million m³
Gas:	0.95 billion Nm³
Water:	2.04 million m³
Production in 1999:	
Oil:	0.41 million m³
Gas:	0.15 billion Nm³
Water:	0.33 million m³
Tot. investments at 1 Jan. 2000:	
99 prices	DKK 1.3 billion

REVIEW OF GEOLOGY

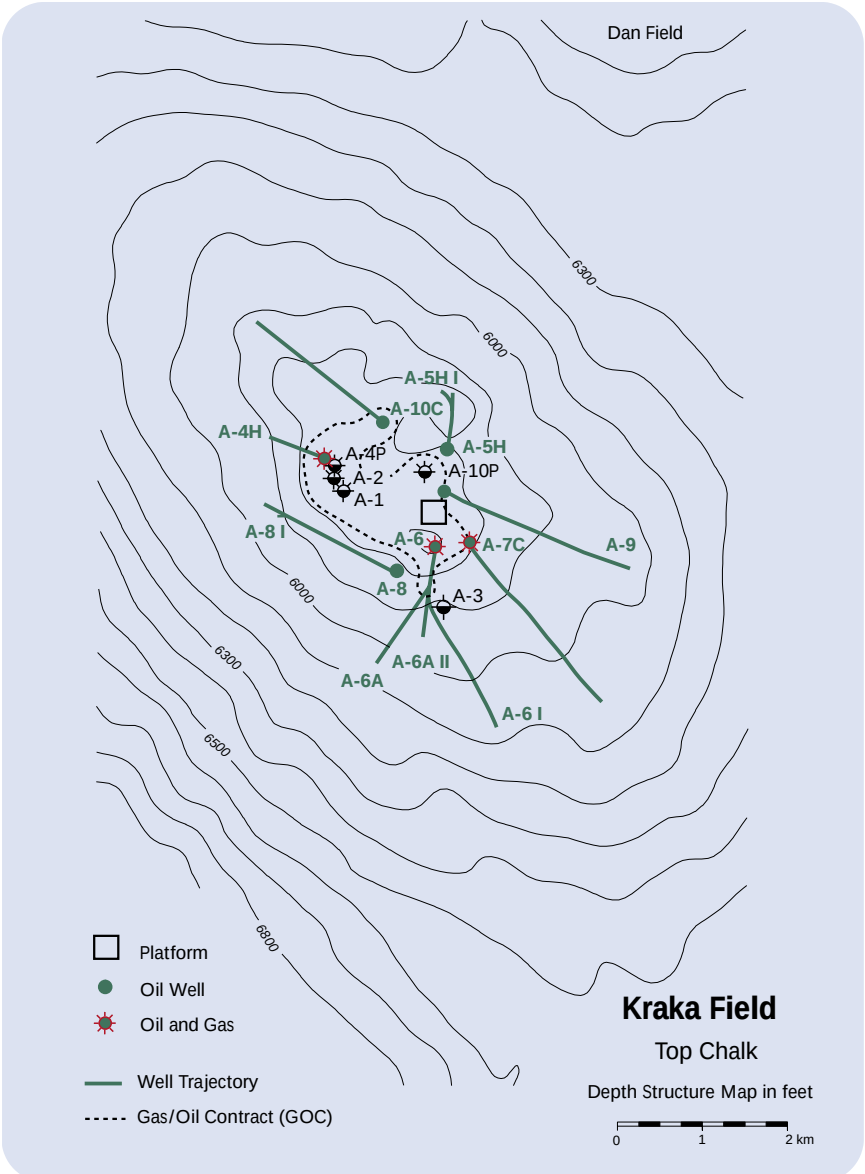
Kraka is an anticlinal structure induced through Zechstein salt tectonics, which to a certain degree has caused fracturing in the chalk. The chalk reservoir has high porosity, although low permeability. The thin oil pay zone is further characterized by high water saturations. There is a minor gas cap in the reservoir.

PRODUCTION STRATEGY

Production from the field is based on natural depletion, meaning no secondary recovery techniques are used, either in the form of gas or water injection. Attempts are currently being made to optimize production so as to liberate as much oil and gas, and as little water, as possible from the tight chalk formation.

PRODUCTION FACILITIES

Kraka is a satellite development to the Dan Field, with an unmanned production platform of the STAR type. The produced oil and gas are transported to the Dan FC platform for processing and export ashore. Lift gas is imported from the Dan FF platform.



LULITA

Location:	Blocks 5604/18 and 22
Licence:	Sole Concession (50%), 7/86 (34.5%) and 1/90 (15.5%)
Operator:	Mærsk Olie og Gas AS
Discovered:	1992
Year on stream:	1998
Producing wells:	2
Water depth:	65 m
Area:	3 km^2
Reservoir depth:	3,525 m
Reservoir rock:	Sandstone
Geological age:	Middle Jurassic
Reserves at 1 Jan. 2000:	
Oil:	0.6 million m^3
Gas:	0.6 billion Nm^3
Cum. production at 1 Jan. 2000:	
Oil:	0.37 million m^3
Gas:	0.25 billion Nm^3
Water:	0.01 million m^3
Production in 1999:	
Oil:	0.23 million m^3
Gas:	0.18 billion Nm^3
Water:	0.01 million m^3
Tot. investments at 1 Jan. 2000:	
99 prices	DKK 0.1 billion

REVIEW OF GEOLOGY

The Lulita Field is a structural fault trap with a Middle Jurassic sandstone reservoir. The accumulation consists of oil with a gas cap.

PRODUCTION STRATEGY

The production of oil and gas is based on natural depletion. Two wells have been drilled, and the installation of water-processing facilities has been approved.

PRODUCTION FACILITIES

Production from the Lulita Field takes place from the fixed installations in the Harald Field. Thus, the Lulita wellheads are hosted by the Harald A platform, where the facilities have been upgraded to handle production from the Lulita Field.

Together with condensate from the Harald Field, the oil produced is conveyed through a 16" pipeline to Tyra East for export ashore. The gas produced in the Lulita Field is transported to Tyra through the 24" pipeline connecting Harald with Tyra East, from where it is transported to shore.

The Harald A platform has special equipment for separate metering of the oil and gas produced in the Lulita Field.

In addition, the Harald A platform has facilities for processing the water produced from the Lulita Field.

The map of the Harald Field includes the Lulita Field.

REGNAR

Prospect:	Nils
Location:	Block 5505/17
Licence:	Sole Concession
Operator:	Mærsk Olie og Gas AS
Discovered:	1979
Year on stream:	1993
Producing wells:	1
Water depth:	45 m
Area:	8 km²
Reservoir depth:	1,700 m
Reservoir rock:	Chalk and Carbonates
Geological age:	Upper Cretaceous and Zechstein

Reserves at 1 Jan. 2000:

Oil:	0.1 million m³
Gas:	0.0 billion Nm³

Cum. production at 1 Jan. 2000:

Oil:	0.80 million m³
Gas:	0.05 billion Nm³
Water:	1.88 million m³

Production in 1999:

Oil:	0.03 million m³
Gas:	0.00 billion Nm³
Water:	0.36 million m³

Tot. investments at 1 Jan. 2000:

99 prices	DKK 0.2 billion

REVIEW OF GEOLOGY

The Regnar Field is an anticlinal structure, induced through Zechstein salt tectonics. The structure is heavily fractured, resulting in favourable reservoir conductivity (compare Skjold, Rolf, Dagmar and Svend).

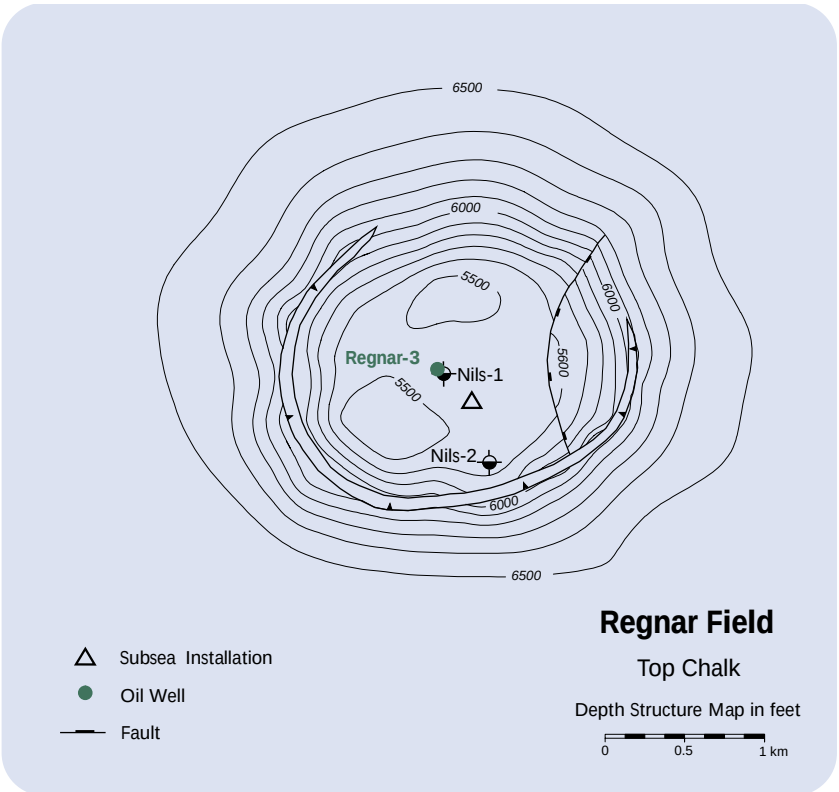
PRODUCTION STRATEGY

Production in the Regnar Field is carried on from a vertical well drilled in the crest of the structure. The oil is forced towards the production well by water flowing in from the water zone. The production strategy is to displace and produce as much of the oil as possible from the tight part of the formation, the matrix.

PRODUCTION FACILITIES

The Regnar Field has been developed as a satellite to the Dan Field. Production takes place in a subsea-completed well. The hydrocarbons produced are conveyed by pipeline in multi-phase flow to Dan FC for processing and export ashore.

The well is remotely monitored and controlled from the Dan FC platform.



ROAR

Prospect:	Bent
Location:	Block 5504/7
Licence:	Sole Concession
Operator:	Mærsk Olie og Gas AS
Discovered:	1968
Year on stream:	1996
Producing wells:	3 (all horizontal)
Water depth:	46 m
Area:	14 km²
Reservoir depth:	2,025 m
Reservoir rock:	Chalk
Geological age:	Danian and Upper Cretaceous

Reserves at 1 Jan. 2000:

Condensate:	1.7 million m³
Gas:	8.2 billion Nm³

Cum. production at 1 Jan. 2000:

Condensate:	1.34 million m³
Net gas:	6.00 billion Nm³
Water:	0.46 million m³

Production in 1999:

Condensate:	0.27 million m³
Net gas:	1.25 billion Nm³
Water:	0.20 million m³

Tot. investments at 1 Jan. 2000:

99 prices	DKK 0.5 billion

REVIEW OF GEOLOGY

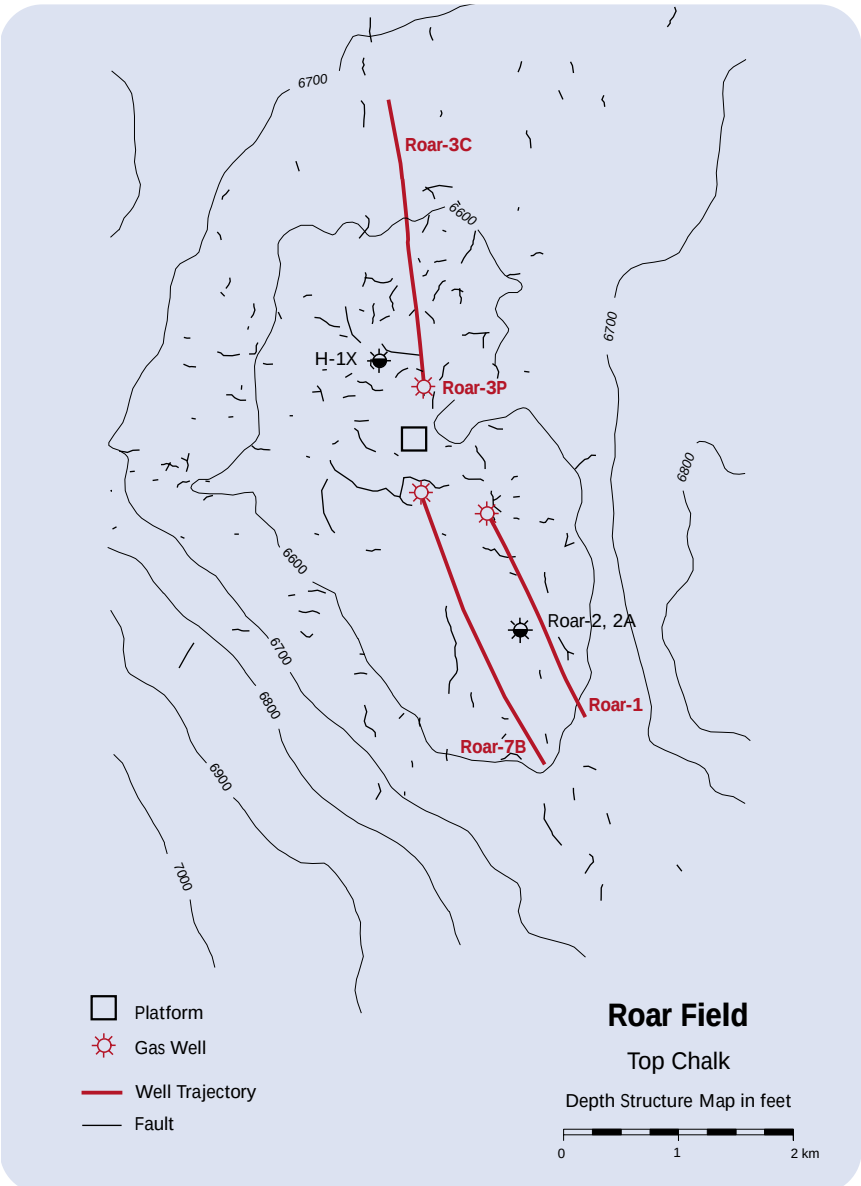
Roar is an anticlinal structure, induced through tectonic uplift. The accumulation consists of free gas containing condensate. The chalk formation is only slightly fractured.

PRODUCTION STRATEGY

Production from the Roar Field is based on the aim of optimizing the production of liquid hydrocarbons in the Tyra Field. This presupposes that the reservoir pressure is stabilized by maximizing production from the other gas fields and thus minimizing the drainage from the Tyra Field. Therefore, increased production from the Roar Field helps optimize the Tyra production conditions.

PRODUCTION FACILITIES

The Roar Field has been developed as a satellite to the Tyra Field with an unmanned wellhead platform of the STAR type. After separation into a gas and a liquid phase, the hydrocarbons produced are conveyed through two pipelines to Tyra East for processing and export ashore.



ROLF

Prospect:	Middle Rosa
Location:	Blocks 5504/14 and 15
Licence:	Sole Concession
Operator:	Mærsk Olie og Gas AS
Discovered:	1981
Year on stream:	1986
Producing wells:	2
Water depth:	34 m
Area:	8 km²
Reservoir depth:	1,800 m
Reservoir rock:	Chalk and Carbonates
Geological age:	Danian, Upper Cretaceous and Zechstein

Reserves at 1 Jan. 2000:

Oil:	0.8 million m³
Gas:	0.0 billion Nm³

Cum. production at 1 Jan. 2000:

Oil:	3.73 million m³
Gas:	0.16 billion Nm³
Water:	3.73 million m³

Production in 1999:

Oil:	0.08 million m³
Gas:	0.00 billion Nm³
Water:	0.37 million m³

Tot. investments at 1 Jan. 2000:

99 prices	DKK 0.9 billion

REVIEW OF GEOLOGY

Rolf is an anticlinal structure created through Zechstein salt tectonics. The chalk reservoir is heavily fractured resulting in highly favourable reservoir conductivity (compare Skjold, Dagmar, Regnar and Svend).

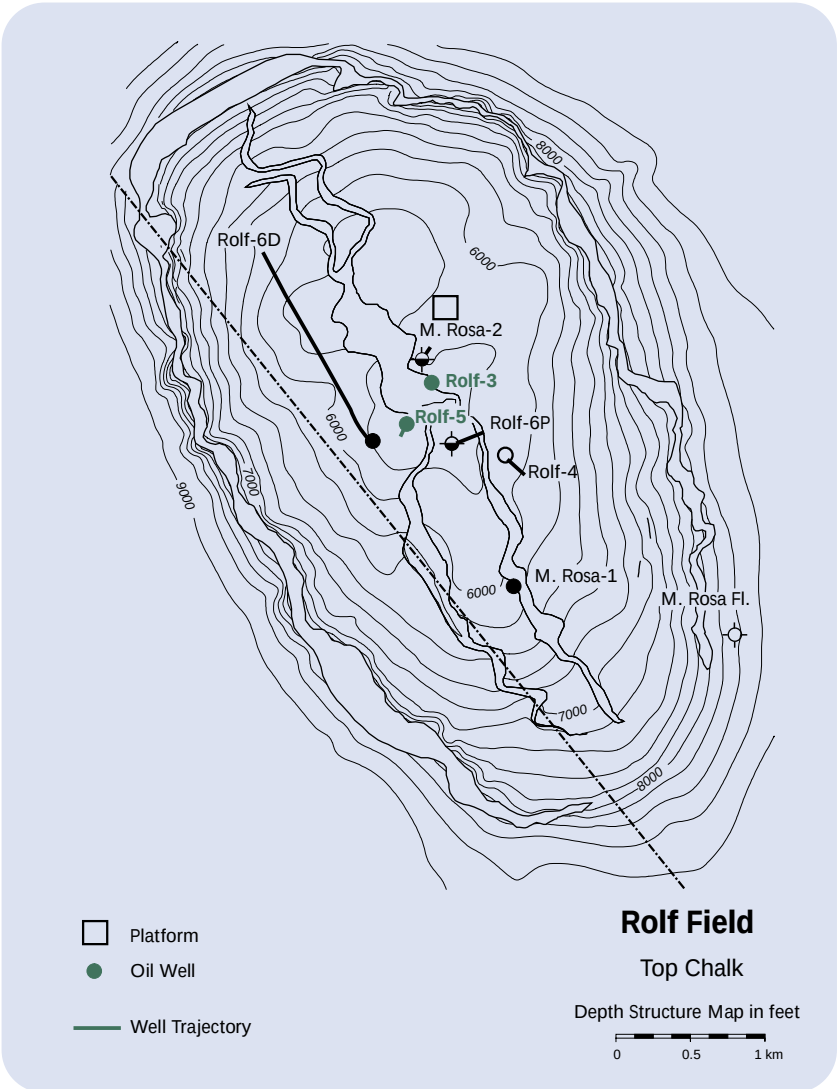
PRODUCTION STRATEGY

Production from the Rolf Field takes place from two wells drilled in the crest of the structure. The oil is forced towards the producing wells by the water flowing in from an underlying water zone. The natural influx of water from the water zone corresponds to the volume removed due to production in the central part of the structure. To date, it has not been found necessary to add energy to the reservoir by water injection.

PRODUCTION FACILITIES

The Rolf Field is a satellite development to the Gorm Field with an unmanned wellhead platform.

The production is transported to the Gorm C platform for processing. Rolf is supplied with lift gas from the Gorm Field.



SIRI

Location:	Block 5604/20
Licence:	6/95
Operator:	Statoil Efterforskning og Produktion A/S
Discovered:	1995
Year on stream:	1999
Producing wells:	5
Water- and gas-injection wells:	2
Water depth:	60 m
Area:	30 km²
Reservoir depth:	2,060 m
Reservoir rock:	Sandstone
Geological age:	Palaeocene

Reserves at 1 Jan. 2000:

Oil:	6.5 million m³
Gas:	0.0 billion Nm³

Cum. production at 1 Jan. 2000:

Oil:	1.59 million m³
Net gas:	0.08 billion Nm³
Water:	0.32 million m³

Cum. injection at 1 Jan. 2000:

Gas:	0.06 billion m³
Water:	1.21 million m³

Production in 1999:

Oil:	1.59 million m³
Net gas:	0.08 billion Nm³
Water:	0.32 million m³

Injection in 1999:

Gas:	0.06 billion m³
Water:	1.21 million m³

Tot. investments at 1 Jan. 2000:

99 prices	DKK 3.22 billion

REVIEW OF GEOLOGY

The Siri Field is a structural trap with a Palaeocene sandstone reservoir. The accumulation consists of oil with a relatively low content of gas.

PRODUCTION STRATEGY

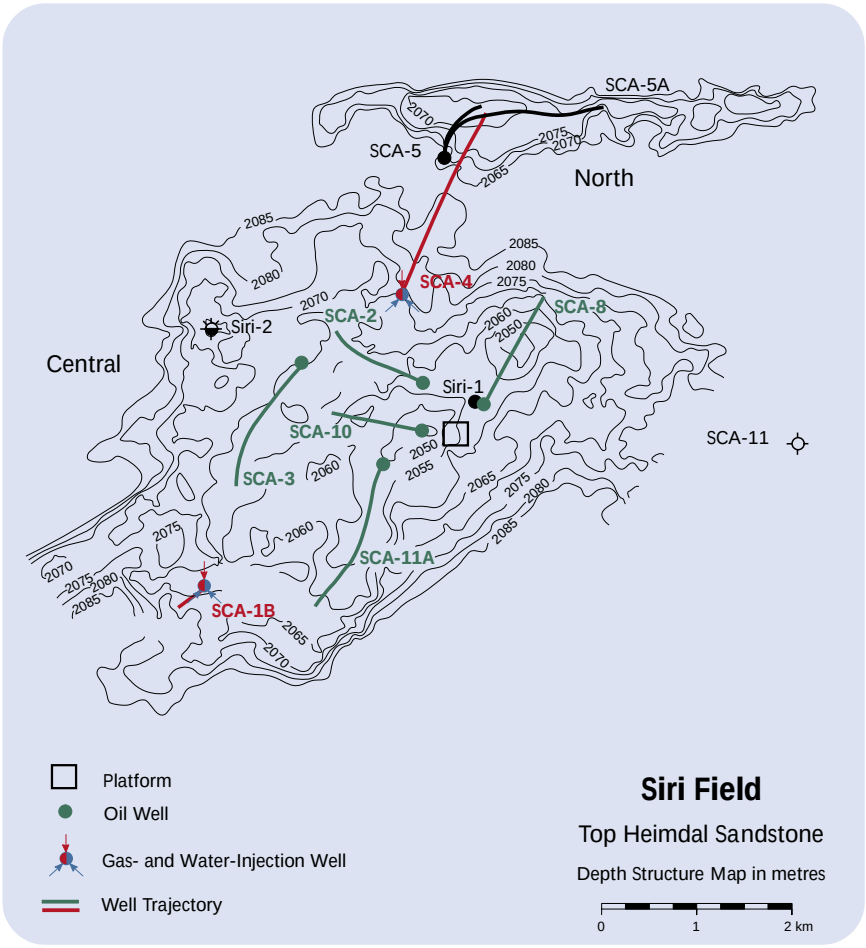
Recovery from the field is based on the production of oil through the co-injection of water and gas. Attempts are made to maintain the reservoir pressure at a level close to the initial pressure, and the volume of water injected is balanced with the volume of liquid produced from the reservoir.

PRODUCTION FACILITIES

The Siri Field installations comprise a combined wellhead, processing and accommodation platform. The processing facilities consist of a plant that separates the hydrocarbons produced. The platform also houses equipment for co-injecting gas and water.

The oil is temporarily stored in a 50,000 m³ storage tank on the sea bed. When the tank is full, the oil is pumped on board a tanker through a pipeline via buoy loading facilities.

The Siri Field has accommodation facilities for 60 persons.



SKJOLD

Prospect:	Ruth
Location:	Block 5504/16
Licence:	Sole Concession
Operator:	Mærsk Olie og Gas AS
Discovered:	1977
Year on stream:	1982
Producing wells:	18
of which horizontal/ parallel with the strata:	11
Water-injection wells: (all horizontal/parallel with the strata)	7
Water depth:	40 m
Area:	10 km²
Reservoir depth:	1,600 m
Reservoir rock:	Chalk
Geological age:	Danian, Upper Cretaceous and Zechstein

Reserves at 1 Jan. 2000:

Oil:	12.9 million m³
Gas:	1.1 billion Nm³

Cum. production at 1 Jan. 2000:

Oil:	28.99 million m³
Gas:	2.55 billion Nm³
Water:	17.42 million m³

Cum. injection at 1 Jan. 2000:

Water:	49.88 million m³

Production in 1999:

Oil:	1.83 million m³
Gas:	0.15 billion Nm³
Water:	3.75 million m³

Injection in 1999:

Water:	5.87 million m³

Tot. investments at 1 Jan. 2000:

99 prices	DKK 4.1 billion

REVIEW OF GEOLOGY

The Skjold Field is an anticlinal structure, induced through Zechstein salt tectonics. The reservoir is intersected by numerous, minor faults extending northwest-southeast. Unusually favourable production properties have been shown to exist in the reservoir.

PRODUCTION STRATEGY

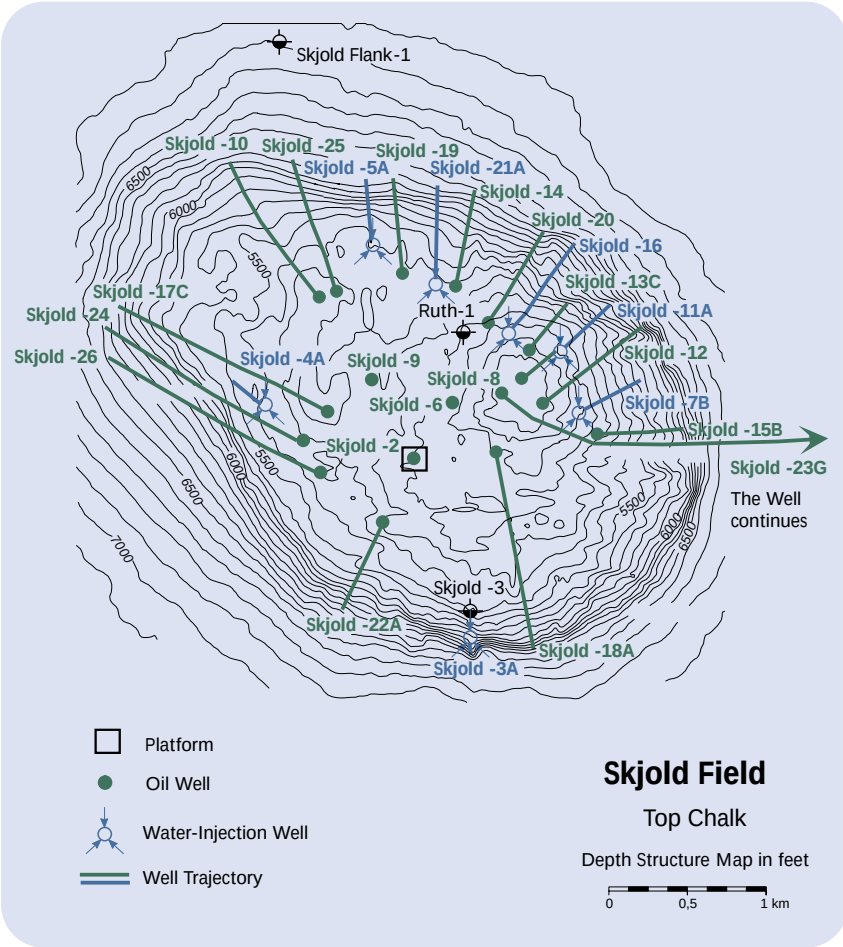
During the first years after production start-up, oil was produced from individual wells drilled in the crestal, central part of the reservoir. Water injection was initiated in the reservoir in 1986. Today, oil from the Skjold Field is mainly produced from horizontal wells at the flanks of the reservoir. The production and injection wells are placed alternately in a radial pattern from the platform. The recovery of oil is optimized by flooding the greatest possible part of the reservoir with as much water as possible. The injection of water has stabilized the reservoir pressure above the bubble point of the oil.

PRODUCTION FACILITIES

The Skjold Field comprises a satellite development to the Gorm Field, including two wellhead platforms, Skjold A and B, as well as an accommodation platform, Skjold C.

There are no processing facilities at the Skjold Field, and the production is transported to the Gorm F platform in the Gorm Field for processing there. The Gorm facilities provide the Skjold Field with injection water and lift gas.

At Skjold C, there are accommodation facilities for 16 persons.



SVEND

Prospect:	North Arne/Otto
Location:	Block 5604/25
Licence:	Sole Concession
Operator:	Mærsk Olie og Gas AS
Discovered:	1975 (North Arne) and 1982 (Otto)
Year on stream:	1996
Producing wells:	2 (both horizontal)
Water depth:	65 m
Area:	25 km²
Reservoir depth:	2,500 m
Reservoir rock:	Chalk
Geological age:	Danian and Upper Cretaceous

Reserves at 1 Jan. 2000:

Oil:	1.3 million m³
Gas:	0.2 billion Nm³

Cum. production at 1 Jan. 2000:

Oil:	3.35 million m³
Gas:	0.39 billion Nm³
Water:	0.93 million m³

Production in 1999:

Oil:	0.53 million m³
Gas:	0.07 billion Nm³
Water:	0.59 million m³

Tot. investments at 1 Jan. 2000:

99 prices	DKK 0.7 billion

REVIEW OF GEOLOGY

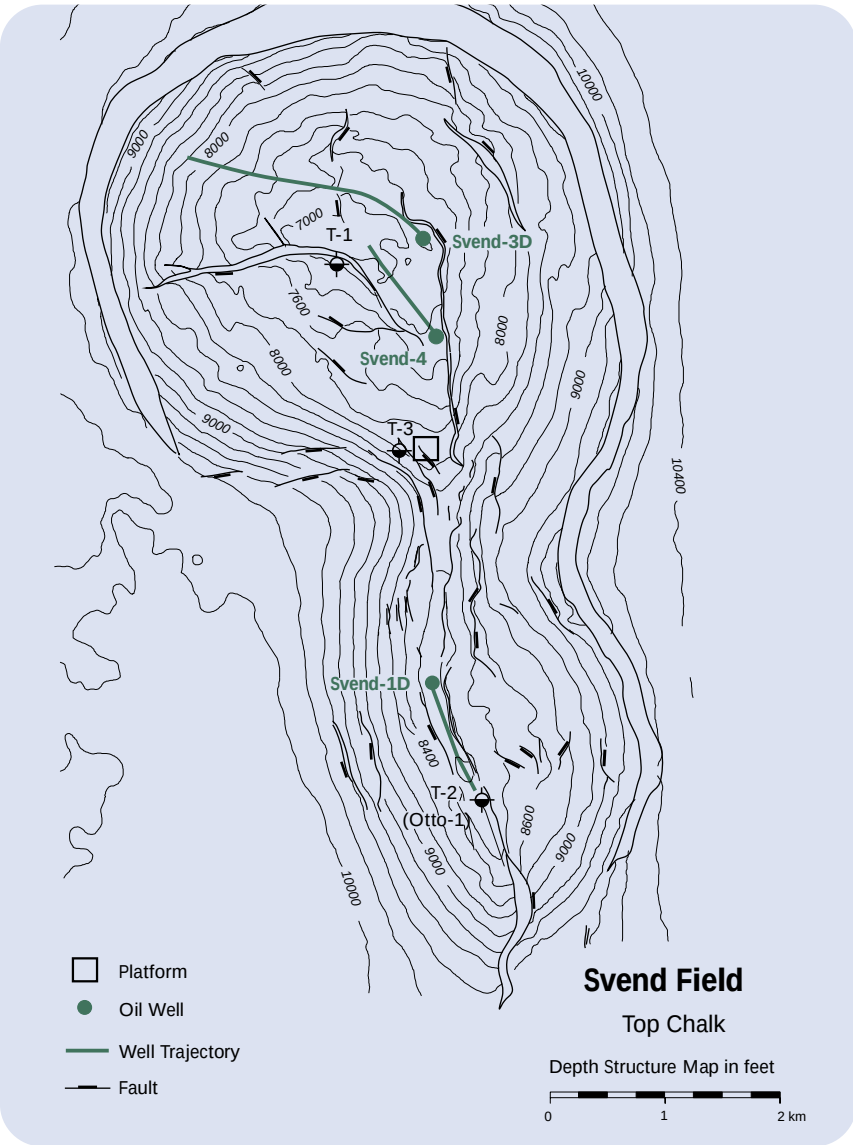
The Svend Field is an anticlinal structure, induced through Zechstein salt tectonics. This has led to fracturing of the chalk in the reservoir. The Svend Field consists of a northern reservoir called North Arne, and a southern reservoir called Otto. The Otto reservoir is situated 250 metres deeper than the North Arne reservoir. The North Arne reservoir has proved to have unusually favourable production properties.

PRODUCTION STRATEGY

Oil and gas production from the Svend Field is currently based on primary recovery at a pressure above the bubble point of the oil in the reservoir. The natural drive mechanism supplied by the underlying water zone has not yet been evaluated. The field has only produced for a short period, and it is uncertain as yet which recovery technique is best in the longer term.

PRODUCTION FACILITIES

The Svend Field has been developed as a satellite to the Tyra Field, with an unmanned STAR wellhead platform. The hydrocarbons produced are conveyed to Tyra East for processing and export ashore. The Svend Field is connected to the 16" pipeline from Harald to Tyra East.



SOUTH ARNE

Location:	Blocks 5604/29 and 30
Licence:	7/89
Operator:	Amerada Hess A/S
Discovered:	1969
Year on stream:	1999
Producing wells:	5 (all horizontal)
Water depth:	60 m
Area:	17 km²
Reservoir depth:	2,800 m
Reservoir rock:	Chalk
Geological age:	Lower Tertiary and Upper Cretaceous

Reserves at 1 Jan. 2000:

Oil:	32.7 million m³
Gas:	7.8 billion Nm³

Cum. production at 1 Jan. 2000:

Oil:	0.75 million m³
Gas:	0.17 billion Nm³
Water:	0.01 million m³

Production in 1999:

Condensate:	0.75 million m³
Gas:	0.17 billion Nm³
Water:	0.01 million m³

Tot. investments at 1 Jan. 2000:

99 prices	DKK 3.87 billion

REVIEW OF GEOLOGY

South Arne is an anticlinal structure, induced through tectonic uplift (both of the Danian/Maastrichtian and the Barremian/Aptian), which has caused the chalk to fracture. The structure contains oil with a relatively high content of gas. The field is the deepest chalk field in Denmark.

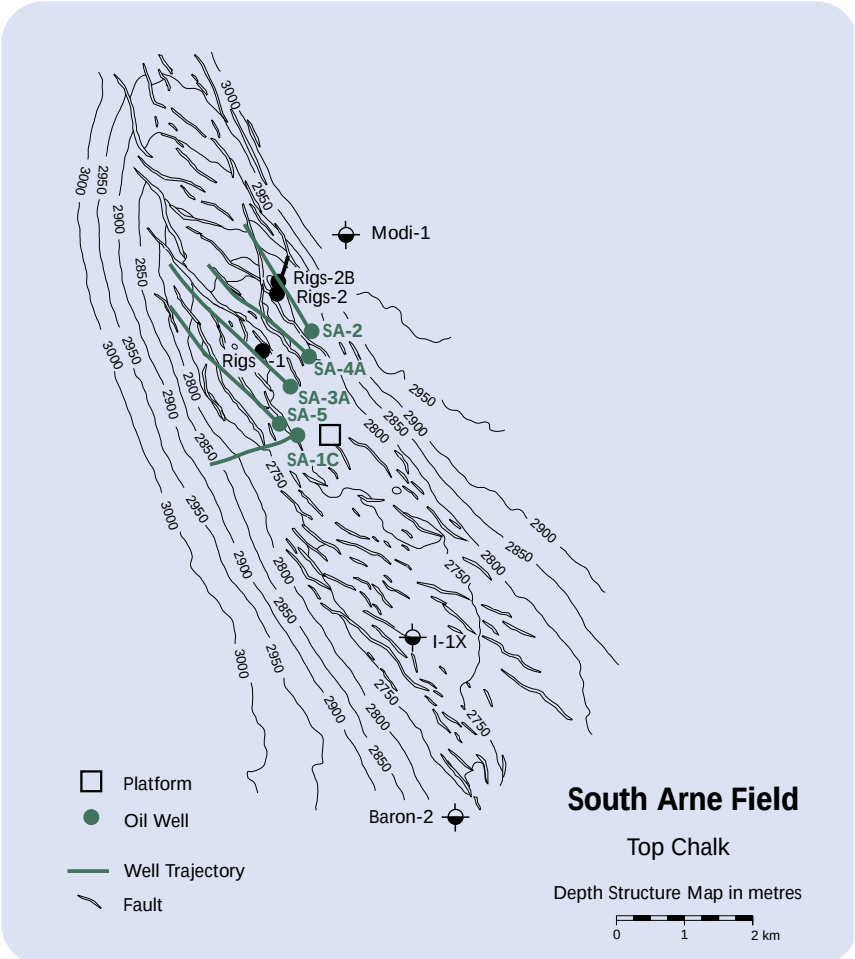
PRODUCTION STRATEGY

In the initial development phase, the recovery of oil and gas from the field is based on natural depletion, meaning no secondary recovery techniques are used, either in the form of gas or water injection. The wells have good production properties. Additional production wells are planned to be drilled in the field. Water injection is envisaged in a subsequent development phase.

PRODUCTION FACILITIES

The South Arne Field installations comprise a combined wellhead, processing and accommodation platform. The processing facilities consist of a plant that separates the hydrocarbons produced as well as gas-processing facilities. The platform also houses equipment for water injection to be used in a later development phase.

The oil is temporarily stored in an 87,000 m³ storage tank on the sea bed. When the tank is full, the oil is pumped on board a tanker through a 2 km pipeline via buoy loading facilities. The gas produced is transported through a gas pipeline to Nybro on the west coast of Jutland.



TYRA

Prospect:	Cora
Location:	Blocks 5504/11 and 12
Licence:	Sole Concession
Operator:	Mærsk Olie og Gas AS
Discovered:	1968
Year on stream:	1984
Producing wells:	38 (22 horizontal)
Producing/ injection wells:	20
Water depth:	37-40 m
Area:	90 km^2
Reservoir depth:	2,000 m
Reservoir rock:	Chalk
Geological age:	Danian and Upper Cretaceous
Reserves at 1 Jan. 2000:	
Oil and condensate:	11.7 million m^3
Gas:	34.4 billion Nm^3
Cum. production at 1 Jan. 2000:	
Oil and condensate:	17.52 million m^3
Net gas:	30.13 billion Nm^3
Water:	14.33 billion m^3
Cum. injection at 1 Jan. 2000:	
Gas:	20.25 billion Nm^3
Production in 1999:	
Oil and condensate:	0.89 million m^3
Net gas:	0.84 billion Nm^3
Water:	2.05 million m^3
Injection in 1999:	
Gas:	3.04 billion Nm^3
Tot. investments at 1 Jan. 2000:	
99 prices	DKK 20.9 billion

REVIEW OF GEOLOGY

The Tyra Field is an anticlinal structure created by tectonic uplift. The accumulation consists of free gas containing condensate, overlying a thin oil zone. A pronounced permeability barrier covering a large part of the reservoir separates the Danian chalk layers from those of Upper Cretaceous age. The reservoir is slightly fractured.

PRODUCTION STRATEGY

As far as natural gas supplies are concerned, the Tyra Field acts as a buffer, so that if the other Danish oil and gas fields do not produce sufficient gas to meet the contractual obligation to supply gas to Dansk Naturgas A/S, the balance is supplied from the Tyra Field.

Excess production capacity in the Tyra Field is used to reinject produced gas, thereby increasing the recovery of liquid hydrocarbons. Attempts are made not to deteriorate condensate and oil production conditions by reducing the reservoir pressure in the gas zone at too early a stage. Increased gas production from the other fields, in particular the Harald and Roar gas fields, meets the objective of optimizing the recovery of liquid hydrocarbons from the Tyra Field.

PRODUCTION FACILITIES

The Tyra Field installations comprise two platform complexes, Tyra West (TW) and Tyra East (TE).

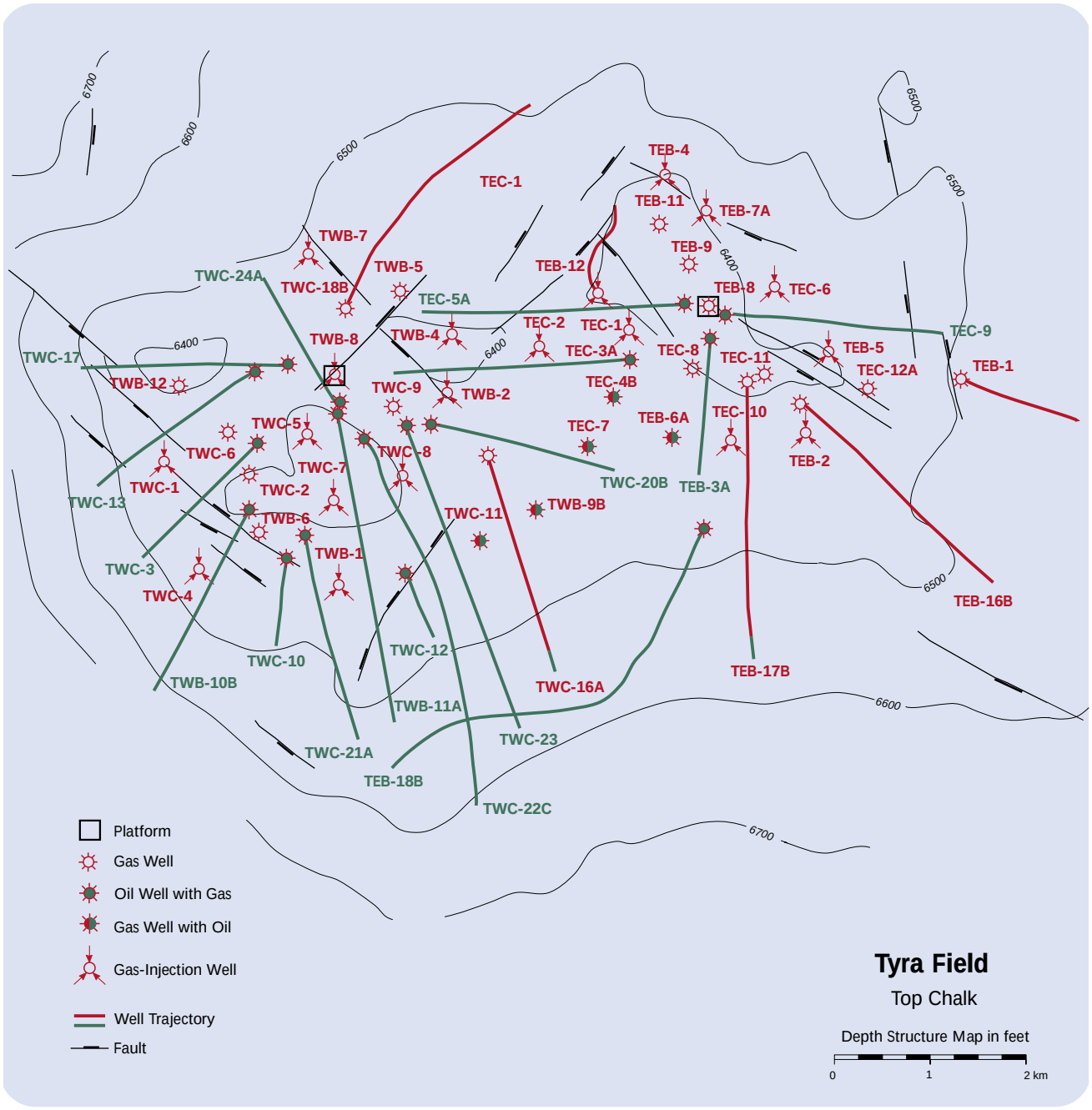
Tyra West consists of two wellhead platforms (TWB and TWC), one processing /accommodation platform (TWA) and one gas flare stack (TWD), as well as a bridge module installed at TWB and supported by a four-legged jacket (TWE).

The Tyra West processing facilities include plant for pre-processing oil and condensate production from the wells at Tyra West. Moreover, the Tyra West complex houses processing and compression facilities for the injection and/or export of gas and processing facilities for the water produced. Oil and condensate are transported to Tyra East for final processing. Tyra West has compressors for the injection of gas. Gas is injected from both Tyra East and Tyra West.

Tyra East consists of two wellhead platforms (TEB and TEC), one processing/accommodation platform (TEA), one gas flare stack (TED), and one riser platform (TEE), as well as a bridge module supported by a STAR jacket (TEF). The Tyra East complex includes facilities for the final processing of gas, oil, condensate and water. The bridge module houses the facilities for receiving and handling production from the Valdemar, Roar and Svend Fields, as well as the Harald Centre.

The two platform complexes in the Tyra Field are interconnected by pipelines in order to generate the maximum operational flexibility and reliability of supply. The oil and condensate produced at the Tyra Centre are transported to shore via Gorm E, while the gas produced at the Tyra Centre, together with the gas production from the Dan, Gorm and Harald Centres, is transported to shore via the TEE platform.

Tyra East has accommodation facilities for 96 persons, while there are accommodation facilities for 80 persons at Tyra West.


6700
6600
6500
6400
TEC-1
TEB-4
TEB-11
TEB-7A
TEB-9
TWB-7
TWB-5
TEB-12
TWC-24A
TWC-18B
TEC-5A
TEB-8
TEC-6
TEC-9
TWB-8
TWB-4
TEC-2
TEC-1
TEC-3A
TEB-8
TEC-11
TEB-5
TEB-1
TWC-17
TWB-12
TWB-2
TEC-4B
TEC-12A
TWC-9
TEC-7
TEB-6A
TEC-10
TWC-5
TWC-6
TWC-8
TEB-2
TWC-7
TWC-1
TWC-2
TWC-20B
TEB-3A
TWC-13
TWB-9B
TWC-11
TWB-6
TWB-1
TWC-3
TWC-4
TEB-16B
TWC-10
TWC-12
TWB-10B
TWC-16A
TEB-17B
TWB-11A
TWC-23
TWC-21A
TEB-18B
TWC-22C
Platform
Gas Well
Oil Well with Gas
Gas Well with Oil
Gas-Injection Well
Well Trajectory
Fault
Tyra Field
Top Chalk
Depth Structure Map in feet
0
1
2 km

VALDEMAR

Prospects:	Bo/North Jens
Location:	Blocks 5504/7 and 11
Licence:	Sole Concession
Operator:	Mærsk Olie og Gas AS
Discovered:	1977 (Bo), 1985 (North Jens)
Year on stream:	1993 (North Jens)
Producing wells:	4 (all horizontal)
Water depth:	38 m
Area:	15 km² (Upper Cretaceous) 15 km² (Lower Cretaceous)
Reservoir depth:	2,000 m (Upper Cretaceous) 2,600 m (Lower Cretaceous)
Reservoir rock:	Chalk
Geological age:	Danian, Upper and Lower Cretaceous

Reserves at 1 Jan. 2000:

Oil:	1.8 million m³
Gas:	1.9 billion Nm³

Cum. production at 1 Jan. 2000:

Oil:	1.02 million m³
Gas:	0.43 billion Nm³
Water:	0.25 million m³

Production in 1999:

Oil:	0.09 million m³
Gas:	0.05 billion Nm³
Water:	0.06 million m³

Tot. investments at 1 Jan. 2000:

99 prices	DKK 1.1 billion

REVIEW OF GEOLOGY

The Valdemar Field consists of a northern reservoir called North Jens and a southern reservoir called Bo, which are both anticlinal chalk structures associated with tectonic uplift.

Valdemar comprises several separate reservoirs. Oil and gas have been discovered in Danian/Upper Cretaceous chalk. In the Lower Cretaceous reservoir, vast amounts of oil in place have been identified in Aptian/Barremian chalk (the Sola and Tuxen formations). While the properties of the Upper Cretaceous reservoirs are comparable to other Danish fields like Gorm and Tyra, the Lower Cretaceous chalk, although featuring high porosity, possesses very difficult production properties due to its extremely low permeability.

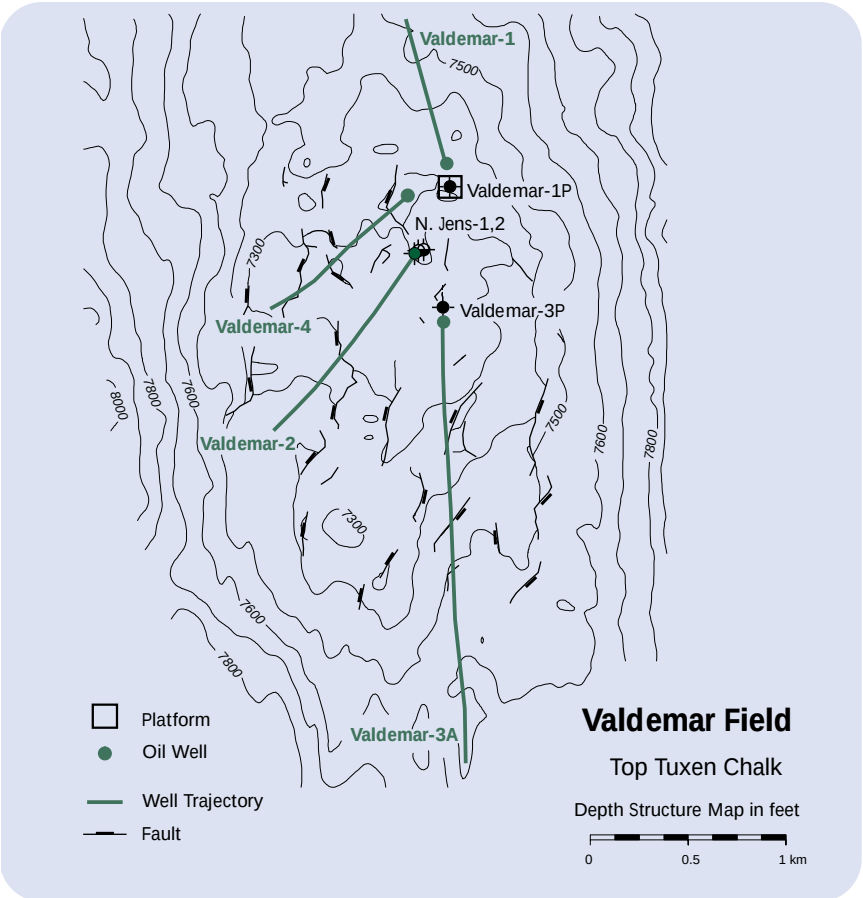
Production from the field is based on primary recovery.

PRODUCTION STRATEGY

The development of a recovery technique based on drilling long horizontal wells with numerous sand-filled, artificial fractures has made it possible to exploit the Lower Cretaceous reservoir commercially. Expectations for production from the North Jens reservoir are subdued. It is uncertain which recovery techniques may enhance the recovery of oil from this extremely tight reservoir.

PRODUCTION FACILITIES

The Valdemar Field (the North Jens reservoir) has been developed as a satellite to Tyra, including an unmanned production platform of the STAR type. The production is transported to Tyra East for processing and export ashore.



FINANCIAL KEY FIGURES

	Investments in Field Development DKK million	Field Operating Costs DKK million[1]	Exploration Costs DKK million	Crude Oil Price USD/bbl[2]	Exchange Rate DKK/USD	Inflation %[3]	Net Foreign-Currency Value DKK billion[4]
1972	105	32	28	3.0	7.0	6.6	-3.2
1973	9	34	83	4.6	6.1	9.3	-4.0
1974	38	58	76	11.6	6.1	15.2	-9.2
1975	139	64	118	12.3	5.8	19.6	-8.5
1976	372	71	114	12.9	6.1	10.3	-9.5
1977	64	88	176	14.0	6.0	11.2	-10.4
1978	71	128	55	14.1	5.5	10.0	-9.2
1979	387	146	78	20.4	5.3	9.6	-13.7
1980	956	169	201	37.5	5.6	12.3	-18.6
1981	1,651	402	257	37.4	7.1	11.7	-20.1
1982	3,948	652	566	34.0	8.4	10.2	-20.6
1983	3,528	615	1,264	30.5	9.1	6.9	-17.8
1984	1,596	1,405	1,211	28.2	10.4	6.3	-18.3
1985	1,953	1,677	1,373	27.2	10.6	4.7	-17.6
1986	1,695	1,533	747	14.9	8.1	3.6	-7.3
1987	908	1,560	664	18.3	6.8	4.0	-5.9
1988	897	1,550	424	14.8	6.7	4.6	-3.7
1989	1,153	1,819	366	18.2	7.3	4.8	-3.2
1990	1,738	1,924	592	23.6	6.2	2.6	-2.7
1991	2,260	2,176	986	20.0	6.4	2.4	-1.9
1992	2,402	2,080	983	19.3	6.0	2.1	-0.4
1993	3,358	2,324	442	16.8	6.5	1.2	-1.7
1994	3,140	2,395	151	15.6	6.4	2.0	-0.5
1995	4,167	2,176	272	17.0	5.6	2.1	0.0
1996	4,259	2,491	470	21.1	5.8	2.1	0.0
1997	3,825	2,772	521	18.9	6.6	2.2	2.0
1998	5,425	2,429	446	12.8	6.7	1.9	1.0
1999*	3,580	2,502	786	17.9	7.0	2.5	3.6

Nominal Prices

1) Including transportation costs (profit element included)

2) Danish crude oil

3) Consumer prices

4) Oil products and natural gas

**Estimate*

PROJECTS FUNDED UNDER ERP 2000

Reference Number 1313/	Project Title	Budget DKK '000	Funding DKK '000	Participating Institutions/ Businesses (Project Leader)
00-0001	New Hydrocarbon Systems in the Eastern North Sea	8,347	3,075	Geological Institute - Aarhus Ødegaard A/S
00-0004	A Stratigraphic Study of the Palaeogene Sediments in the Danish North Sea Sector, East of the Central Trough	5,137	2,887	GEUS DONG E & P A/S
00-0005	The Hydrocarbon Potential of the Norwegian-Danish Basin	2,738	1,514	GEUS
00-0008	Displacement and Deformation Processes in Fractured Reservoir Chalk	4,839	2,600	Geotechnical Institute IGG & ISVA (DTU), GEUS Mærsk, BP/Amoco
00-0011	Reservoir Simulation of Deformation Processes in Reservoir Chalk	1,000	500	Geotechnical Institute COWI, BP/Amoco
00-0013	Mapping of Fracture Density in Chalk Reservoirs	1,020	612	Ødegaard A/S The Priority Group
00-0017	Model for Wax Inhibitors	2,190	500	Calsep A/S
00-0020	Free-Span Burial Inspection Pig - Phase B	1,954	1,400	The FORCE Institute DONG E & P A/S
99-0014	Improved Design Basis for Offshore Flexible Pipes	747	380	NKT Flexibles
Total		**27,972**	**13,468**	

ERP Projects Completed in 1999

Reference Number 1313/	Project Title	Participating Institutions/Businesses (Project Leader)
96-0003	Improved Seismic Inversion for Mapping Pre-Chalk and Other Reservoirs	Ødegaard A/S (Jacob Mørch Pedersen)
97-0005	Geophysical and Geostatical Reservoir Characterization of Chalk Fields and Use of Reservoir Simulation	Ødegaard A/S (Jacob Mørch Pedersen) GEUS, COWI
96-0008	Wave Impact on Slender Offshore Structures	LICengineering A/S (Bjarke Pedersen), DHI
96-0009	Optimization of Pipelines for Marginal Fields	LICengineering A/S (N.E-Ottesen Hansen), DTU
97-0034	Description of the Petroleum System in the Vietnamese Song Hong Basin	GEUS (Claus Andersen)

GEUS = Geological Survey of Denmark and Greenland
DTU = Technical University of Denmark
DHI = Danish Hydraulic Institute

CATEGORIES OF RESERVES

As in previous years, the assessment only includes reserves in structures in Danish territory where the presence of hydrocarbons has been conclusively established through drilling and testing.

The method used by the Danish Energy Agency in calculating the reserves makes allowance for the uncertainty involved in all the parameters used in the calculation. For each oil and gas field, the reserves assessed are expressed by three values: *low, expected and high*, reflecting the margins of uncertainty tied to the oil and gas reserves in the relevant field.

Only a percentage of the oil and gas in place can be recovered. The amount of oil and gas that can be recovered throughout the life of the field is termed the ultimate recovery. Thus, the difference between ultimate recovery and the amounts of oil and gas produced at any given time constitutes the reserves.

The projects which are ongoing or for which the operator has submitted plans are divided into three categories: *ongoing, approved and planned recovery*.

The Danish Energy Agency assesses the reserves recoverable under *possible recovery* projects for which the operator has not submitted specific plans to the authorities. The categories of reserves are defined as follows:

Ongoing Recovery

This category includes the reserves that are recoverable with the use of existing production facilities and wells. It is assumed that ordinary maintenance and workover operations are performed to ensure the continued functioning of the existing facilities.

Approved Recovery

If production has not yet been initiated under an approved development plan or any part of an approved plan, the reserves assessed to be recoverable are categorized as approved recovery. This applies to the development of new fields as well as extensions and modifications of existing installations.

Planned Recovery

Planned recovery denotes projects described in a development plan that is being considered by the authorities. Likewise, the reserves attributable to discoveries for which a declaration of commerciality has been filed are termed planned recovery.

Possible Recovery

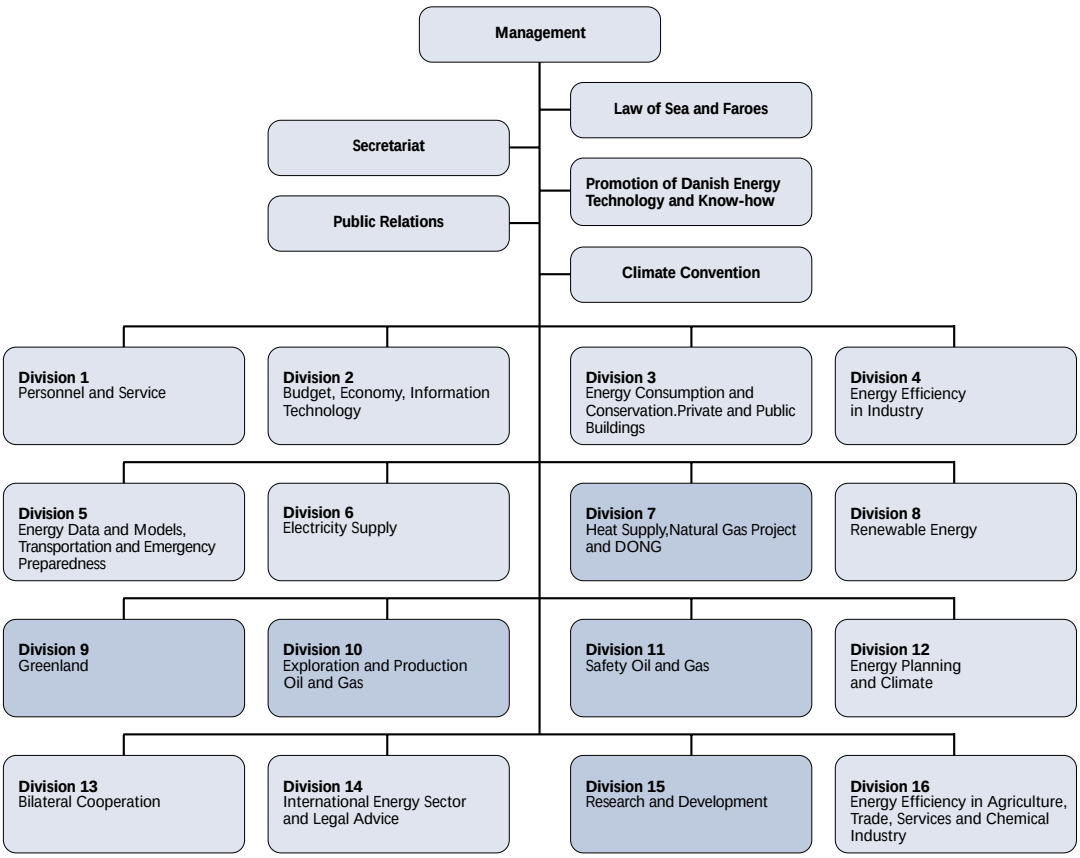
Possible recovery denotes reserves recoverable with the use of known technology, i.e. technology which is currently used in areas where the conditions are comparable to those prevailing in the North Sea. For instance, this includes water injection on a larger scale than before or wider application of horizontal wells. For discoveries for which a declaration of commerciality has not yet been filed, the recoverable reserves are categorized as possible recovery. This category also includes recovery from discoveries considered to be non-commercial.

ORGANIZATION

The Danish Energy Agency is an institution under the Ministry of Environment and Energy. The Agency administers all technical matters, administrative and political tasks within the energy area, in which connection the Agency prepares the energy-related issues to be submitted to the Minister, and handles relations and coordination with external parties. The chart below shows the organization of the Danish Energy Agency at the end of 1999. *At the time this report went to press, the organization was being restructured.*

The Danish Energy Agency has 16 divisions, as well as a few staff functions reporting to Management. The administration of oil and gas activities is handled by the 10th and 11th divisions of the Agency, assisted by the 7th, 9th and 15th divisions to some extent. How responsibilities between the oil and gas divisions are divided is dealt with in more detail on the next page.

At the turn of the year 1999/2000, the Agency employed the equivalent of about 275 full-time employees, about 40 of whom are involved in the administration of oil and gas activities.



The administration of oil and gas activities is handled by:

10th Division: Exploration and Production of Oil and Gas

Head of division: Søren Enevoldsen

Supervising exploration and production activities in terms of resources, as well as financial and legal aspects. Licensing policy and administration, licensing rounds and the awarding of licences. Approving appraisal programmes and work programmes.

Evaluating declarations of commerciality. Approving development plans and production profiles. Addressing matters concerning the obligation to connect production facilities to existing pipelines and exemptions from payment of the pipeline tariff. Matters concerning unitization. Geological evaluations and reservoir engineering. Preparing analyses, evaluating the potential and making forecasts of Danish oil and gas reserves. Evaluating commercial viability, including work on energy plans. Considering political and administrative issues related to DONG Efterforskning og Produktion A/S. Advising the Bureau of Minerals and Petroleum (BMP) under the Greenland Home Rule Authority on legal and technical issues. Responsibility for the Danish Energy Agency's oil/gas-related system exports. Advising the BMP for Greenland on other issues falling within the division's area of expertise.

11th Division: Safety in the Oil/Gas Sector

Head of division: Uffe Danvold

Activities concerning safety, working environment and other environmental issues under the provisions of the Danish Offshore Installations Act, the Subsoil Act and the Continental Shelf Act. Approving mobile and fixed installations as well as pipelines. Supervising the safety, working environment and other environmental aspects of offshore installations and pipelines, as well as monitoring drilling operations in terms of safety. Approving and supervising manning tables and organizational charts, as well as undertaking the tasks related to membership of the Action Committee, the Coordination Committee and the Average Commission for Offshore Installations. Monitoring supplies conveyed through the transmission systems belonging to DONG Naturgas A/S and supervising the technical safety aspects of the gas storage facilities established by DONG Naturgas A/S. Considering political and administrative issues related to DONG Olierør A/S and the Danish Oil Pipeline Act. Moreover, the division draws up regulations in this area. Advising the BMP under the Greenland Home Rule Authority on legal and technical issues.

7th Division: Heat Supply, the Natural Gas Project and DONG

Head of division: Thomas Bastholm Bille

Matters concerning the DONG group and the regional natural gas companies. The financial, legal, technical and organizational matters related to the implementation of the natural gas project. Parliamentary Acts on natural gas supplies. Matters concerning the purchase and export of natural gas. Activities under the provisions of the Danish Heat Supply Act. Expanding decentralized heat and power systems and using environmentally friendly energy sources. Legal/administrative and financial issues. Approving projects and hearing appeals under the Heat Supply Act. The Danish Act on Subsidies for the Generation of Electricity.

9th Division: Greenland

Head of division: Uffe Strandkjær

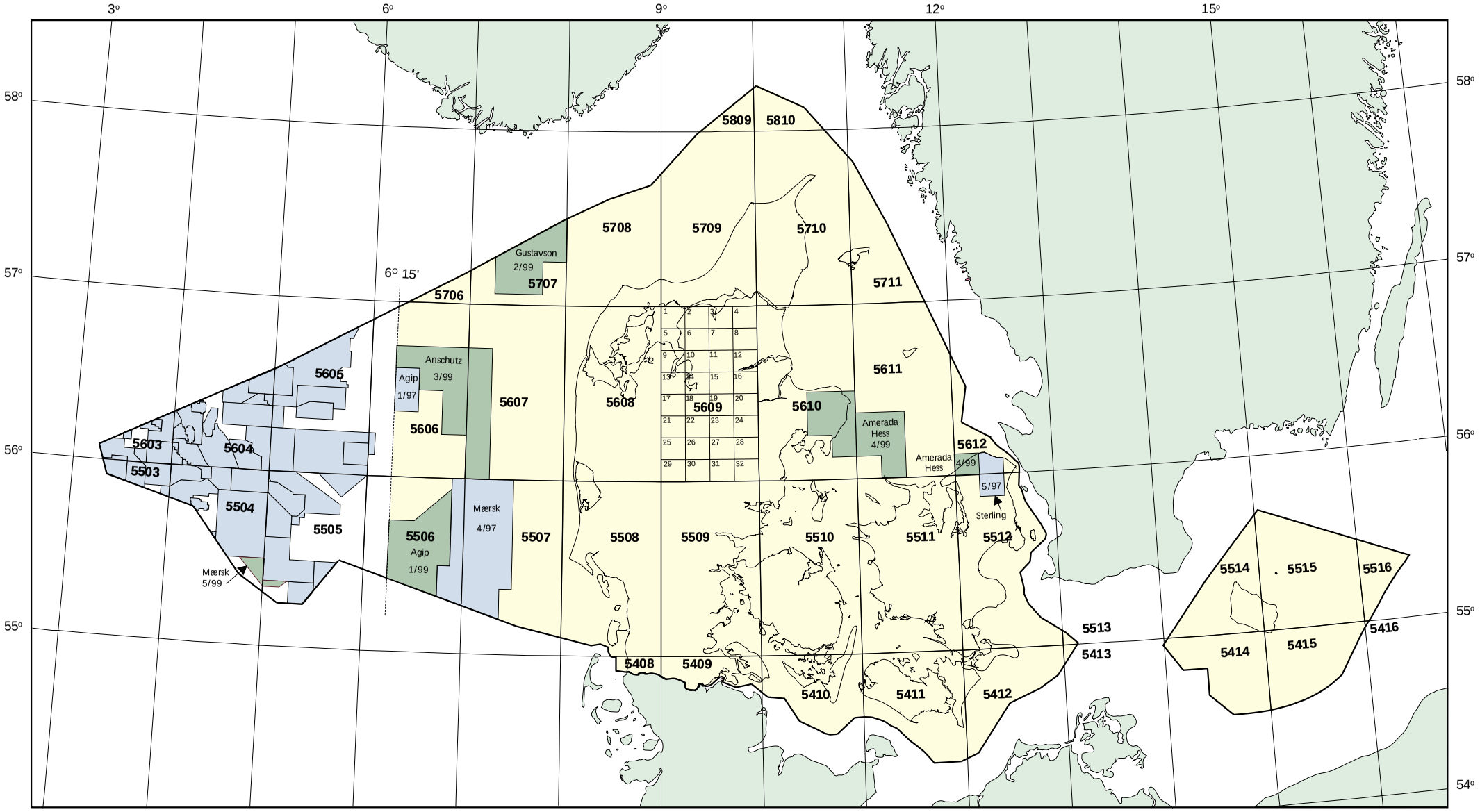
Governmental tasks in pursuance of the Act on Mineral Resources in Greenland (the Mineral Resources Act), the legislation on Nunaoil and any other associated legislation and agreements, etc. Work related to the Danish participation in the Joint Committee on Mineral Resources in Greenland. Cooperating with the BMP for Greenland. Tasks connected with energy-related projects in Greenland and with the sector programme for property and housing renovation with a positive impact on the environment and energy consumption, financed by MIFRESTA funds. Fee-based consultancy services for the Greenland Home Rule Authority in relation to the extraction and export of ice and water.

15th Division: Research and Development

Head of division: Henrik Andersen

National and international activities regarding energy research. The national activities include administering energy research programmes, research policy proposals and statements, as well as acting as the secretariat of the Advisory Oil and Natural Gas Research Committee. The international activities relate mainly to the EU research programmes, the IEA and the Nordic Energy Research Programme.

Danish Licence Area January 2000



Danish Licence Area January 2000

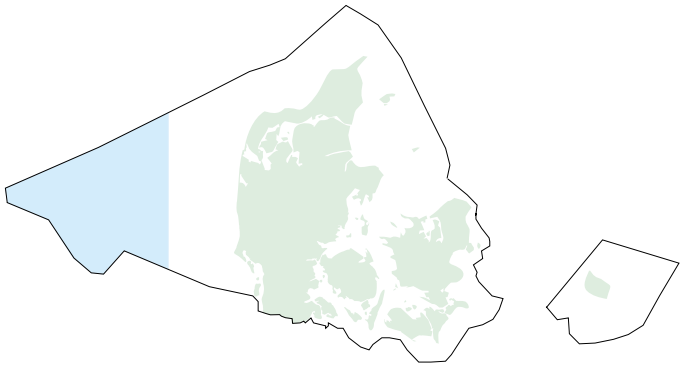
The Western Area

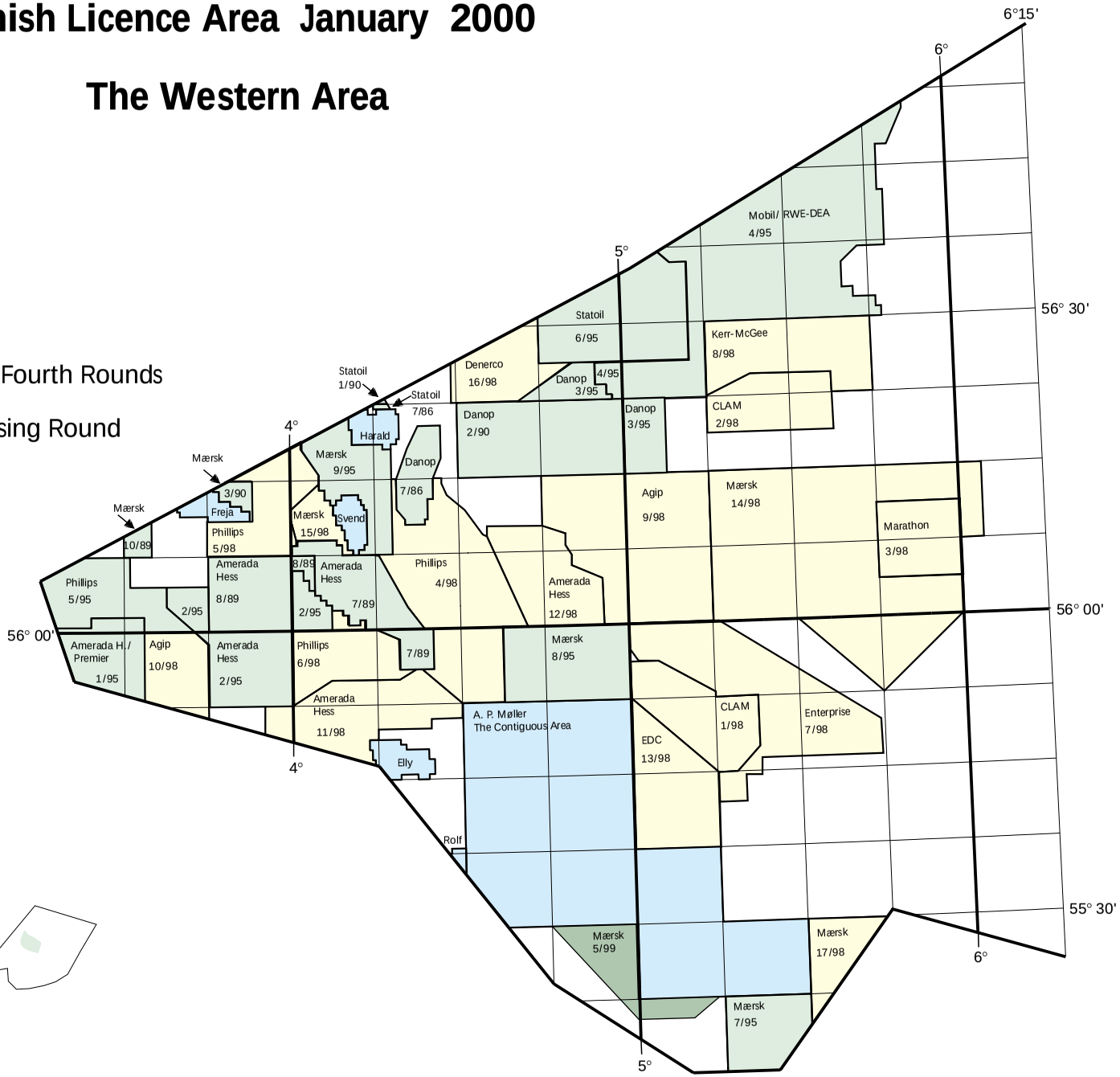
A. P. Møller, 1962 Licence

Licences issued in the Second to Fourth Rounds

Licences issued in the Fifth Licensing Round

Licence issued in 1999





As an agency established by law in 1976 under the Ministry of Environment and Energy, the Danish Energy Agency deals with matters relating to the production, supply and consumption of energy. On behalf of the Government, its task is to ensure that the Danish energy sector develops in a manner appropriate to society, the environment and safety.

The Danish Energy Agency prepares and administers Danish legislation, and analyzes and evaluates developments in the energy sector. Another important task is to follow up the Governments's energy policy, including to help ensure that Denmark maintains and underpins its role as a frontrunner in promoting sustainable development globally. Among its numerous other functions, the Danish Energy Agency supervises the recovery of oil and gas from the Danish subsoil, and deals with matters relating to natural gas storage facilities, safety and working environment. In addition, the Agency prepares forecasts and issues exploration and production licences.

The Danish Energy Agency works closely with local, regional and national authorities, energy distribution companies and licensees, etc. At the same time, the Danish Energy Agency maintains relations with international partners in the energy area, including the EU, IEA, as well as the Nordic Council of Ministers.

The Danish Energy Agency
44 Amaliegade
DK-1256 Copenhagen K

Telephone + 45 33 92 67 00
Fax + 45 33 11 47 43
Telex 22 450 energ dk
Homepage: www.ens.dk

Published: June 2000
Number printed: 1500

Front page: Photos made available by Mærsk Olie og Gas AS and the Geological Survey of Denmark and Greenland (coccoliths – calcareous discs from microscopic algae)

NORDISK MILJØMÆRKNING
541 055

Print: Scanprint A/S
Printed on: 100% recycled paper. Cover: 250 g Cyclus offset. Content: 130 g Cyclus print

Layout: Advice
Translation: Rita Sunesen

ISBN 87-7844-145-5
ISSN 0908-1704

ISBN 87-7844-146-3

In 1966, the first discovery of oil and natural gas was made in Denmark. Since 1986, the Danish Energy Agency has published its annual report "Oil and Gas Production in Denmark".

As in previous years, the 1999 report describes exploration and development activities as well as production in the Danish area. The report also includes an assessment of Danish oil and gas reserves, a section on state-subsidized research in oil and natural gas issues, as well as a review of the health and safety aspects of offshore production activities.

Finally, the report contains a section on the impact of oil and gas production on the Danish economy and a separate section on environmental effects and considerations related to production.

The report can be obtained from the Danish Energy Information Centre, tel. +45 70 21 80 10, on request and is also available on the Danish Energy Agency's homepage, www.ens.dk.

ISBN 87-7844-145-5