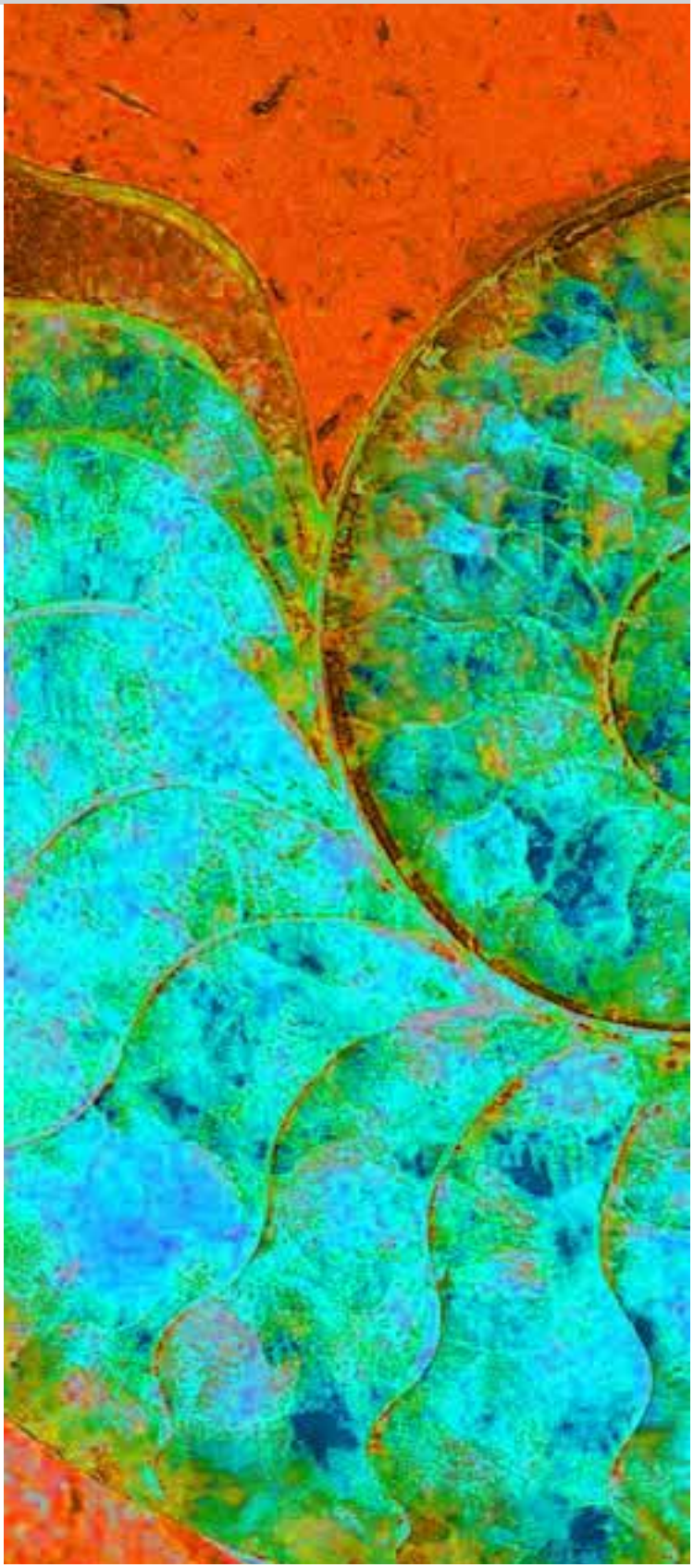
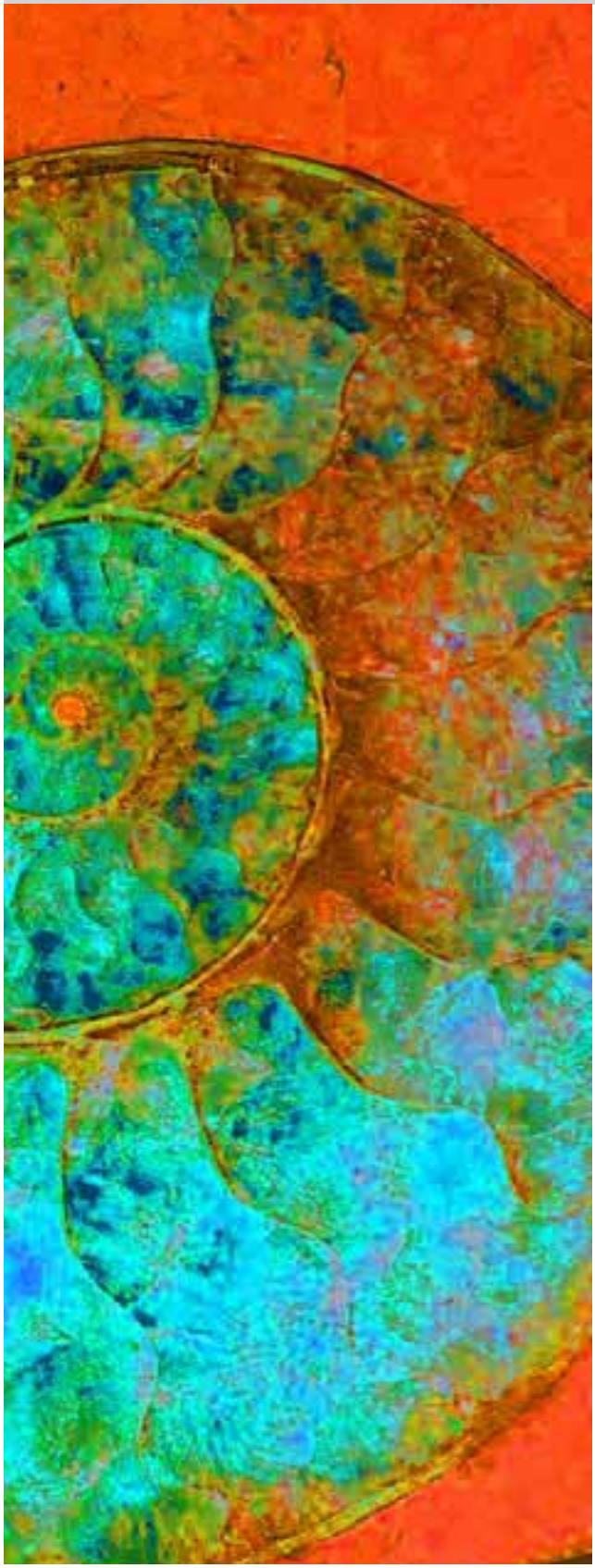
Offshore Norway 2003





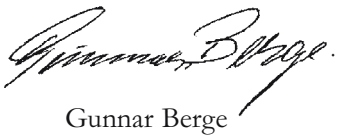
The Storting (Norwegian Parliament) decided to establish the Norwegian Petroleum Directorate on 14 June 1972. The Directorate's primary responsibility was to manage the petroleum resources in the best interests of the Norwegian society, as well as to have a general responsibility for safety on the continental shelf.

Thirty-two years later, on 1 January 2004, the Norwegian Petroleum Directorate was split into two independent entities, the Norwegian Petroleum Directorate and the Petroleum Safety Authority Norway. This division was a result of the process surrounding Storting White Paper No. 17 (2002 – 2003) On State supervision. The Storting endorsed the proposal of separating supervision of health, safety and working environment from the management of the petroleum resources. However, the Norwegian Petroleum Directorate and the Petroleum Safety Authority Norway still have offices in the same building in Stavanger.

All of the 350 employees have found a place in the two agencies. The details surrounding the two new organizations are still being worked out, but this work is now in its final stages. The physical reorganization will be complete by mid-May, with internal moves and swapping of offices.

This reorganization obviously made 2003 a unique year. Many employees have been busy working on tasks related to the division process. Personally, I believe that we have been able to carry out the division of the Norwegian Petroleum Directorate without adverse effects on our primary tasks. I hope that the petroleum industry, our superiors in the Ministry of Petroleum and Energy and the Ministry of Labour and Government Administration, and the public in general, share this view.

Stavanger, 17 March 2004



Gunnar Berge
director general

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Published by:
The Norwegian Petroleum Directorate
Prof. Olav Hanssensv.10
P.O.Box 600
NO-4003 Stavanger
Norway

Tel: +47 51 87 60 00
Fax: +47 51 55 15 71
E-mail: postboks@npd.no
Internet: www.npd.no

Editorial team:
Inger Anda
Arne Bjørøen
Britt-Laila Dahlberg
Thor Gunnar Dahle
Øystein Dretvik
Rune Goa
Eldbjørg Vaage Melberg
Tarjei Moen
Janne-B. Carlsen N'jai
Evy Zenker

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The future lies in the past

Gunnar Berge, director general

Saying that "the future lies in the past" does not mean everything was so much better before, but is a highly relevant observation about developments on the Norwegian continental shelf. It sums up briefly and succinctly much of the value of the NPD's work. This agency is alone in having a full overview of the NCS – in every area. It has access to all seismic data gathered in these waters, as well as an overview of all investment, wells drilled, cores, pipelines, installations, fields and licences. And all information pertaining to current production is collected.

This huge volume of data must be converted into knowledge and made available in an effective way to benefit the industry and society as a whole. The NPD's knowledge, overview, insight and expertise make a major contribution to value creation by Norway's oil sector. Knowledge of the past helps to build the future of the NCS.

The petroleum business creates many interesting jobs, both in the oil companies and in the supplies industry. This sector is also highly significant for education and research, and ranks as Norway's most important industry by far. It contributed 20 per cent of Norwegian gross domestic product in 2002, 23 per cent of investment and 43 per of total exports. Foreign earnings from oil and gas in 2002 were 10 times larger than revenue from fishing, the country's second largest export industry.

Laying the basis for further development is important. When Report no 38 (2001-2002) to the Storting (parliament) on oil and gas activities was debated, the Storting backed the aim of achieving the "long-term scenario". This requires the country to succeed in exploiting all its oil and gas resources, and thereby ensure at least another 50-100 years of activity.

Norway's petroleum industry is at a crossroads. It can still make big discoveries, but most of the remaining opportunities are of a size which requires new initiatives, players and incentives to ensure that oil and gas wealth in the ground is cost-effectively converted into cash in the bank. Many of these resources are time-critical. Located in mature areas where the geology is well known, they embrace supplementary resources in producing fields as well as possible discoveries and prospects close to existing infrastructure. If Norway fails to create incentives to drill these infrastructure-near prospects in time, they could be lost for ever.

Improved recovery and investment in the final phase to extend the producing life of fields often also requires changes in existing frame conditions. In addition, players must know that sensibly-priced processing and transport services are available to all. The risk is highest in the exploration and field development phases. New players must naturally pay the cost price plus a profit element for processing and transport, but

SIGNALS

The Norwegian Petroleum Directorate will contribute to creating the greatest possible value for society from oil and gas activities by means of prudent resource management based on safety, emergency preparedness and safeguarding the natural environment.

resource management is constrained if terms are not clarified in advance.

While parts of the North Sea can still be defined as immature, most such areas lie in the Norwegian and Barents Sea. These waters contain the major undiscovered resources which have yet to be explored by drilling. Exploration activity is low, and has been curbed in recent years on the northern NCS to ensure that conflicts with fishing and environmental interests are handled in the best possible way.

While 33 exploration wells were spudded in 2001, the figure was 19 for 2002 and 22 in 2003. The forecast for 2004 is around 20 wells.

Despite the low level of exploration in 2003, 11 new discoveries were made on the NCS. Seven of these were in the North Sea and four in the Norwegian Sea. A preliminary assessment of the discoveries indicates that about 40 per cent of production in 2003 was replaced with new resources.

Companies on the NCS have complained in recent years about the lack of new exploration acreage. The authorities announced the 18th offshore licensing round in December 2003, with awards expected in the second quarter of 2004. In acreage terms, this is the largest conventional round on the NCS since the first in 1965. A total of 30 new production licences were awarded – 11 in the 2002 North Sea round and 19 in predefined areas of the North and Norwegian Seas (APA 2003). That made 2003 a record year for acreage on offer.

Norwegian petroleum output is still rising. While oil production has flattened out, the flow of gas continues to increase. A total of 262 million standard cubic metres of oil equivalent (Sm^3 o.e.) was produced, up by three million from the 2002 record. Investment was also very high in 2003, at roughly NOK 62 billion excluding exploration costs. This represented an increase of NOK 10 billion from 2002.

"The good times are when you lay the basis for the bad," former Bank of Norway head Hermod Skånland once remarked. Norway is now reaping from fields discovered and decisions taken from the 1970s to the 1990s. Last year's positive results must not divert attention from what the reality will be if the country rests on its offshore laurels. If things continue as they are, the positive trend is set to reverse sharply in about five years. This will have negative consequences for both petroleum sector workers and the Norwegian economy. Maintaining progress in the Norwegian oil industry depends on making the necessary adjustments now.

One of the most controversial oil policy issues in 2003 related to petroleum operations in the northern Norwegian Sea off the Lofoten islands and the Barents Sea. The political decision many had been awaiting was taken just before Christmas, when the government resolved to resume year-round operation in parts of the Barents Sea. However, it decided to extend the suspension of activities in the Nordland VI area off Lofoten.

Achieving the long-term scenario on the NCS requires that all the resources which can be commercially recovered are produced. Major challenges are presented off northern Norway, where the NPD calculates that about a third of the country's undiscovered resources lie.

Many interests are involved in the debate on petroleum operations in the far north. In connection with the government's ULB impact assessment of year-round petroleum activity off Lofoten and in the Barents Sea, completed last autumn, the NPD produced a sub-report which specified that operations can be pursued in these waters without harmful discharges to the sea. This is possible with existing technology or solutions currently under development.

Opposition to northern activity can be graded. Some people are against all operation regardless, while others want to wait until more knowledge has been gained. The government concluded that enough is known to permit a resumption of work in the Barents Sea. This was an important decision for a number of reasons. About one billion scm oe are thought to await discovery in the ULB area – roughly a third of the undiscovered total on the NCS. The petroleum sector is a knowledge-intensive industry. It took Norway 40 years to build up today's major centres of expertise. If the northern areas are to be developed, it is important to act while this knowledge and competence remain available.

Oil and gas are also an international business. The NCS competes with other petroleum provinces for both expertise and capital. Knowledge takes a long time to build up, but can be lost terribly quickly. Exploring for oil and gas in new areas demands expertise and capital – and is risky. It is important that the companies which take this risk earn enough on the NCS to pay for both dry wells and the development of expertise and technology.

Frame conditions are an important issue in Norway's petroleum debate. The authorities have been urged by the industry to look at the tax regime, for instance. This discussion remains unresolved at present. But frame conditions mean more than just tax. Attention has also been focused on the level of Norwegian offshore costs - including tariffs. These are higher than on the UK continental shelf and by and large in all the other offshore provinces with which Norway competes.

There are many challenges. So everyone involved in the industry must accept responsibility. The unpleasant cannot always be avoided. But Norway may find this acceptable if it yields the desired result – a continued high level of activity on the NCS, so that the long-term scenario is achieved.

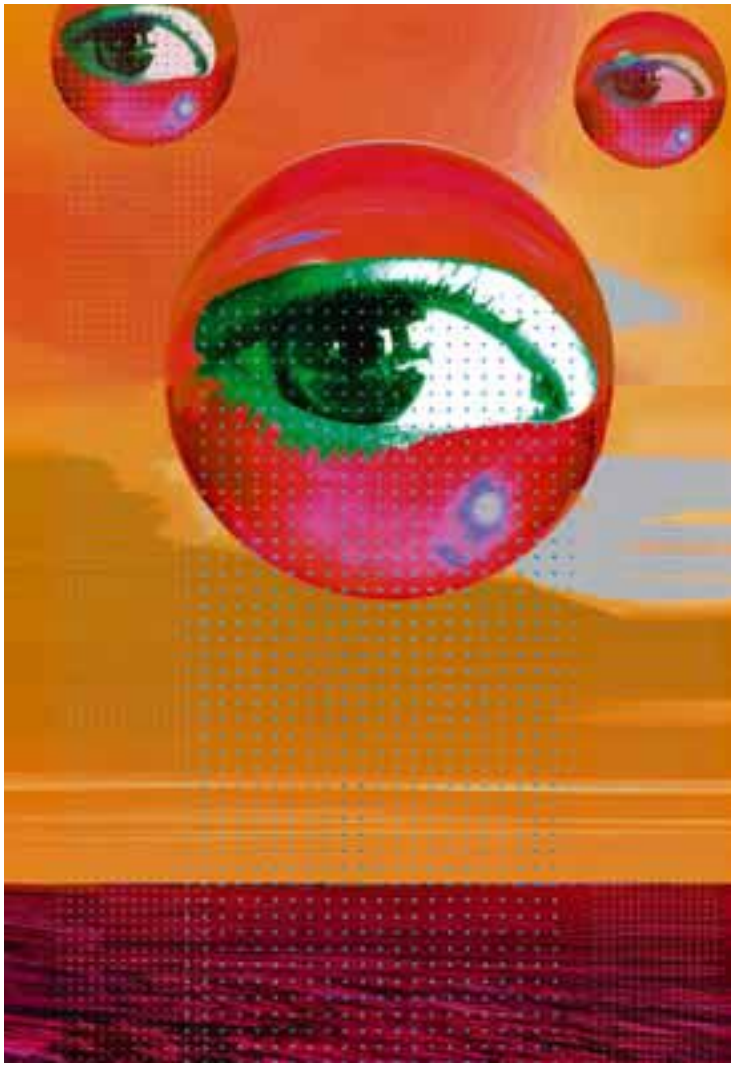
PART 1

IOR means hard work but a big return

Achieving an average recovery factor of 50 per cent for oil and 75 per cent for gas from fields in production on the Norwegian continental shelf is fully possible. But it calls for hard work, innovative thinking and a willingness to take courageous decisions.

Several measures to improve recovery on the NCS were initiated during 2003, and made a substantial contribution to the growth in reserves for the year.

Less than 30 per cent of Norway's offshore petroleum resources have so far been produced. With an active policy and good resource management, the 70 per cent still below ground could sustain Norwegian oil production for a great many years to come. This would generate substantial revenues for the community.



But that calls in part for continued technological progress. The expertise built up by Norway's petroleum industry over almost 40 years must be developed and strengthened to meet the challenges associated with continued growth on the NCS.

The total volume of Norwegian oil and gas is fixed by nature. Exactly how large these resources might be remains unknown, but estimates can be made. These change as understanding of conditions on the shelf increases. On the basis of present know ledge, the NPD has estimated that Norwegian offshore resources total more than 21 billion Sm^3 o.e. More than half of this, or roughly 12.9 billion Sm^3 o.e., is expected to be recoverable. But that estimate is also dynamic.

The size of commercially recoverable resources on the NCS will be determined in part by the willingness of licensees to take decisions – to explore so that new discoveries are made, and to develop these so that that their resources can be recovered. And decisions on implementing measures to improve the recovery factor on producing fields are also important.

Long-term commitment

Improving oil recovery (IOR) requires a conscious commitment. In many cases, new or upgraded technology is also needed before IOR projects can be initiated.

The trend among oil companies over the past five years has been to focus heavily on quick returns. Long-term planning and

projects with a long time horizon have been given lower priority than rapid earnings and good quarterly results.

Developing the resources on the NCS requires a commitment which combines short-, medium- and long-term perspectives.

The NPD believes that greater efforts are particularly needed in stimulated development, where a marked gap currently exists between expectations and actual activity.

A stronger focus on research and development relating to alternative production methods represents a necessary contribution in raising the recovery factor.

The NPD will be a prime mover in ensuring that time-critical resources are recovered, and will continue to encourage greater cooperation between players in developing cost-effective methods and IOR projects.

An average oil recovery factor of 50 per cent is the target set by the authorities for the NCS. The difference between today's expected recovery factor and this official goal is 300 million scm of oil.

But the potential for IOR is not a given volume, nor does a 50 per cent recovery factor represent a ceiling. Attainable recovery varies sharply from one reservoir to another, with more than 70 per cent possible from the best performers while others will be difficult to raise above 40 per cent.

To challenge the limits

Increased knowledge about fields, production histories and new methods have laid the basis for IOR projects. However, a high level of expertise in the companies is a key requirement.

Gunnar Berge, director general of the NPD, presented the IOR prize for 2003 in January 2004 to the Valhall licensees and their life-of-field seismic project. Utilising 4D seismic surveys and sensors permanently installed on the seabed, this work is intended to enhance understanding of reservoir conditions during production. It was one of many good candidates for the 2003 IOR prize.

The NPD is encouraged by this development, particularly because no worthy candidates for the prize were found in 2002. Decisions to implement IOR were in short supply, and the jury therefore decided to make no award.

With a purposeful commitment and a willingness to adopt the required technology, combined with the launch of new IOR projects, there is no reason why development should stop when the average oil recovery factor reaches 50 per cent.

As mentioned, however, this requires a willingness to take decisions and to challenge the physical and commercial limits to production. The IOR methods most widely employed on Norwegian fields so far have been water, gas or water-alternating-gas (WAG) injection, or increasing the well density. Drilling horizontal and multilateral wells has also been very important.

Pilot projects on using foam to prevent injected gas returning too quickly to the surface via the production wells have been pursued with good results on several fields.

Carbon dioxide can also be injected to drive more oil out of the reservoir. This technique has been used for many years on land, particularly in the USA, where reservoirs of pure carbon dioxide are available.

However, it has not as yet been applied for IOR on the NCS. Carbon dioxide is separated from Sleipner Vest gas production and injected into a sub-surface aquifer for deposition. Plans also call for this concept to be applied on Snøhvit.

The NPD has been a driving force in persuading the Gullfaks licensees to study whether carbon dioxide injection would be possible and profitable for IOR on that field.

Carbon dioxide projects on the NCS could have many positive aspects, both financial and environmental. In a number of cases, the method might provide better reservoir drive than water/natural gas. So far, however, it has proved unprofitable on the NCS because of the high cost associated with securing pure carbon dioxide and transporting it to the fields.

Norway's major North Sea fields have a substantial potential for enhanced value creation through IOR. However, securing this value depends on investment, continued technological development and not least on competent and creative teams of specialists.

A steadily growing number of fields have subsea-completed wells. This type of development solution accounted for 41 per cent of Norway's total annual oil and gas production in 2003. Such wells pose extra challenges for recovery, in terms both of data availability and of maintenance and modification costs. These challenges could easily become barriers to IOR projects.

Statoil is among the companies with ambitious goals in this area. Its target is that focused R&D will improve the average oil recovery factor for fields with subsea-completed wells to 55 per cent.

Unique survey of IOR potential

Much IOR technology is already available, but a need still exists to enhance existing solutions or implement measures which demonstrate that adopting such methods will be profitable.

The NPD has carried out a fresh review and analysis of resources in fields, discoveries and prospects in areas close to existing NCS infrastructure. Identifying the IOR potential in mature areas has provided an overview of the many ideas and possible IOR projects held by the companies for fields in production.

This unique survey indicates the value contained in the mature part of the NCS, how this changes over time and what projects are planned to realise it. The need for continued technology development is clear.

Identifying the potential and opportunities for IOR also shows what value could be lost if these resources fail to be produced within a given time frame, and which projects are unlikely to be implemented without encouragement from the authorities.

The NPD has registered that the average oil recovery factor on the NCS is improving at a slower pace. After a high rate of increase in 1990-98, the curve flattened out and has since shown a minimal upward trend. Based

on current plans, the average expected oil recovery factor for producing fields on the NCS is now 45 per cent.

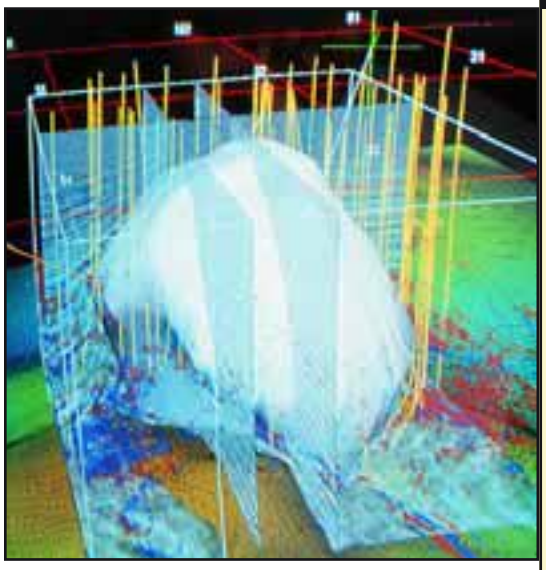
A number of the IOR projects listed in the company survey are profitable, but only if they are sanctioned in the near future. The authorities have focused on solving these problems together with the companies. An overview of projects being implemented or parked, and those which are or could be assessed, will form the basis for evaluating which projects the authorities should or must follow up and which are likely to be realised without intervention.

The authorities can require licensees to study socio-economically beneficial projects, but these must be commercial if the companies are to be instructed to implement them. A project's commercial profitability depends on the economic cycle, and can change in line with the base estimates made by the players on oil prices and costs.

Research

The NPD has welcomed the creation of two IOR research centres. A government-funded centre of excellence has been established at the University of Bergen as part of a new national R&D drive. And the IOR centre in Stavanger is the result of a collaboration between Rogaland Research, the Ekofisk licence and the petroleum department at Stavanger University College.

These initiatives are regarded by the NPD as both important and right. It hopes they can help to fill the vacuum created when the heavyweight government-funded IOR research programmes were completed in



the 1990s. The NPD has great expectations for the results these centres will produce.

Implementing IOR projects is important in securing the optimum producing life for fields in production. Once a field has been shut down, any remaining resources stay in the ground. Technology development, long-term thinking and the willingness to invest have ensured that fields which might have gone off stream long ago are still producing, and thereby contributing to IOR.

PART 1

A year of change

PETROLEUM SAFETY AUTHORITY NORWAY

The PSA is due to be fully tailored by July 2004 for fulfilling its role as a source of policy advice on health, safety and the environment (HSE) in Norway's oil and gas business.

Division, change and the creation of new structures have made a strong mark on the NPD and the PSA since December 2002. The White Paper which proposed splitting up the NPD was published just before Christmas in that month, with 1 January 2004 set as the deadline for separating HSE duties into a new body. Responsibility for land-based facilities relating to the oil and gas sector was also assigned to the new PSA.

"It would be no exaggeration to say that this has been a hectic time," says Magne Ognedal, who was appointed director-general of the PSA in November 2003.

"And 2004 will also be heavily affected by change and the creation of a new agency. Our aim is to have the actual organisa tional model, management and other staff in place before the summer holiday in July.

"Our just over 160 staff have tackled this change-over in a convincing way, and deserve top marks for the way they have carried out their external and in-house work in parallel with the process. That deserves respect. I take an optimistic view of the future, and am convinced that we'll succeed in building a regulator worthy of its mandate."

Experience

The NPD was responsible for HSE in the petroleum sector from 1972, and the PSA can thereby build on more than 30 years of experience. But supervising land-based plants relating to the industry presents an entirely new challenge.

"The differences between oil and gas operations offshore and on land have gradually been eliminated, not least because of remote control technology," Mr Ognedal observes.

"Activity on land is highly significant for offshore operation – and vice versa. So HSE work is being strengthened for the whole industry by giving responsibility to a single regulator."

The PSA will give great weight to incorporating the land-based plants in its supervision plans. These initially include the facilities at Kårstø, Stura, Kollsnes, Mongstad, Tjeldbergodden, Slagentangen and Melkøya. Emphasis is placed on creating a unified approach to HSE challenges on land and offshore.

Priorities in 2004 include helping to reduce the level of risk, continuing work to build a good safety culture in the industry and further developing the regulations. At the same time, the PSA will assign capacity to work on the next HSE White Paper, scheduled for early 2006.

Resources

"We don't have the resources to do everything we'd like to in 2004, so we're prioritising in line with signals from the Ministry of Labour and Government Administration," Mr Ognedal explains.

"To get to grips with the important job of regulating land-based petroleum operations, resources must be earmarked for visiting these facilities. That also requires priorities to be set, and one consequence could be fewer supervisory hours on offshore installations during 2004."

But he emphasises that the PSA will do its best to ensure that safety is maintained at today's high standard, and further improved.

"At present, we're working on an extensive in-house project to improve supervision efficiency. Our aim includes enhancing company awareness of and commitment to the HSE area. We hope and believe that this project will mean more effective and tailored regulation, thereby increasing the value of supervisory hours spent offshore - and eventually on land.

"The number of hours isn't the only important factor. Results and efficiency are just as much a matter of focus and methodology."

Mr Ognedal points out that it is the operator who undertakes to observe the regulations and avoid accidents.

The Petroleum Safety Authority Norway (PSA) was established as a result of Report no 17 (2002-2003) to the Storting on government regulatory agencies. Subordinate to the Ministry of Labour and Government Administration (AAD), the PSA's main objective is to "stipulate premises for checking that the players in the petroleum activity maintain high standards of health, safety, the environment and emergency preparedness, and thereby also contribute to creating the greatest possible value for society."

"Official supervision comes on top of the monitoring carried out by the operator and in addition to each company's independent responsibility."

He says that the aim is to achieve a normal division of resources and working hours between land-based and offshore activities after a running-in year during 2004.

Positive

In many respects, 2003 was a positive year for HSE in for Norway's oil and gas industry. The most important consideration is that no fatal accidents occurred in the sector then regulated by the NPD.

"We're naturally pleased about that, but would nevertheless be cautious in drawing conclusions about the underlying risk of major and minor accidents," says Mr Ognedal.

Another positive trend he highlights is the continued decline in the number of reportable personal injuries.

"However, there's been a marked increase in the number of injuries defined as requiring first aid, and we must look at what might lie behind that."

First-aid injuries are not reportable to the PSA, but are reported in order to safeguard rights in Norway's national insurance system.

Objective

The "level of risk" project was initiated in 1999 to secure a more objective and measurable basis for assessing the development of risk in major accidents and to help identify which problem areas make the biggest contribution to this trend.

On-going work in this project show that gas leaks, well kicks and damage to load-bearing structures were the main contributors to risk during 2003. However, preliminary figures for gas leaks reveal a marked decline from the same period of 2002. The biggest improvement was for minor leaks. Nor were any of the leaks in 2003 classed as "large".

"We're nevertheless concerned at the extent of gas leaks," says Mr Ognedal. "Given the potential threat posed by any such escape, they'll always have a high priority for us. But we're satisfied that the industry now seems to be taking this problem seriously."

Operators are committed to halving the number of gas leaks in 2003-05 compared with the preceding three-year period. The final figure for gas leaks in 2003 will be presented in the annual review of the risk level on the NCS on 23 April 2004.

Other highlights of 2003

Rest and restitution
Enforcement of section 31 of the activities regulations on rest and restitution has been a demanding task in 2003 and will remain so in 2004.

Both the HSE regulations and Report no 7 to the Storting on HSE in petroleum activities focus to a greater extent than before on the worker's opportunities for uninterrupted sleep. The aim is to ensure qualified rest and restitution to reduce the threat of errors which can cause accidents, and to avoid undesirable physical and mental strain.

Change processes
Supervision of current change processes in the industry was a priority in 2003 and will remain so in 2004. The authorities are open to the industry organising operations in new ways. So attention must focus primarily on how such processes are managed in terms of their short- and long-term effect on HSE and employee involvement.

The types of change processes which the PSA will monitor include:

- the organisation of work on installations approaching their final phase or with "low-staffing" operation
- the removal of installations after production has ceased
- new concepts for dividing work between land and offshore, including operation and monitoring of installations from land
- changes to decision-making patterns, including new contracts, new players and increased internationalisation of decision-making.

Compliance statement
The compliance statement (SUT) scheme was introduced in 2002 and became mandatory on 1 January 2004.

At the request of the owner of a mobile drilling unit, the PSA issues a statement that the unit in question together with its technical equipment and management systems is considered to comply with the relevant requirements in Norway's offshore regulations.

The aim is to avoid unnecessary duplication of effort in checking and documenting compliance with the drilling unit regulations when such units accept new assignments.

This benefits both the authorities and the industry. It also gives the owners greater predictability over using their units on the NCS. The scheme has received a very positive reception from the industry.

Safe operations in sensitive waters

Four-five exploration wells are planned in the Norwegian sector of the Barents Sea during 2004. Before work can begin, however, the oil companies must document that they can meet regulatory requirements for health, safety and the environment (HSE). The PSA plays a key role in assessing whether operators are able to keep within these limits.

The government resolved on 15 December 2003 to reopen much of the Barents Sea South area to all-year drilling. This decision was taken on the basis of the ULB impact assessment of year-round petroleum activity off Lofoten and in the Barents Sea, earlier evaluations and not least experience gained from almost 30 years of petroleum operations on the Norwegian continental shelf.

Oil company interest is growing in the northern NCS, which will account for 20 per cent of total Norwegian petroleum exploration in 2004. This means that the PSA will devote more resources to supervising operations in the far north, both offshore and on land.

Activities off northern Norway are nothing new either for the industry or for the authorities. Exploration drilling in the Norwegian and Barents Seas began in 1980, 14 years after such work started in the North Sea. Sixty-one of the roughly 1 000 wildcat and appraisal wells drilled on the NCS are in the Barents Sea, yielding a number of small and medium-sized discoveries.

Snøhvit was proven in 1984, and ranks today as the only Barents Sea field approved for development. Located about 140 kilometres north-west of Hammerfest, it is due to come on stream in December 2005.

Unified

To ensure that HSE considerations are seen in an overall context, the PSA (formerly the NPD), the Norwegian Pollution Control Authority (SFT) and the Directorate of Health and Social Affairs cooperate over regulating petroleum operations on the NCS. This collaboration is coordinated by the PSA.

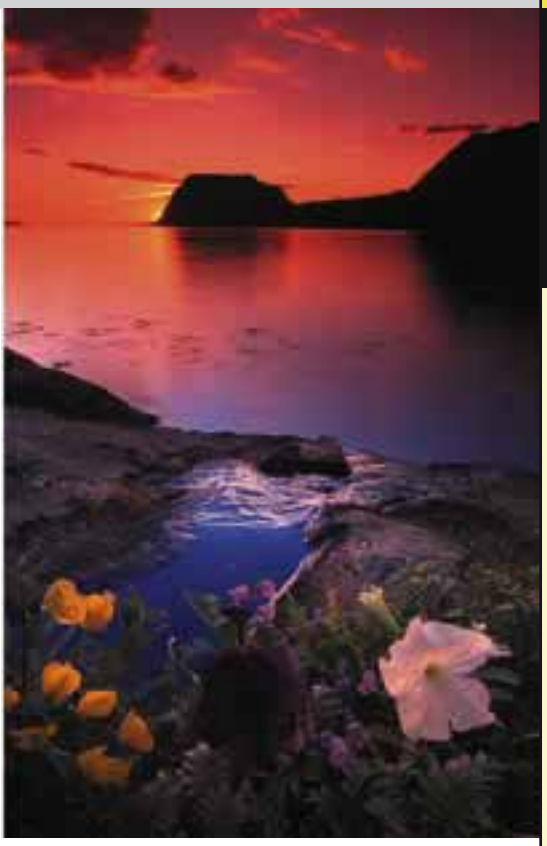
The common regulations applied by these agencies help to ensure that the best possible care is taken of people, the environment and material assets. A holistic perspective shows that good measures which increase safety for people also contribute to reducing the risk of damage to the environment and facilities. Making exploration drilling safer provides a case in point.

Responsibility for coordinating HSE supervision is exercised by the PSA for petroleum operations both offshore and at integrated land-based plants. In the Snøhvit development, it coordinates regulation both in the Barents Sea and at the plant on Melkøya island outside Hammerfest.

This role includes coordinating work on applications relating to petroleum operations, such as drilling consent with associ ated discharge permits. The aim is to ensure efficient regulatory consideration and consistent conclusions. Possible disagreements between the three agencies are handled at a senior level.

Functional

Norway's HSE regulations for petroleum operations are based on functional requirements for the level of performance to be attained. The companies must, for instance, tailor their choice of installation, equipment, control systems, barriers and



emergency response to specific activities in defined areas.

Characteristics of the Barents Sea include large distances, lack of infrastructure, winter darkness and a tough climate. These factors will require special attention compared with other parts of the NCS, not least when selecting a drilling rig for robustness, emergency response and effective barriers against undesirable incidents.

Companies operating off northern Norway are also required to take special account of environmental and fishing considerations. Among other provisions, the government has specified that all petroleum activities in the Barents Sea must involve zero discharges to the sea from drilling and downhole work during normal operation. The exception is drill cuttings and fluids from the upper part of the well, which can normally be deposited on the seabed.

The NPD carried out an assessment in 2003 of where Norway stands in environmental technology terms for meeting these discharge targets. The report, which forms part of the ULB, concludes that the goals can be met with the aid of existing technology and solutions currently under development.

Risk

Information collected by the NPD/PSA over more than 30 years provides a good picture of the risks associated with operations on the NCS. Historical data show, for instance, that no exploration well drilled off Norway has involved accidental discharges with environmental consequences.

Although the Barents Sea lies far to the north, experience and knowledge of the regional geology indicate that drilling there is no more complicated than in other parts of the NCS.

Reservoir pressure is not high, unlike the position in certain areas of the North and Norwegian Seas. That reduces the risk of uncontrolled blowouts.

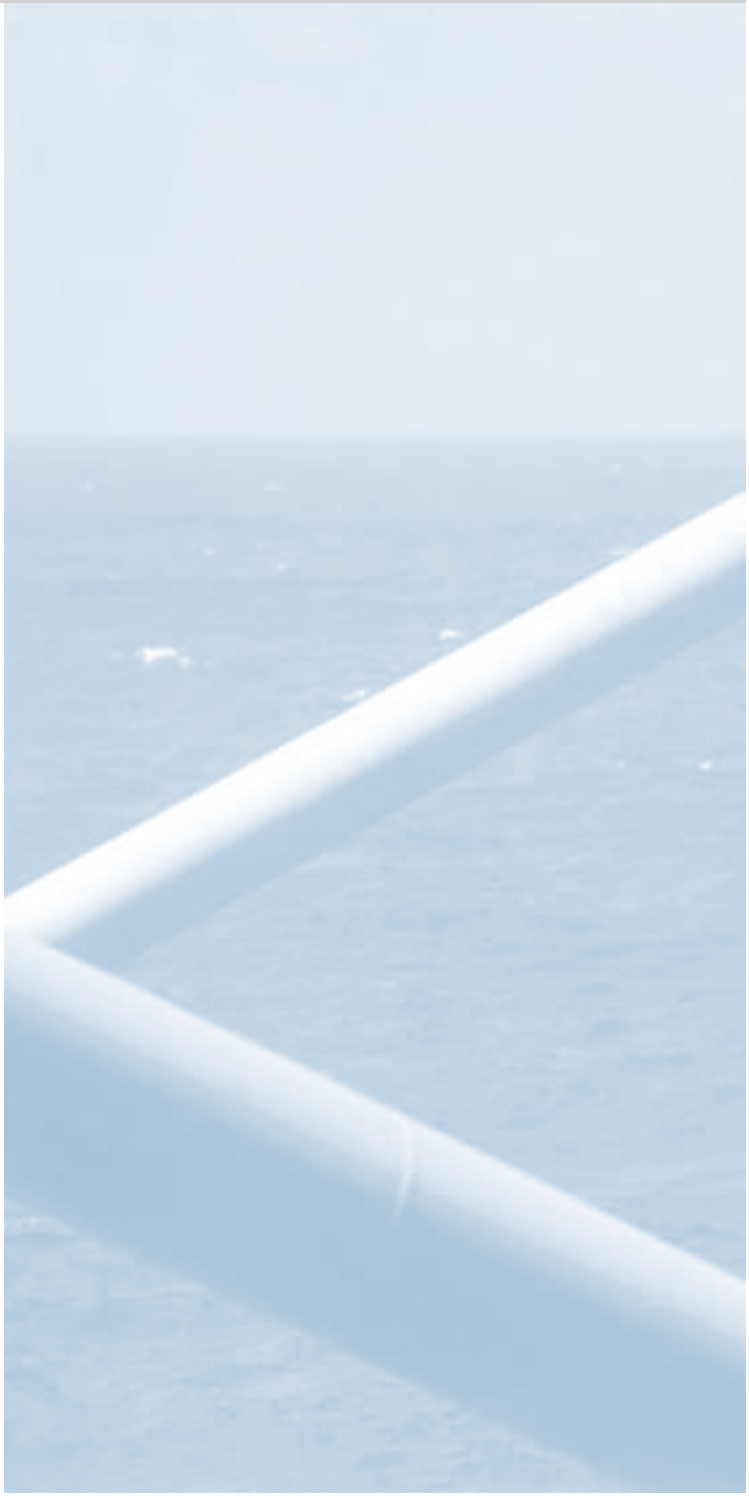
Wind and wave statistics also show that conditions in both summer and winter are virtually the same as in the North Sea, or even rather better.

Experience and professional assessments indicate that, with competent players, continuous technological development and existing regulations, the risk of undesirable incidents or discharges in the Barents Sea is no greater than elsewhere on the NCS.

At the same time, it is important to recognise that no activity is risk-free. The possibility that something might happen is always present. However, accidents are not fated. They have causes, and can thereby be avoided.

Documentation
When the PSA receives an application for consent to drill in the Barents Sea, the authorities involved will assess the company's plans for executing the work in accordance with all HSE requirements. Choice of rig and use of barriers are among the regulatory requirements which receive great attention.

In other words, securing a drilling consent in the Barents Sea requires the operator to document that people, the environment and material assets are safeguarded in an acceptable manner at all stages of the activity.



Important assets

The NPD's resource report for 2003 estimates that the Barents Sea conceals more than a third of the total undiscovered petroleum on the NCS.

However, the uncertainty range in these estimate is considerable – from 460 to 1 700 Sm^3 o.e. This primarily reflects limited knowledge of the regional geology. To learn more, additional exploration is needed – including drilling.

If Norway is to achieve the long-term scenario for the NCS defined in Report no 38 (2001-2002) to the Storting on oil and gas activities, it must also develop resources in the Barents Sea. Undiscovered resources account for no less than 62 per cent of the difference between the decline and long-term scenarios.

PART 2

1 Resource Management

The fact part primarily deals with information that is new or has changed during the course of 2003. Information on fields and discoveries is available on the Norwegian Petroleum Directorate's fact pages at www.npd.no.

1.1 THE RESOURCE ACCOUNTING

The Norwegian Petroleum Directorate's resource accounting includes a year-end overview of both the original recoverable and remaining recoverable petroleum volumes on the Norwegian continental shelf. New discoveries will provide additions to the resource accounts. Other changes may be the result of adjustments in the resource estimates for existing fields and discoveries based on new surveys or new production technology. The remaining resources are also reduced by production.

The resources are classified in accordance with the Norwegian Petroleum Directorate's resource classification system, see www.npd.no.

1.1.1 Resource accounting for 2003

The total estimate of original recoverable resources on the Norwegian shelf as of 31 December 2003 is 12 918 million Sm^3 oil equivalents (o.e.). The distribution and maturity of the resources is shown in Table 1.1.1 and Figure 1.1.1. Total remaining recoverable resources are 9 139 million Sm^3 o.e. with a range of uncertainty from 6.9 to 12.0 billion Sm^3 o.e., see Figure 1.1.2. The geographical distribution of the resources is shown in Figure 1.1.3.

Table 1.1.1 shows changes in the total recoverable resources compared with the estimate published in the Norwegian Petroleum Directorate's annual report for 2002 and in the Norwegian Petroleum Directorate's resource report 2003.

Terms

Discovered resources comprise Resource Categories (RC) 0 - 7 and is used for petroleum volumes proven through drilling.

Contingent resources refers to discovered resources that have not yet been approved for development.

Undiscovered resources are petroleum volumes that are presumed to be in place in defined play models, confirmed or unconfirmed, but that have not yet been proven through drilling (Resource Categories 8 and 9). There is always great uncertainty associated with estimates of undiscovered resources. The resource estimate stated for undiscovered resources is the statistical expected value.

Reserves comprise remaining recoverable, marketable petroleum resources in petroleum deposits that the licensees have decided to develop, and for which the authorities have approved a Plan for Development and Operation (PDO) or granted a PDO exemption. Reserves also include petroleum resources in deposits which the licensees have decided to develop, but which have not yet been considered by the authorities in the form of a PDO approval or PDO exemption. Reserves are distributed among Resource Categories 1 - 3.

A petroleum deposit is an accumulation of petroleum in a geological unit, delimited by rocks with structural or stratigraphic boundaries, contact surfaces between petroleum and water in the formation, or a combination of these, so that the overall petroleum included is in pressure communication through liquid or gas.

A discovery is one or more petroleum deposits together which were discovered in the same well and which through testing, sampling or logging have shown probable mobile petroleum (includes both commercial and technical discoveries). There is only one discovery well for each discovery. This means that new wells that prove resources that are part of, or that will be incorporated in, the resource estimate for an existing discovery are not regarded as being new discovery wells. The discovery year is the year the discovery well was temporarily abandoned or completed.

A field is one or more discoveries together which are covered by an approved Plan for Development and Operation (PDO) or which have been granted an exemption from the PDO requirement.

Figure 1.1.1
The distribution of the petroleum resources (bill Sm³ o.e.)

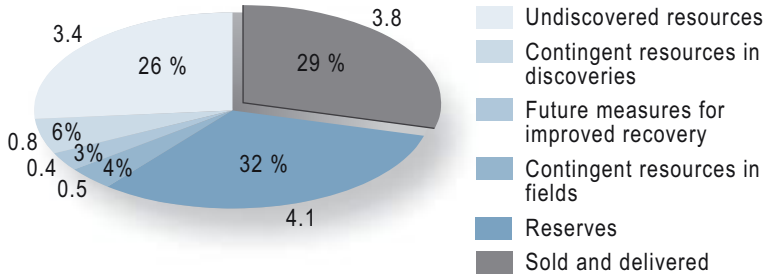


Table 1.1.1
The total petroleum resources on the Norwegian continental shelf as of 31 December 2003

Class	Category	Project status	Oil mill Sm³	Gas bill Sm³	NGL mill tonnes	Cond. mill Sm³	Oil equiv.[1] mill Sm³	Change from the Resource Report 2003: Oil equiv.[1] mill Sm³	Change from Annual Report 2002: Oil equiv.[1] mill Sm³
Historical production		**FIELDS** [2]							
	0	**Sold and delivered**	**2708**	**870**	**68**	**71**	**3 779**	**262**	**262**
Reserves	1	Reserves in producing fields	1174	1427	100	46	2837	142	142
	2 and 3	Approved or decided to be developed	61	1034	24	96	1237	155	155
		Total reserves	**1235**	**2461**	**124**	**142**	**4074**	**297**	**297**
Contingent resources	4	In the planning phase	169	110	22	2	323	-46	-46
	5	Recovery likely	97	57	7	8	175	42	42
	7F	New discoveries, not evaluated	2	1	0	1	3	1	1
		Total contingent resources in fields	**268**	**167**	**29**	**10**	**501**	**-3**	**-3**
	7A	Poss. future measures for impr. recovery	300	100			400	-50	-500
		Total reserves and resources in fields	**1802**	**2728**	**154**	**152**	**4975**	**244**	**-206**
		DISCOVERIES							
	4F	In the planning phase	114	148	12	11	297	-379	-379
	5F	Recovery likely	77	298	3	22	401	-32	-32
	7F	New discoveries, not evaluated	39	15	7	0	67	60	60
		Total contingent resources in discoveries	**230**	**460**	**22**	**33**	**764**	**-351**	**-351**
Undiscov. resources	8 and 9	**Prospects and plays**	**1160**	**1900**		**340**	**3400**	**0**	**-530**
Total resources		**Total resources**	**5900**	**5958**	**244**	**597**	**12918**	**155**	**-825**
		Total remaining resources	**3192**	**5088**	**175**	**525**	**9139**	**-109**	**-1087**

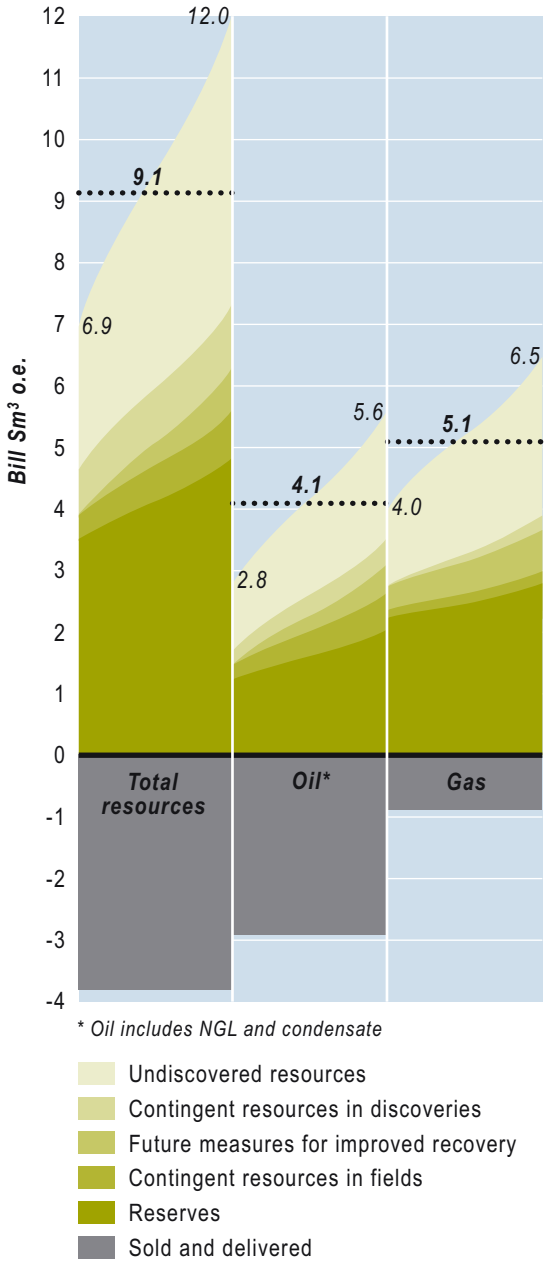
1) 1.9 is the conversion factor for tonnes NGL into Sm³.
2) Also contains discoveries in RC 3F (6305/5-1 Ormen Lange and 34/10-47 S Gulltopp)

Compared with the resource accounts in the Norwegian Petroleum Directorate's 2002 annual report, the total recoverable resources are reduced by 825 million Sm³ o.e., while the total resources have increased by 155 million Sm³ o.e. compared with the estimate in the resource report. This is due to the fact that, in the spring of 2003, the Norwegian Petroleum Directorate reduced its estimate of undiscovered resources by 530 million Sm³ o.e., including 460 million Sm³ o.e. of gas in the Norwegian Sea. At the same time, the estimate for resources from potential future measures to improve

PART 2

Resource Management

Figure 1.1.2
The distribution of the petroleum resources with uncertainty span (low (P90) and high (P10) estimate)



recovery was reduced by 450 million Sm³ o.e., of which 400 million Sm³ o.e. is gas. For more information, please refer to the Norwegian Petroleum Directorate's 2003 resource report (www.npd.no) published in June 2003.

1.1.2 Resource status

Historical production
Historical production describes the total volume of petroleum that has been sold and delivered. The produced volumes come from fields that are in production and from fields that have already been shut down.

Shutdown fields
No fields ceased production in 2003. There are a total of 12 fields on the Norwegian continental shelf where production has ceased. Production from these fields is shown in Table 1.1.2, Appendix 1.

Producing fields
In 2003, there were 48 fields in production on the Norwegian continental shelf, of which 42 fields in the North Sea and six fields in the Norwegian Sea. The Fram and Grane fields came on stream in the North Sea, while the Mikkel field started producing in the Norwegian Sea.

Reserves in producing fields (RC 1)
As of 31 December 2003, there were 65 fields on the Norwegian continental shelf with approved plans for development and operation (PDOs), including the 12 fields that have ceased production. Troll is considered to be one field, in spite of the fact that it consists of separate developments with different operators. Table 1.1.3, Appendix 1 provides information on fields in production, or fields with approved plans for development and operation. The original recoverable volumes and remaining reserves in fields in production are shown in Table 1.1.4, Appendix 1.

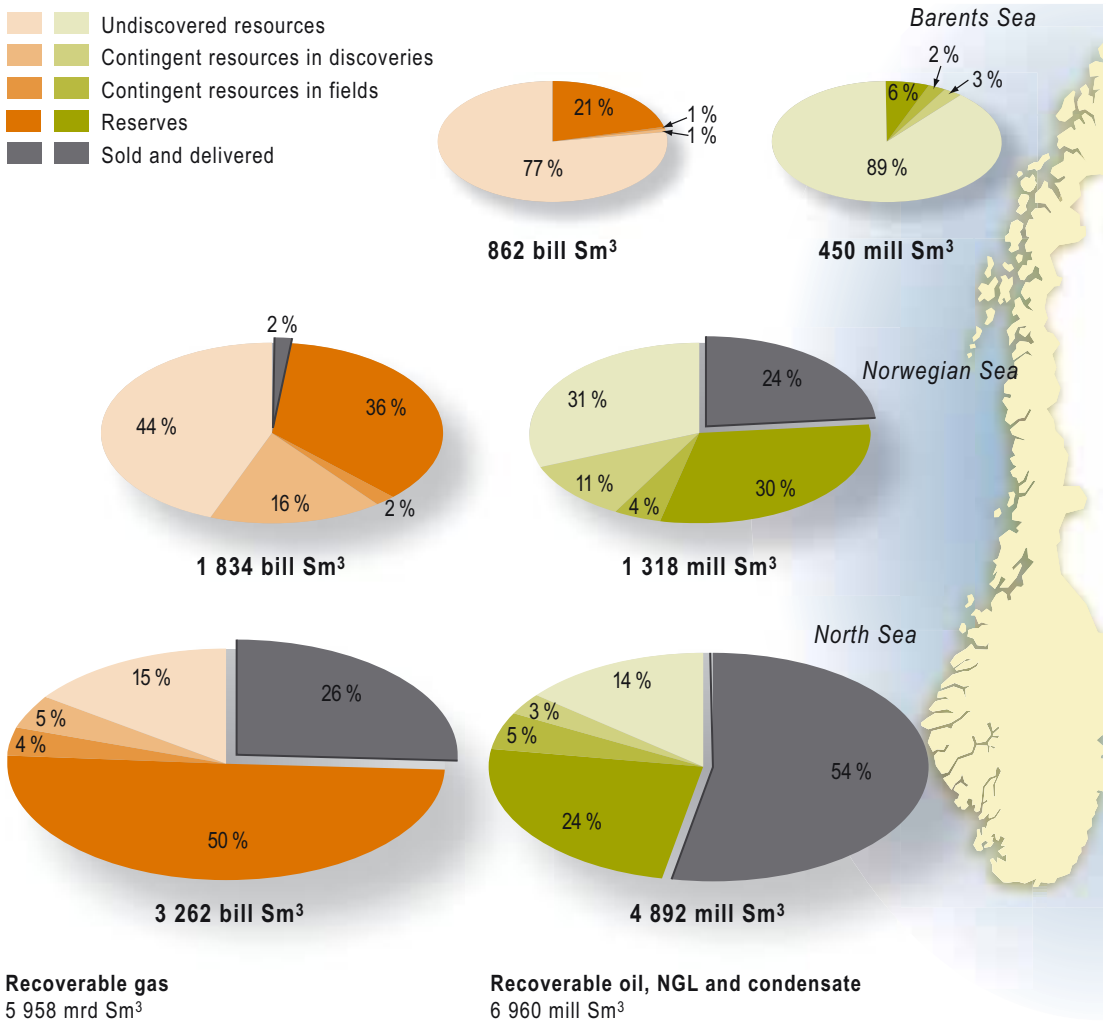
The remaining reserves in fields in production have increased compared with last year. Three new fields have started producing, and there has also been an increase in reserves in fields that are already producing. Among other things, the Ekofisk Vest project was approved, which increased reserves by more than 30 million Sm³ o.e. A new

segment of the Balder field has started producing and the oil reserves have increased by more than ten million Sm³. In 2003, resources from future wells in the Eldfisk field were reported in the reserves category, while they were counted as resources in previous years' reports.

Reserves in fields with an approved plan for development and operation (RC 2F)
At the end of 2003/beginning of 2004, there were four fields that had approved PDOs but which had not yet started producing. The Kvitebjørn PDO was approved in 2000, Kristin in 2001 and Snøhvit and Skirne (Byggve is part of Skirne) secured approval of their PDOs in 2002.

Reserves in discoveries which the licensees have decided to develop (RC 3F)
There were two discoveries in this resource category at the turn of the year 2003/2004, see Table 1.1.5, Appendix 1. In December 2003, the licensees submitted a PDO to the authorities for 6305/5-1 Ormen Lange. The resources in 6305/5-1 Ormen Lange, amounting to 375 billion Sm³, have now been classified as reserves and make a large

Figure 1.1.3
The geographical distribution of the petroleum resources



Recoverable gas
5 958 mrd Sm³

100 bill Sm³ gas from future measures for improved recovery is included

Recoverable oil, NGL and condensate
6 960 mill Sm³

300 mill Sm³ oil from future measures for IOR is included

contribution to the increase in reserves. The authorities also received an application for exemption from a PDO for 34/10-47 S Gulltopp.

Contingent resources

Resources in discoveries in the planning stage (RC 4F)

At the turn of the year 2003/2004, the operators had concrete plans for developing 18 discoveries, see Table 1.1.6, Appendix 1. These are discoverie s where the operator has indicated that a plan for development and operation will be submitted and where it is assumed that a plan will be approved by the authorities within five years.

Compared with 2002, the resources in this category have been reduced by 379 million Sm^3 o.e. This is largely due to the 6305/5-1 Ormen Lange discovery, which is classified as reserves in Resource Category 3F. The 24/6-2 discovery has increased the resources by 16 million Sm^3 o.e. after several discoveries have been included in what is being planned as one future development. Three discoveries in this category had their PDOs approved in 2003, 30/6-18 Kappa Main, 30/6-26 Gamma Vest and 30/6-27 Kappa Nord. These discoveries have now been incorporated into the Oseberg field. As of this year, the 6608/10-6 Svale discovery encompasses the resources in the 6608/10-8 Stær discovery. The 25/4-3 Gekko discovery has been reclassified to Resource Category 6 following new assessments of the production possibilities.

Resources in discoveries where development is likely, but unresolved (RC 5F)

At year-end there were a total of 40 discoveries where development is likely, but unresolved, see Table 1.1.7, Appendix 1.

This includes discoveries were there are no concrete plans for development, and where it is assumed that a plan for development and operation will be approved in the course of five years, at the earliest.

The resource volume in this category amounts to 401 million Sm^3 o.e.. This is a reduction of 32 million Sm^3 o.e. compared with last year. The most important reasons for the reduction are that discoveries 6406/2-1 Lavrans with 23 million Sm^3 o.e. and 6608/10-6 Svale with eight million Sm3 o.e. are now reported in category 4F. 6406/2-1 Lavrans now has resources only in resource category 4F. Two discoveries, 2/7-29 and 7228/7-1 have been reclassified to Resource Category 6.

Resources in discoveries where development is not very likely (RC 6)

Through the years, a number of technical discoveries have been made that are either so small or so difficult to produce that, even with a long-term perspective, it seems unlikely that production will take place. Since the Norwegian Petroleum Directorate has low expectations of these discoveries being produced, they are not included in the annual resource accounting. This also includes discoveries located in relinquished areas. However, the resources in these discoveries have been included in the uncertainty calculations for the resources, and thus contribute to the high estimate (P10).

Resources in discoveries where evaluation is not yet complete (RC 7F)

At the turn of the year 2003/2004, three discoveries had been recorded in this resource category. The preliminary estimates for discoveries in Resource Category 7F amount to 67 million Sm^3 o.e. (Table 1.1.8, Appendix 1). The estimates are provisional and are thus very uncertain.

Table 1.1.9, Appendix 1, shows discoveries which are reported as part of other fields or discoveries in 2003.

1.2 EXPLORATION LICENCES

Licences to explore for petroleum

As of 31 December 2003, a total of 288 exploration licences have been awarded. Such licences have a duration of three years. The following licences were awarded in 2003:

Company	
TGS-Nopec Geophysical Co ASA	285
Fugro-Geoteam AS	286
A/S Norske Shell U&P	287
EMGS AS	288

Licences for scientific exploration

As of 31 December 2003, 406 licences have been granted for scientific exploration on the Norwegian part of the continental shelf. Sixteen such licences were awarded in 2003, see Table 1.2.1.

1.3 SURVEYING

Geophysical surveys

A total of 329 129 km of seismic data were acquired on the Norwegian shelf in 2003. The number of kilometers refers to line kilometers.

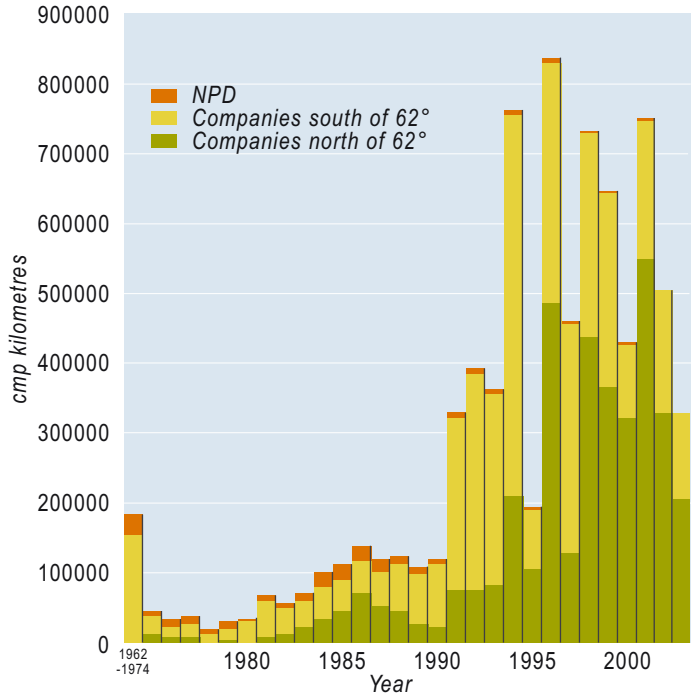
In the North Sea, a total of 122 085 km of seismic data were acquired, while 117 983 km were acquired in the Norwegian Sea, and 89 061 km in the Barents Sea.

The Norwegian Petroleum Directorate did not acquire seismic data in 2003. Of this

Table 1.2.1
Licenses for scientific exploration for natural deposits in internal Norwegian waters, in Norwegian sea territory and on the continental shelf

Licence	Name	Scientific field			Area
		Geophysics	Geology	Other	
391/2003	Gothenburg University		X	Hydrography	Skagerrak, South Coast
392/2003	Alfred Wegener Institut für Polar- und Meeresforschung		X	Oceanography, geochemistry, biology	Svalbard west, the Barents/Norwegian Sea
393/2003	University of Tromsø	X	X		Balsfjorden
394/2003	University of Bergen	X			West of Bergen, the Norwegian Sea
395/2003	Alfred Wegener Institut für Polar- und Meeresforschung			Biology, biochemistry	Skagerrak
396/2003	University of Tromsø	X	X		Ofotfjorden, Vestfjorden, Trænadjupet and several fjords in Troms
397/2003	University of Bergen	X			The Norwegian Trench west of Bergen
398/2003	Lamont-Doherty Earth Observatory	X			The Norwegian Sea
399/2003	Alfred Wegener Institut für Polar- und Meeresforschung	X	X	Bahtymetry, oceanography, chemistry	Svalbard
400/2003	Gothenburg University		X		South Coast, seven fjords
401/2003	University of Tromsø	X	X		Svalbard, Isfjorden
402/2003	JSC Marine Arctic Geological Expedition	X			Svalbard West
403/2003	State Enterprise "Polar Marine Geosurvey Expedition"	X	X		The Norwegian Sea
404/2003	Intitut für Meereskunde an der Universität Kiel		X		Oslofjorden
405/2003	Gothenburg University		X	Hydrography	Skagerrak, South Coast
406/2003	University of Tromsø	X			Balsfjorden

Figure 1.3.1
Seismic acquisition on the Norwegian continental shelf 1962-2003



total, Norwegian oil companies acquired 182 385 km and foreign oil companies acquired 39 361 km. The contracting companies PGS, TGS Nopec, Veritas DGC and WesternGeco acquired 107 383 km for their own accounts.

Of the total amount of seismic data acquired, 3D seismic accounted for 320 489 km: 119 729 km in the North Sea, 111 699 km in the Norwegian Sea and 89 061 km in the Barents Sea. Figure 1.3.1 shows the development in the total acquired line kilometers of seismic data.

1.4 PRODUCTION LICENCES

There were two new licence awards in 2003. Nine new production licences were awarded on 11 April 2003 in the North Sea Award 2002 and 19 new licences were awarded on 12 December 2003 in pre-defined areas (TFO). The areas encompass 54 blocks or parts of blocks with a total area of 14 000 km^2.

The Ministry of Petroleum and Energy also approved nine new individual awards/partitions outside of the standard licensing rounds. Five of these awards came as a result of applications from the companies and upon the recommendation of the Norwegian Petroleum Directorate, and were established as so-called stratigraphic production licences. These licences were awarded acreage that is wholly or partially contained in existing licences, but where the right to explore for and produce oil and gas is restricted to a defined depth level. The intention of this system is to increase activity and value creation on the continental shelf.

The companies have relinquished ten production licences during the course of the year. The new awards amounted to 37 production licences, so that net increase is 27. At the end of the year, there were 222 active production licences on the Norwegian continental shelf. The operator responsibility for these is divided among 22 different companies.

During the course of 2003 there were 89 transactions between the companies regarding sale/transfer of ownership interests. This figure is high compared with previous years. At the turn of the year 2003/2004, 34 different companies held ownership interests.

Reference is also made to our fact pages at www.npd.no.

1.4.1 New players

Nine companies were prequalified as operators or licensees on the Norwegian continental shelf in 2003.

Company	prequalified as
Paladin (UK)	operator
Mærsk Olie og Gas (Denmark)	operator
OER oil (Norway)	licensee
Talisman Energy (Canada)	operator
Anadarko (USA)	operator
Ruhrgas (Germany)	licensee
Revus Energy (Norway)	licensee
BG Group (UK)	operator
Gaz de France (France)	operator

1.4.2 Change in operator

Transfer of operatorship in 2003:

Production licence	From	To
006 C	Amerada Hess Norge as	Det Norske Oljeselskap as
019 B	BP Norge as	Talisman Energy Norge as
019 C	BP Norge as	Talisman Energy Norge as
143	Norsk Hydro Produksjon as	ConocoPhillips Skandinavia as
148	Amerada Hess Norge as	Det Norske Oljeselskap as
150	TotalFinaElf Exploration Norge as	Marathon Petroleum Norge as
230	Mobil Development Norway as	Statoil ASA
231	Mobil Development Norway as	Statoil ASA
232	Mobil Development Norway as	Statoil ASA
057 089 120	Norsk Hydro Produksjon as	Statoil ASA

1.5 EXPLORATION ACTIVITY

1.5.1 Exploration drilling

As of 31 December 2003, a total of 1063 exploration wells had been spudded on the Norwegian continental shelf. Twenty-two exploration wells were spudded in 2003, of which 14 were wildcats and eight were appraisal wells.

The drilling activity in 2003 has been divided among nine wildcat and seven appraisal wells in the North Sea, and five wildcat wells and one appraisal well in the Norwegian Sea. In addition, three temporarily abandoned exploration wells in the North Sea were re-entered for permanent plugging.

At the turn of the year 2002/2003, drilling of one exploration well was in progress. At the end of 2003/beginning of 2004, no exploration wells were being drilled, so that 23 exploration wells were completed in 2003. The geographical distribution of these is as follows: ten wildcat wells and seven appraisal wells in the North Sea, five wildcat wells and one appraisal well in the Norwegian Sea.

Regional distribution of the total number of exploration wells is shown in Figure 1.5.1. Exploration wells completed in 2003 are shown in Table 1.5.1.

Figure 1.5.1
Regional spread of exploration wells

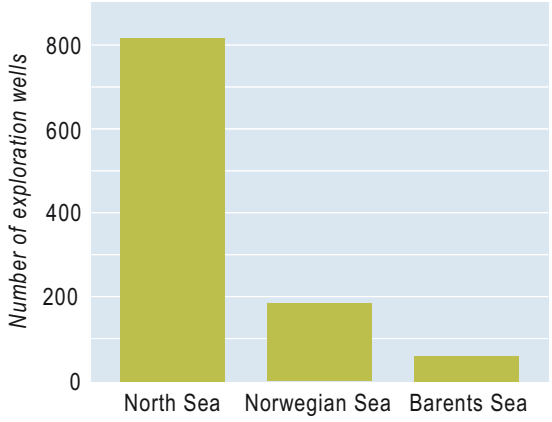


Table 1.5.1 Exploration wells completed in 2003

Exploration well	Production licence	Operator	Status	Well classification	Total depth	Total depth (age)
1/9-7	44	Phillips	gas/cond	wildcat well	4947	Triassic
15/12-13	38	Pertra	dry	appraisal well	1350	Jurassic
15/12-13 A	38	Pertra	dry	appraisal well	2532	Jurassic
15/12-13 B	38	Pertra	oil	appraisal well	3068	Jurassic
15/12-14	38	Pertra	oil	appraisal well	3254	Jurassic
16/1-6 S	167	Statoil	oil/gas	wildcat well	1997	Cretaceous
16/1-6 A	167	Statoil	dry	appraisal well	2194	Cretaceous
16/7-8 S	72	Esso	dry	wildcat well	2900	Triassic
24/6-3	88	Marathon	dry	abandoned	253	Pliocene
24/6-4	88	Marathon	oil/gas	wildcat well	2325	Paleocen
25/4-7	203	Marathon	oil	wildcat well	2286	Paleocen
25/4-8	203	Marathon	oil/gas	appraisal well	2286	Paleocen
25/4-9 S	36	Hydro	oil	wildcat well	2377	Paleocen
25/8-14 S	27	Esso	oil	wildcat well	2145	Jurassic
25/9-2 S	189	Esso	dry	wildcat well	2250	Jurassic
34/10-45 B	50	Statoil	gas/cond	wildcat well	7928	Jurassic
35/8-5 S	195	Hydro	dry	wildcat well	4000	Jurassic
6405/7-1	281	Statoil	oil	wildcat well	4336	Cretaceous
6406/1-2	256	Agip	gas/cond	wildcat well	4500	Triassic
6407/9-10	93	Shell	oil	appraisal well	1800	Jurassic
6608/10-9	128	Statoil	oil	wildcat well	2400	Jurassic
6608/10-10	128	Statoil	dry	wildcat well	2800	Jurassic
6706/6-1	264	Esso	gas	wildcat well	3451	Cretaceous

New discoveries 2003
Eleven new discoveries were made on the Norwegian shelf during 2003, see Table 1.5.2. Seven discoveries were made in the North Sea and four in the Norwegian Sea. Based on the number of completed wildcat wells (15) and one discovery in a production well, this gives a technical discovery rate of about 69 per cent.

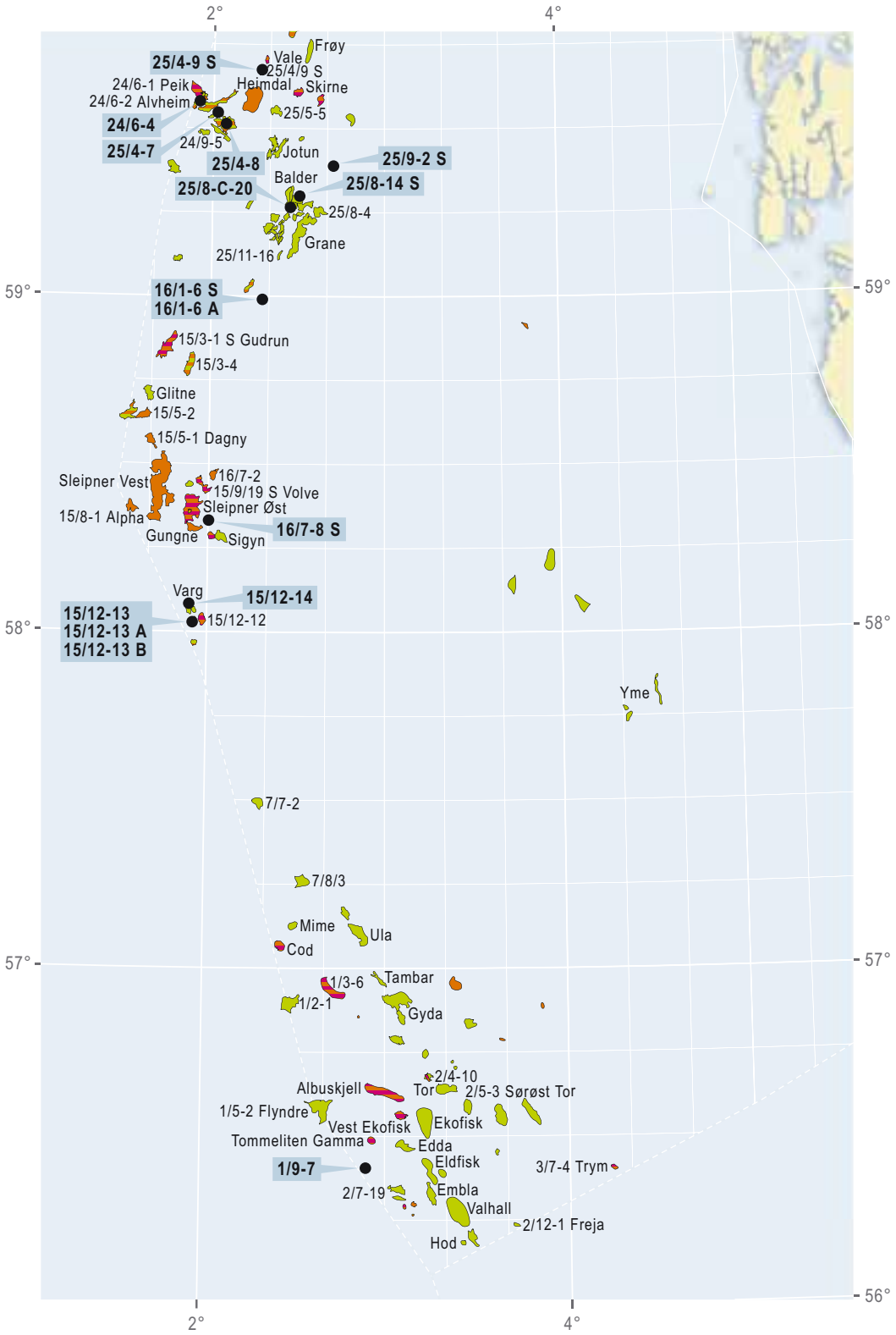
Detailed description of drilling in 2003
Figures 1.5.2, 1.5.3 and 1.5.4 show the locations of exploration wells that have been spudded or completed during the year.

Wildcat well 1/9-7 was drilled by ConocoPhillips as operator of production licence 044 to the southwest of the Ekofisk area. The well was completed in rocks from the Triassic Age. No hydrocarbons were proven in this well.

Table 1.5.2 New discoveries in 2003, recoverable resources

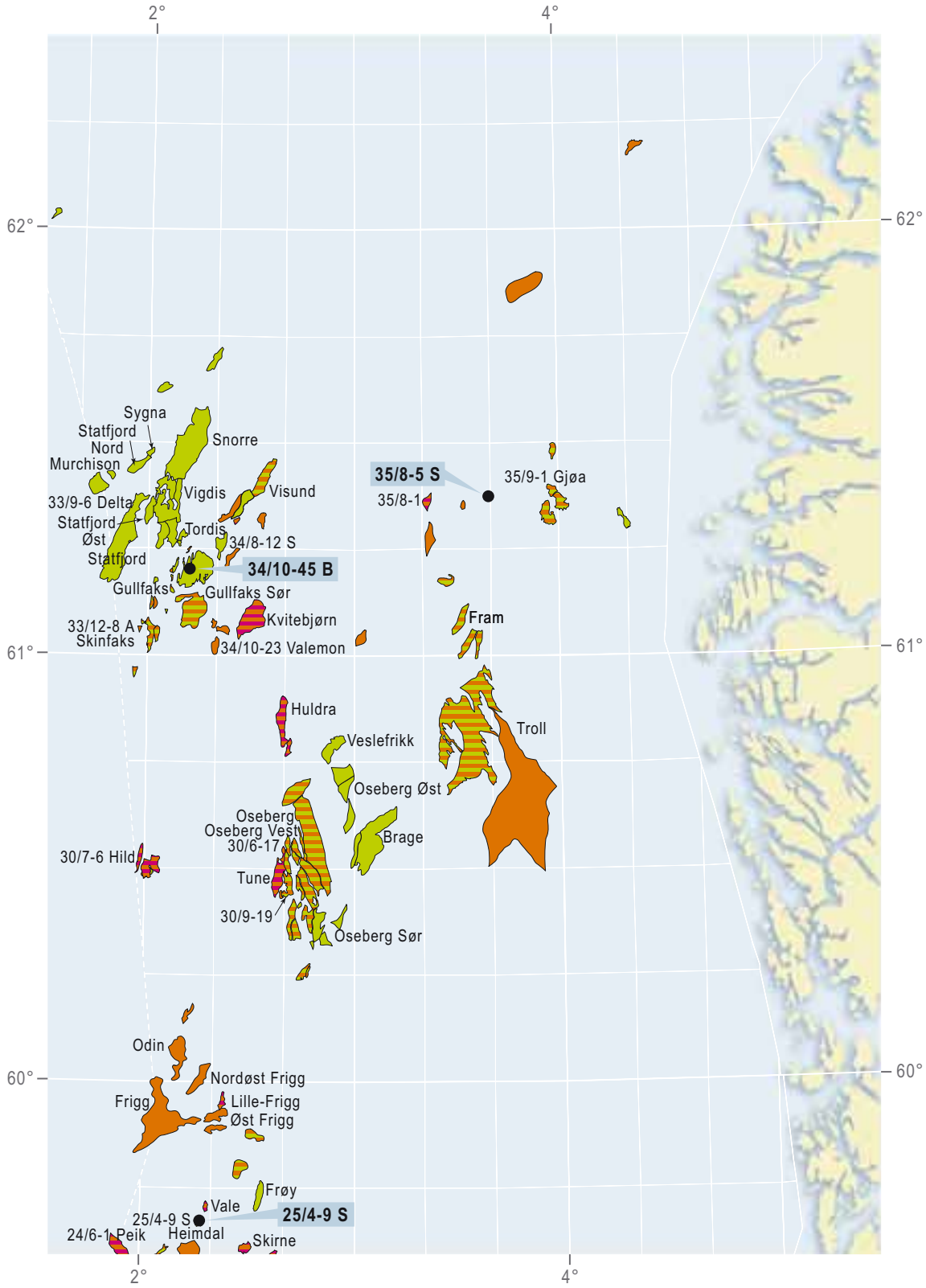
Well	Operator	Hydrocarbon type	Oil/condensate (mill Sm^3)	Gas (bn Sm^3)
16/1-6 S	Statoil	gas		<1
24/6-4	Marathon	oil/gas	2 - 8	1 - 2
25/4-7	Marathon	oil	6 - 17	
25/4-9 S	Hydro	oil	5 - 7	
25/8-14 S	Esso	oil	2 - 10	
25/8-C-20	Esso	oil	5 - 7	
34/10-45 B	Statoil	condensate	1	
6405/7-1	Statoil	oil	1 - 30	
6406/1-2	Agip	gas/condensate	6 - 8	14 - 16
6608/10-9	Statoil	oil	<1	
6706/6-1	Esso	gas		20 - 50

Figure 1.5.2
*Exploration wells in the southern North Sea spudded or completed during the year **



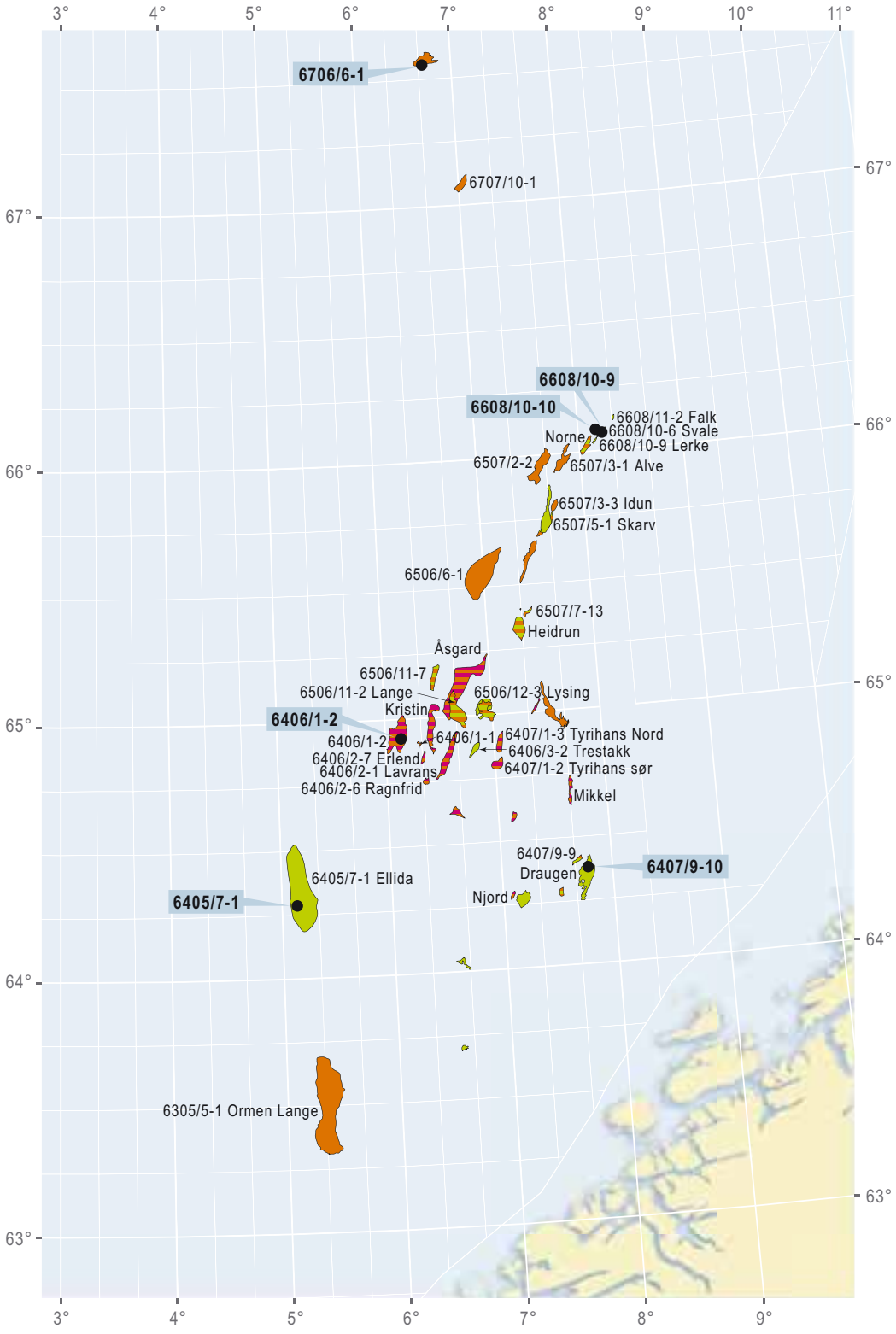
**Resource category 6 - resources where development is not very likely are shown without discovery name/discovery well*

Figure 1.5.3
*Exploration wells in the northern North Sea spudded or completed during the year **



*Resource category 6 - resources where development is not very likely are shown without discovery name/discovery well

Figure 1.5.4
*Exploration wells in the Norwegian Sea spudded or completed during the year **



**Resource category 6 - resources where development is not very likely are shown without discovery name/discovery well*

Appraisal well 15/12-13 was drilled be Pertra AS as opertor of production licence 038. The well was drilled in a structure known as Varg Sør, about eight kilometres south of the Varg field. The well encountered sandstone from the Late Jurassic Age, but at a somewhat greater depth than expected and below the presumed oil/water contact. The well was plugged back to the 13-3/8" cashing shoe and cemented. A decision was made to sidetrack the well.

Appraisal well 15/12-13 A had to be abandoned before reaching the reservoir due to formation problems and sloughing shale. A decision was made to drill a new sidetrack from 13/12-13 A to prove the oil/water contact in sandstone from the Late Jurassic Age.

Appraisal well 15/12-13 B proved a 125 metre thick sequence of reservoir rocks from the Late Jurassic Age. Ninety metres of the reservoir sequence contain hydrocarbons, of which 34 metres consist of oil-bearing rocks.

Appraisal well 15/12-14 was drilled by Pertra AS as operator of production licence 038. The well was drilled as a sidetrack from well 15/12-A-12 and into a segment west of the Varg field. The well was completed in rocks from the Early Jurassic Age. The well proved oil-bearing sandstone alternating with siltstone and clay stone from the Late Jurassic Age. The overall thickness of the oil-bearing sandstones is about 78 metres. The oil/water contact was not proven. The well will be converted into a production well with anticipated production start-up in January 2004.

Wildcat well 16/1-6 S was drilled on the western part of Utsirahøgda in production licence 169, where Statoil is the operator. The well was drilled about 70 km northeast of the Sleipner area. Minor volumes of gas were proven in rocks from the Heimdal formation in the Tertiary Age, as well as smaller volumes of oil in a younger sandstone layer from the Tertiary Age.

Appraisal well 16/1-6 A was completed in the Ekofisk formation. The reservoir in the Heimdal formation in the Tertiary Age came in somewhat deeper than forecast and was of good quality, but water-bearing. A younger sandstone layer from the Tertiary Age, which proved to be oil-bearing in well 16/1-6 S, was also water-bearing in this well.

Wildcat well 16/7-8 S was drilled by Esso as operator of production licence 072 B, east of Sleipner Øst. The well was completed in rocks from the Triassic Age. Sandstone was encountered at the anticipated reservoir level from the Triassic Age, but no hydrocarbons were proven. The well has been plugged and permanently abandoned.

Wildcat well 24/6-4 was drilled by Marathon in production licence 088 BS. The well was drilled to delimit a discovery made by Norsk Hydro in rocks from the Early Tertiary Age in 1998, the 24/6-2 discovery. The drilling activity was carried out about 18 km west of the Heimdal field and about 3.5 km west of the well that proved the 24/6-2 discovery. The well proved a 24-metre gas column and a 28-metre oil column in sand from the Heimdal formation. The well was classified as appraisal well 24/6-3 when it was spudded. The well had to be plugged for technical reasons at a depth of about 230 metres, and re-spudded under a new designation, 24/6-4. Both the gas/oil and oil/water contact in the well were somewhat different than the contacts in the 24/6-2 discovery. Therefore, the resources proven in the well have subsequently been assessed as being a separate discovery and the well has been reclassified to a wildcat well.

Wildcat well 25/4-7 was drilled by Marathon as operator of production licence 203. The well was drilled on a prospect from the Paleocene Age situated about 13 km west/southwest of the Heimdal field, between the 25/4-3 discovery and the 24/6-2 discovery. The well proved an approximate 48-metre oil column in sand from the Heimdal formation.

Appraisal well 25/4-8 was drilled by Marathon as operator of production licence 203. The well was drilled to delimit a discovery made by Elf in rocks from the Early Tertiary Age in 1974, the 25/4-3 discovery. The drilling activity was carried out in the northern part of this discovery, about 12 km southwest of the Heimdal field. The well proved a gas column of about eight metres and an oil column of about seven metres in sand from the Heimdal formation. Core samples and geophysical measurements showed disappointing thickness and poor reservoir quality at the drilling location. The expectations concerning the resource base in the 25/4-3 discovery have thus been significantly reduced.

Wildcat well 25/4-9 S was drilled by Norsk Hydro as operator of production licence 036. The well was drilled on a prospect called Klegg from the Paleocene Age, about 11 km north/northeast of the Heimdal field. The well proved an approximately 65-metre oil column in sand from the Heimdal formation. The location near existing infrastructure, and in an area of several minor new discoveries, gives rise to expectations of future development.

Development well 25/8-C-20 was drilled by Esso Exploration and Production Norway A/S, which is a subsidiary of Exxon Mobil Corporation, and operator of production licences 027 and 027 C in block 25/8. This well proved additional resources in the Ty formation in connection with the 25/8-10 S Ringhorne discovery in the Balder field. The well was drilled form the Ringhorne installation in connection with the ongoing drilling program, and oil was discovered in rocks from the Early Tertiary Age. The discovery has been granted an exemption from the PDO requirement, and has now been incorporated into the Balder field.

Wildcat well 25/8-14 S was drilled on Utsirahøgda by Esso as a combined well for production licences 027 and 169, where Hydro is the operator of the latter production licence. The well was drilled about two km east of the Ringhorne discovery. Oil was proven in the Statfjord formation in rocks from the Jurassic Age. Its proximity to existing infrastructure makes it likely that the resources can be produced as additional resources for the Balder field. This was the second discovery near the Ringhorne discovery in 2003.

Wildcat well 25/9-2 S was drilled on the northeast flank of Utsirahøgda by Esso as operator of production licence 189. The well was drilled about 15 km southeast of the Jotun field. No hydrocarbons were proven in the relevant sandstone layers from the Middle Jurassic Age.

Wildcat well 34/10-45 B was drilled by Statoil as operator of production licence 050. The well was drilled from the Gullfaks B installation to a minor structure about two km southwest of Gullfaks. Gas/condensate was proven in Cretaceous sandstone.

Wildcat well 35/8-5 S was drilled by Norsk Hydro as operator of production licence 195. The area lies to the west of 35/9-1 Gjøa. The well as completed in rocks from the Middle Jurassic Age. Only traces of hydrocarbons were present in the well, which was plugged and abandoned.

Wildcat well 6405-7-1 was drilled by Statoil as operator of production licence 281 in the Møre Basin about 60 km north of 6305/5-1 Ormen Lange. The well was drilled on the Ellida structure at a water depth of 1206 metres, and completed in rocks from the Late Cretaceous Age. Oil was proven in sandstone-bearing layers from the Late Cretaceous Age. It is too early to say whether the resources can be produced profitably. Well evaluations indicate poor production properties. Additional wells must be drilled in order to map oil volumes in place and to investigate whether the oil can be produced.

However, the results of the well are regarded as being encouraging for further exploration in the area. It is particularly interesting that a significant oil column was proven in this area. This shows that considerable volumes of oil have been generated in an area where gas was generally expected.

Wildcat well 6406/1-2 was drilled by Norsk Agip as operator of production licence 256, just to the west of the Kristin field. The well was completed in rocks from the Triassic Age. Gas/condensate was proven in Cretaceous rocks. The well was not tested. Evaluation of the size of the discovery is underway.

Appraisal well 6407/9-10 was drilled on the Draugen field by Norske Shell as operator of production licence 093. The well was completed in Middle Jurassic rocks. The purpose of the well included proving resources in rocks from the Middle Jurassic Age. The well will be reclassified as an observation well.

Wildcat well 6608/10-9 was drilled by Statoil as operator of production licence 128. The well was drilled on a structure called Lerke situated about four km northeast of the Norne field. The well was completed in rocks from the Early Jurassic Age. Oil was proven in Late Jurassic sandstone. The presumed main reservoirs from the Early and Middle Jurassic Ages showed only traces of hydrocarbons.

Wildcat well 6608/10-10 was drilled by Statoil as operator of production licence 128. The well was drilled on the Gråspett structure, about ten km north of the Norne field. The well was completed in Early Jurassic rocks. No hydrocarbons were proven in the well. Both reservoir rocks from the Early and Middle Jurassic Ages and reservoir rocks from the Late Jurassic Age were water-bearing.

Wildcat well 6706-6-1 was drilled by Esso as operator of production licence 264. The well was drilled on a structure called Hvitveis situated on the Naglfar dome about 320 km west of Bodø. The well was completed in rocks from the Cretaceous Age. Gas was proven in sandstone from the Cretaceous Age.

1.5.2 Exploration costs

Figure 1.5.5 shows total exploration costs from and including 1980. The costs include the costs of exploration drilling, general surveys, field evaluation/field development, as well as administration and other costs. A total of NOK 4.05 billion was spent in 2003. This is about the same level as the previous year. Total exploration costs from 1980 through 2003 amounted to 197 billion 2003-NOK. Table 1.5.3 shows the exploration costs for 2003 in total and for the four cost groups. Figure 1.5.6 shows the percentage distribution among the cost groups.

Table 1.5.3 Exploration costs distributed by cost groups

Cost category	Mill 2003 NOK
Exploration drilling	2381
General surveys	598
Field evaluation/field development	413
Administration and other costs	657
Total	4049

In 2003, the share of exploration costs related to exploration drilling was 59 per cent, while the corresponding figure for 2002 was 57 per cent. Figure 1.5.7 shows average drilling costs per exploration well. In 2003, NOK 2.4 billion worth of drilling was carried out and the drilling cost per exploration well is estimated at NOK 108 million. The drilling cost per exploration well in 2002 was 121 million 2003-NOK.

Figure 1.5.8 shows the average drilling cost per day and per metre drilled in the years 1980 through 2003 inclusive.

Figure 1.5.6
Percentage distribution of exploration costs for 2003

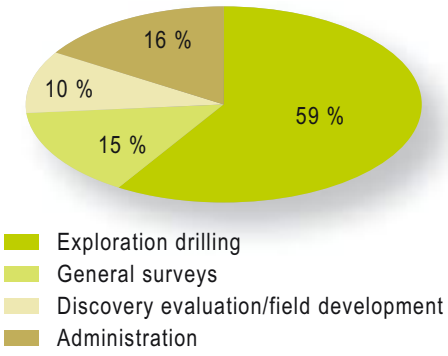


Figure 1.5.5
Annual exploration and planning costs

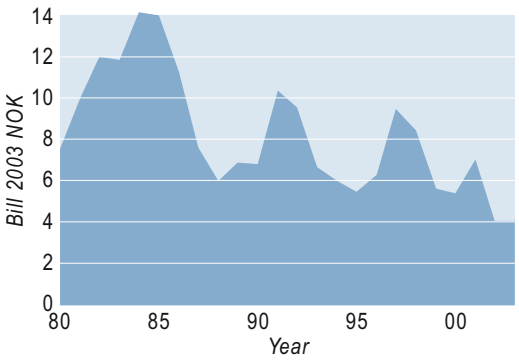


Figure 1.5.7
Average drilling costs per exploration well

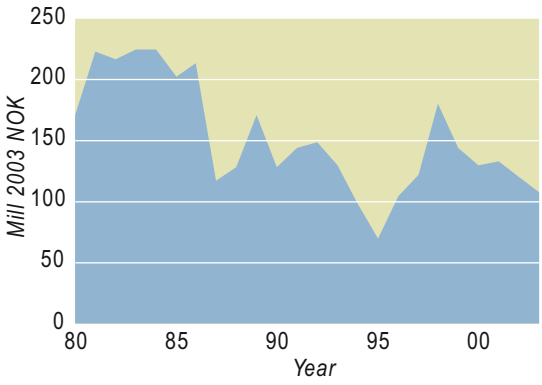
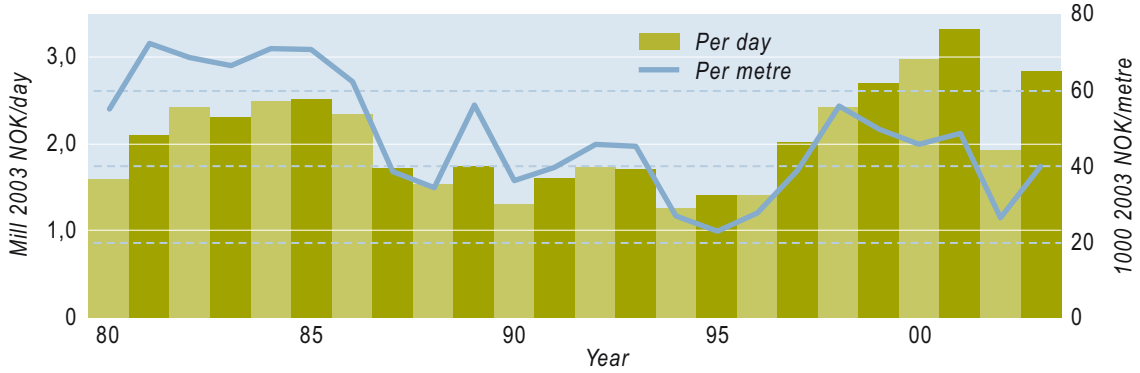


Figure 1.5.8
Average drilling cost per day and per metre drilled in 1980-2003



1.6 DEVELOPMENT AND OPERATIONS

Facts and figures relating to fields and discoveries may be obtained at the Norwegian Petroleum Directorate's web site www.npd.no. Descriptions of fields, etc. can also be found in Facts 2004 www.oed.dep.no, published by the Ministry of Petroleum and Energy.

Figures 1.6.1, 1.6.2, 1.6.3 and 1.6.4 show fields and discoveries in the southern North Sea, the northern North Sea, the Norwegian Sea and the Barents Sea.

Southern North Sea

Valhall
A simple wellhead installation was installed on the northern flank of the Valhall field in 2003. Production start-up is planned for early 2004. The first of the two installations incorporated in the approved PDO in the fall of 2001 had production start-up from the southern flank in the spring of 2003.

The water injection installation approved for construction in 2000 was installed in the summer of 2003. Expected start-up of water injection is early 2004.

Ekofisk and Eldfisk
The PDO for the Ekofisk Growth Project was approved by the King in Council in June 2003. The plan entails that a new installation be installed in a central location on the field, encompassing 30 well slots and first stage separation, connected by a bridge to the 2/4-J process installation. The plan also includes a number of measures to increase the production capacity from Ekofisk and Eldfisk. Installation of the substructure and bridge for the new installation is planned for late summer 2004, followed by a phase of pre-drilling wells. The plan is to install the rest of the installation in 2005, with production start-up in the third quarter.

On 1 September 2003, operatorship of the **Gyda** field was taken over by Talisman. The new operator has upgraded equipment on the field and is aiming for increased production through the drilling of new wells, well interventions and gas lift, as well as potential phase-in of nearby prospects.

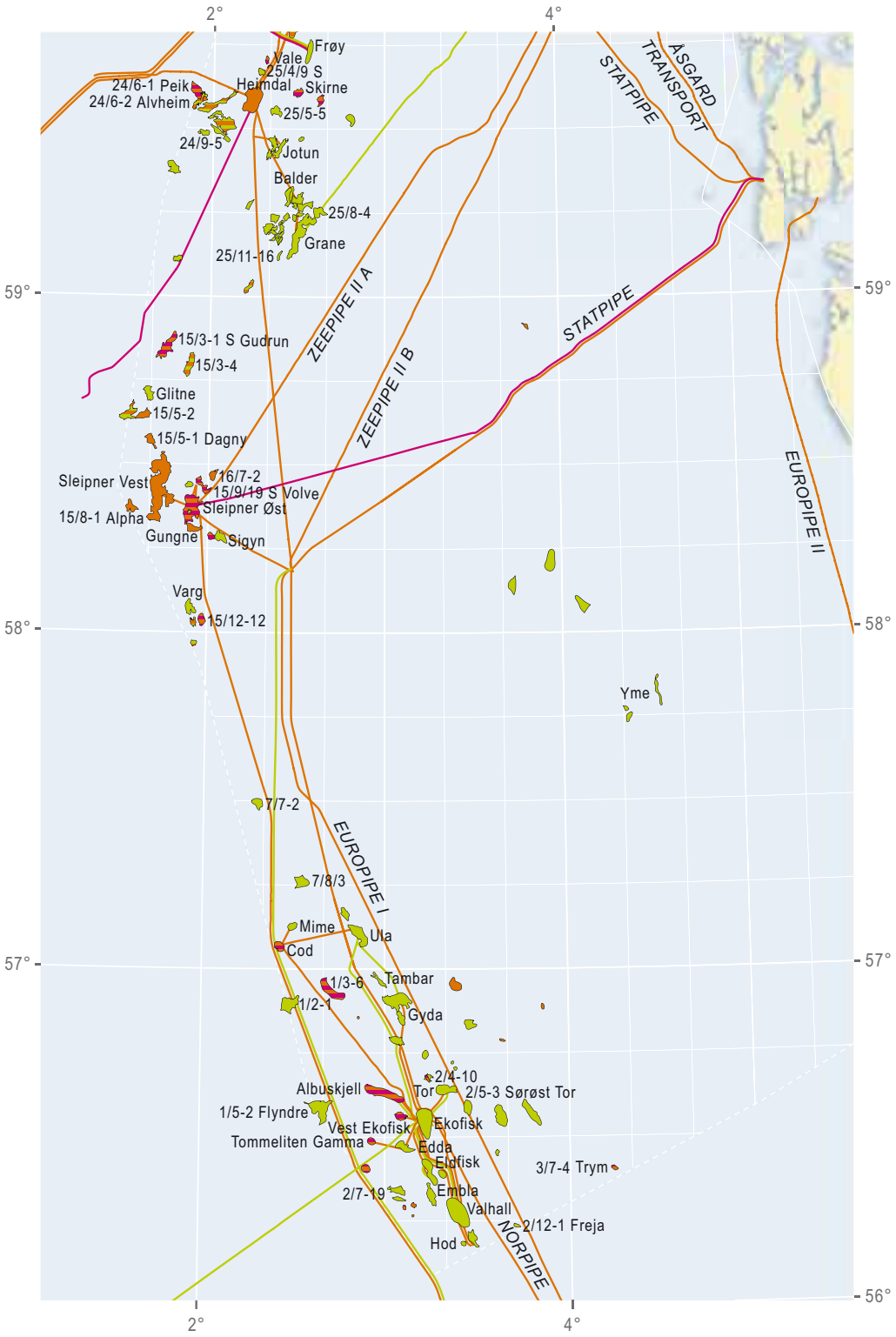
Northern North Sea

Grane started producing in the autumn of 2003. This is an oil field developed with an integrated living quarters, drilling and process installation with a fixed steel jacket. The oil will be transported via pipeline from the field to the Sture terminal and gas for injection will be imported through a pipeline from Heimdal. Production is planned by means of gas injection at the top of the structure, and long horizontal production wells at the bottom of the oil zone. Nine oil producers and two gas injectors were pre-drilled, in addition to a well for injection of cuttings. Further drilling of production wells is underway.

In recent years, **Troll** has been the highest-producing field on the Norwegian continental shelf, as regards both oil and gas. More than 100 horizontal oil production wells have now been drilled in the thin oil zones in Troll Vest, many of these with several branches. Troll has been organized as a unit encompassing both Troll Øst and the Kollsnes Terminal facility with Statoil as operator and Troll Vest with Hydro as operator. A process has been underway in 2003 with the intention of splitting off the Kollsnes Terminal facility so that it becomes part of Gassled, with Gassco as opertor.

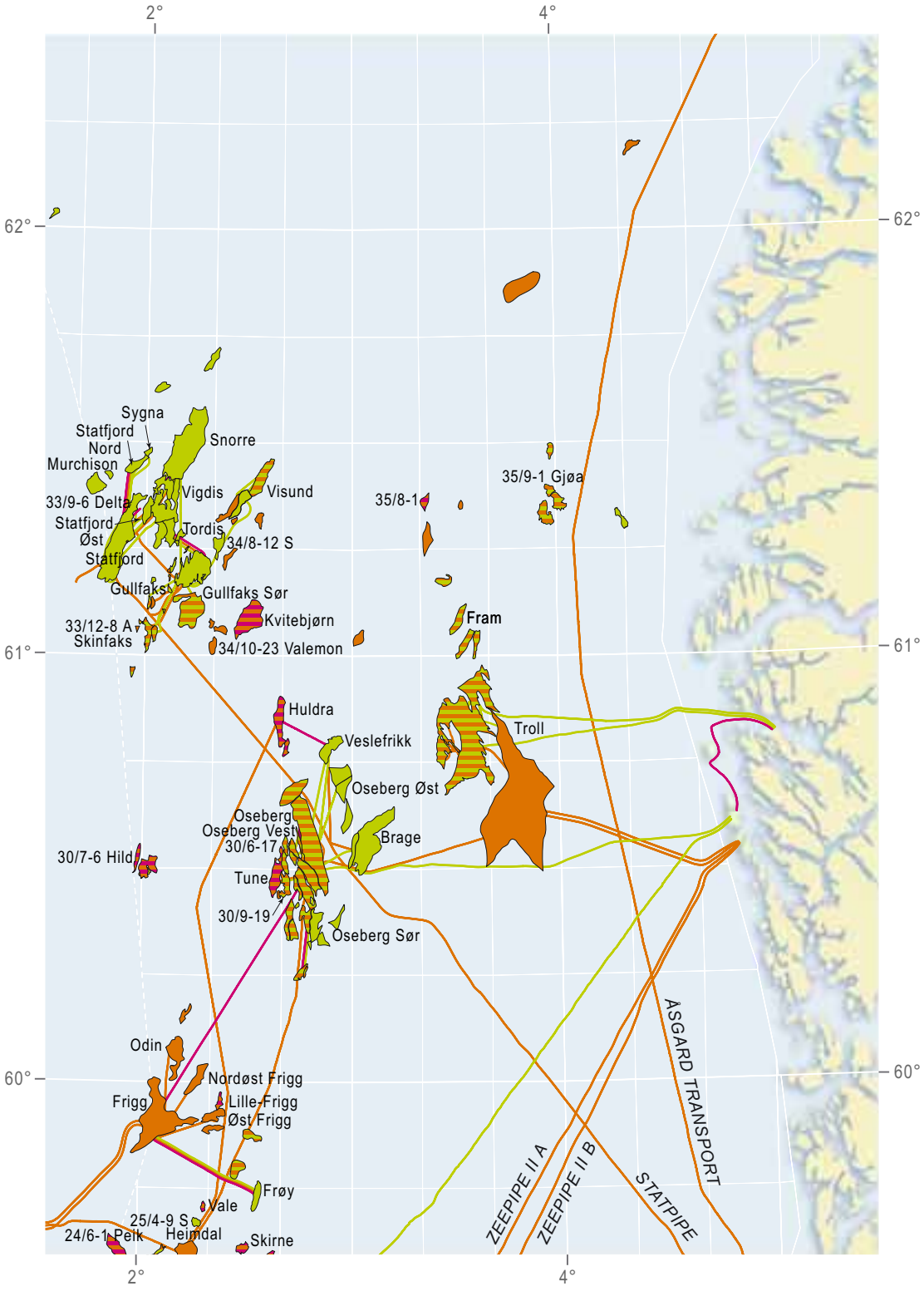
Fram started producing in the autumn of 2003. Fram is an oil field consisting of several structures and so far the development includes two subsea templates on Fram Vest tied in to Troll C. On Troll C, gas is separated from the liquid and reinjected into Fram. The Fram oil is transported via Troll C to Mongstad through Troll Oljerør II. Work is underway on further development of the other structures within Fram.

Figure 1.6.1
*Fields and discoveries in the southern North Sea (Resource category 1-5)**



*Resource category 6 - resources where development is not very likely are shown without discovery name/discovery well

Figure 1.6.2
*Fields and discoveries in the northern North Sea (Resource category 1-5)**



*Resource category 6 - resources where development is not very likely are shown without discovery name/discovery well

Vigdis
Production from the Vigdis Extension started in October 2003. The Vigdis Extension PDO was approved by the authorities in December 2002. Vigdis Extension consists of several minor discoveries incorporated as a part of Vigdis. Vigdis Extension has been developed using subsea templates and satellite wells, and is connected to Snorre via the Vigdis installations.

The Norwegian Sea

6305/5-1 Ormen Lange is situated in the Møre Basin in the southern part of the Norwegian Sea, about 130 km west of Kristiansund. The discovery contains gas and some condensate. The main reservoir is in sandstone rocks from the Early Tertiary Age at a depth of 2700-2900 metres. The discovery is located on the Ormen Lange dome, which is one of a number of post-Jurassic dome structures that have developed in the Norwegian Sea during the Tertiary Age.

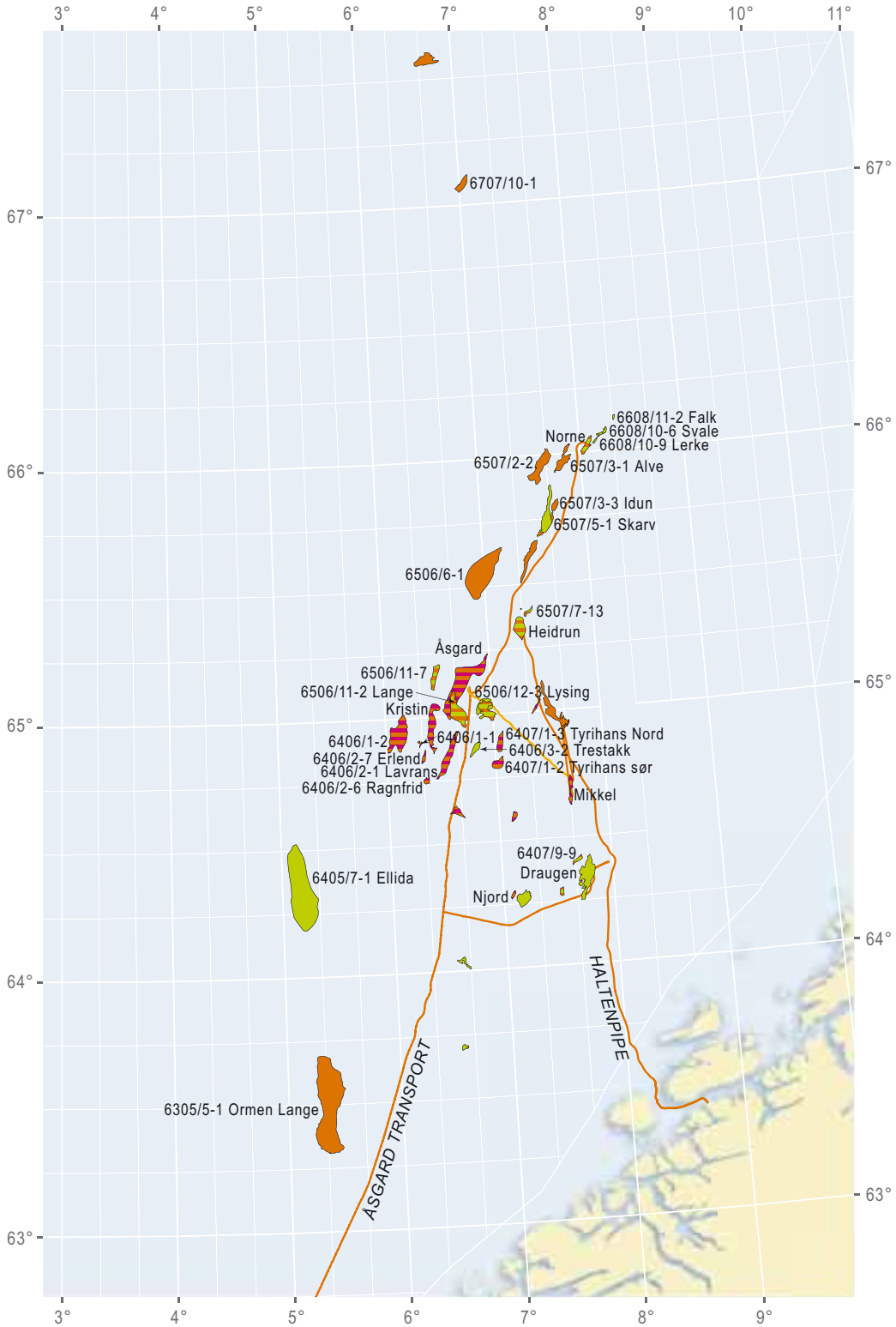
The PDO was submitted to the authorities in December 2003. The sea depth in the area where the installation is to be situated varies from 800-1100 metres. The development area is in the slide depression of the Storeggaskredet which occurred about 8200 years ago. The plan is to develop Ormen Lange by means of 24 wells drilled from four subsea templates. The plan is to install the first two subsea templates at a water depth of about 850 metres.

The production strategy is based on production through depressurization and subsequent compression. The untreated wellstream, which consists of gas and condensate, will be routed through two 30" multi-phase pipelines to a land facility at Nyhamna in the municipality of Aukra in Møre og Romsdal county. A 6" pipeline will also be installed for monoethyleneglycol (MEG) as well as control umbilicals. The addition of MEG will ensure good transfer of the untreated wellstream to land. The gas will be dried and compressed at the land facility in Nyhamna before it is routed via a 42" gas export pipeline, Langeled, southwards to Sleipner and then on to the United Kingdom. Langeled will have a total length of about 1200 km.

The plan is to start gas production from Ormen Lange in October 2007, assuming that the authorities approve the PDO in the first quarter of 2004. A future compression installation will be installed on the field to maintain production in the event of declining reservoir pressure. The current forecast is that this installation will be in operation from 2016. A final decision on the compression concept will be made after a few years of production experience.

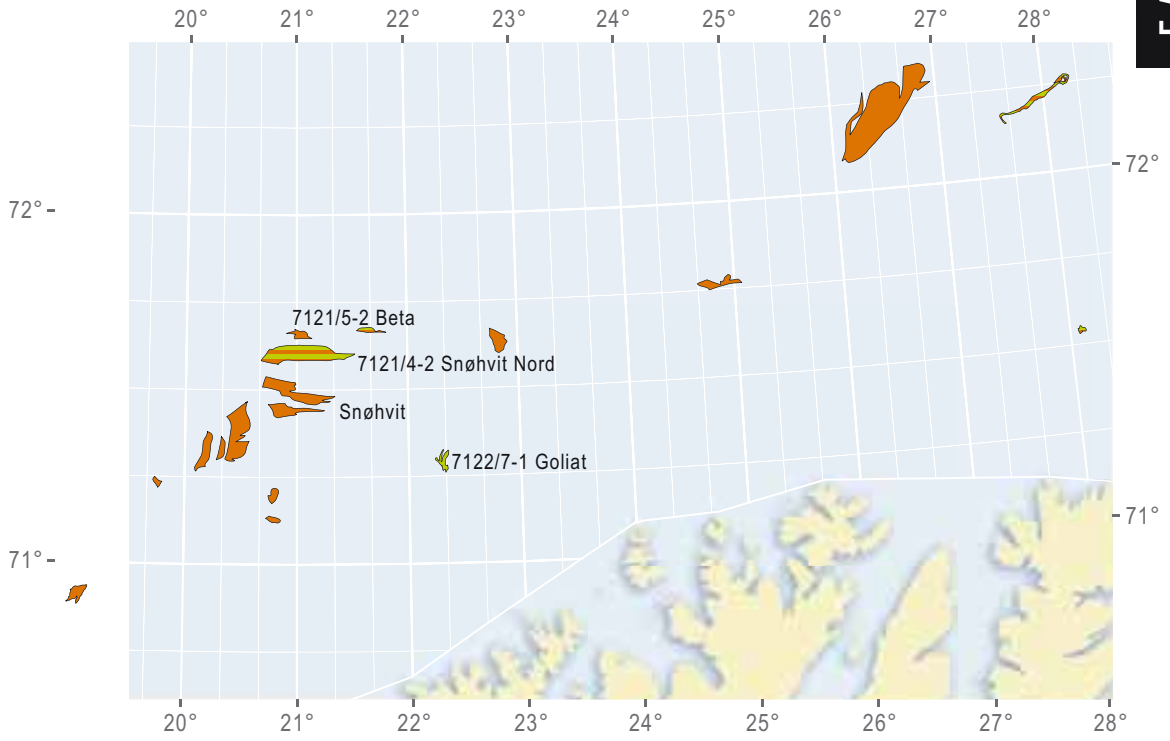
Mikkel commenced production on 1 August 2003, and the official date for start-up of gas deliveries was 1 October 2003. The field is a gas field situated in blocks 6407/5 and 6407/6, about 40 km south of 6507/11-1, the Midgard field. Recoverable gas reserves have been adjusted upwards by 20 per cent compared with the estimate in the PDO. Mikkel has been developed using two subsea templates. The Mikkel wellstream is routed via the Midgard discovery to Åsgard B for processing.

Figure 1.6.3
*Fields and discoveries in the Norwegian Sea (Resource category 1-5)**



*Resource category 6 - resources where development is not very likely are shown without discovery name/discovery well

Figure 1.6.4
*Fields and discoveries in the Barents Sea (Resource category 1-5)**



*Resource category 6 - resources where development is not very likely are shown without discovery name/discovery well

1.6.1 Development drilling

Since 1973, 2 329 development wells have been spudded on the Norwegian continental shelf; 2 114 of these in the North Sea and 215 in the Norwegian Sea, where drilling commenced in 1992. 1 663 are production wells, 408 are injection wells and 258 are observation wells. Twelve development wells were being drilled as of 31 December 2003. Figure 1.6.5 shows development wells spudded per year during the period 1973-2003.

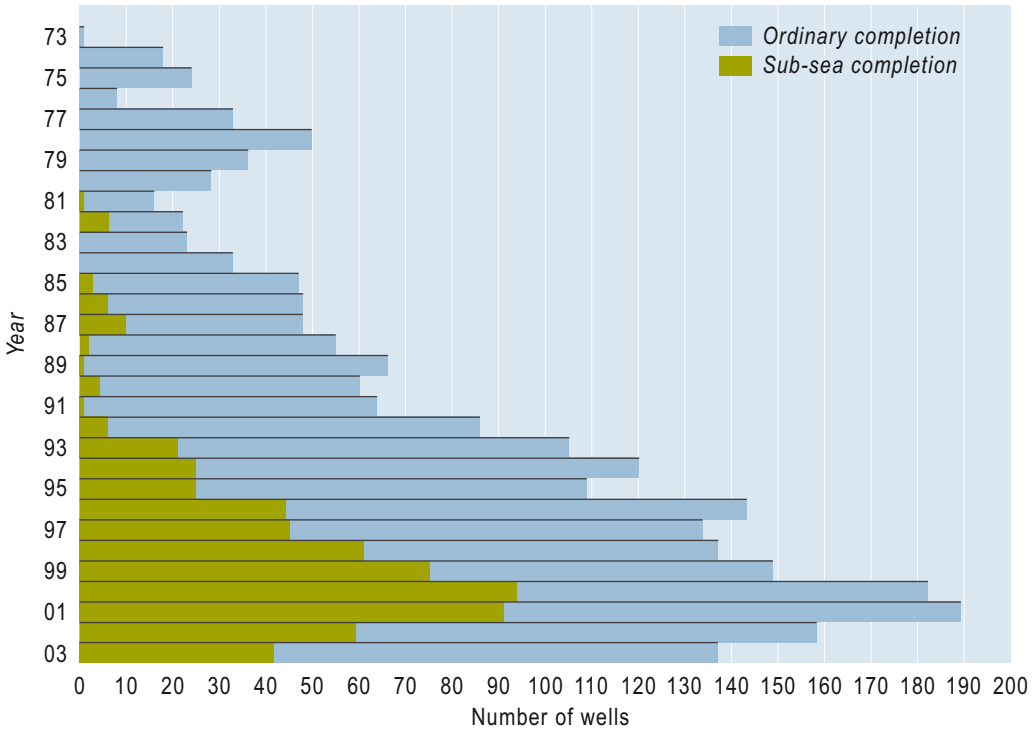
In 2003, 137 development wells were spudded on 26 fields; 122 of these were in the North Sea and 15 in the Norwegian Sea. 48 of the wells, i.e. 35 per cent, were drilled from 16 different mobile units. The number of subsea completed wells increased from 1995 to 2001 when the figure rose from 25 to 84. In 2003, the number of subsea completed wells was just 42.

1.6.2 Cessation plans

According to the Petroleum Act, the licensees shall submit a cessation plan 2-5 years before expiration of a production licence or a licence for installation and operation, or the use of an installation ceases. Cessation plans consist of a disposal section and an impact assessment section. Based on the plan, the authorities make decisions regarding disposal.

The Norwegian Petroleum Directorate assists the Ministry of Petroleum and Energy with assessments related to the cessation plans for the individual fields or facilities.

Figure 1.6.5
Development wells on the Norwegian continental shelf 1973-2003



Cessation plans and disposal activity in 2003

Frigg
On 26 September 2003, the Government decided that the steel installation (DP2), steel jacket (DP1) and the topsides of the concrete installation (TCP2) on the Norwegian side of the Frigg field will be removed and brought to land for disposal. The Frigg field is unitized, developed and produced in a cooperative effort between Norway and the United Kingdom. 60.82 per cent of the resources are located on the Norwegian side of the border.

The plan is to submit a proposition to the Storting in the spring of 2004 for disposal of the TCP2 concrete substructure.

Troll Oseberg Gas Injection (TOGI) Cessation plan
A draft study program for the impact assessment for the TOGI cessation plan has been received from the Ministry of Petroleum and Energy, and has been sent out for a consultation process with a deadline for comments of 1 March 2004.

1.7 TRANSPORTATION SYSTEMS

The various transportation systems are shown in Figure 1.7.1.

The transport capacity in any pipeline depends, among other things, on the composition of petroleum being transported, temperature and pressure. A change in any of these parameters will change the transport capacity. Therefore, the capacities listed below will change if the preconditions are changed.

Planned transportation systems

Langeled
The plan is to build the Langeled gas transportation system in connection with development of the Ormen Lange field,

Figure 1.7.1
Transportation systems for oil and gas from Norwegian fields

with an associated process terminal at Nyhamna. An application for installation and operation was submitted to the authorities in December 2003.

The system will consist of a northern pipeline from Nyhamn to the Sleipner riser platform, subsea valve system in the Sleipner area, riser and modifications to the Sleipner riser installation, and a southern pipeline from the Sleipner riser installation to Easington in the United Kingdom. The northern pipeline will be about 630 km long and have a diameter of 42". Maximum capacity for this part of Langeled will be more than 80 million Sm^3 gas per day. The southern pipeline will have a diameter of 44" and extend the remaining 540 km from Sleipner to Easington. Capacity in this pipeline will be approx. 70 million Sm^3 gas per day. With a total length of just under 1200 km, Langeled will be the world's longest offshore gas pipeline.

The selection of the riser platform on Sleipner as the tie-in point means that the gas can also be transported to the Continent. In addition, the gas can be diluted so that it always meets the quality specifications in the various markets.

It will be possible to operate the southern and northern pipelines independently of each other. Start-up of the southern pipeline is planned for 1 October 2006, while the northern pipeline will have a start-up coinciding with the Ormen Lange field on 1 October 2007.

Norsk Hydro is the operator for the development phase, while Gassco will take over operatorship for the operations phase. Upon start-up, Langeled will also be included in Gassled.

Total costs for Langeled are estimated at approx. NOK 19.5 billion.

1.8 PRODUCTION OF OIL AND GAS

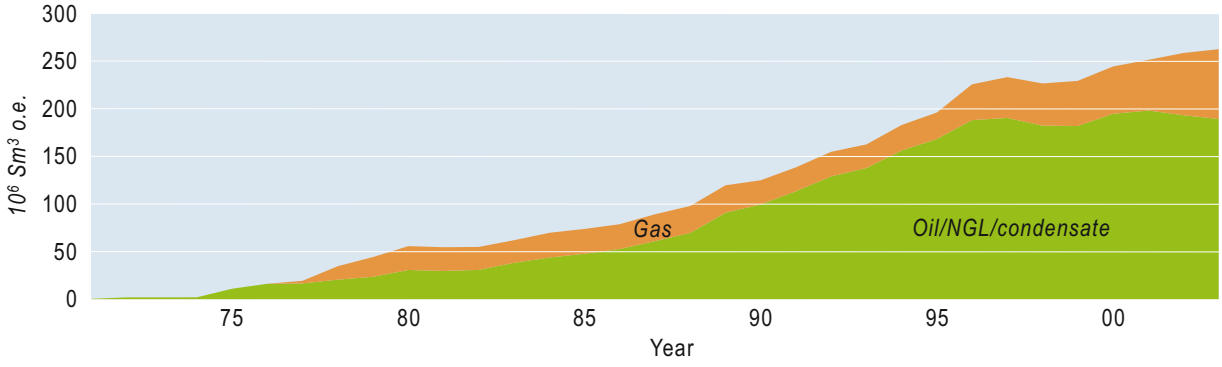
The production of oil and gas on the Norwegian continental shelf amounted to 262.6 x 10^6 Sm^3 o.e. in 2003. Production in 2002 amounted to 258.6 x 10^6 Sm^3 o.e. Production details are presented in Table 1.8, Appendix 2 and in Figure 1.8.1.

1.9 SALE AND TAXES

1.9.1 Sale of petroleum

In 2003, 139 million tonnes of crude oil were sold from the Norwegian continental shelf. This represents a decline of 5.2 per cent compared with 2002. The United Kingdom was the largest recipient with 23.5 per cent of the shipments, Norway received 12.9 per cent, the Netherlands 12.6 per cent, France 11.2 per cent and Germany 9.3 per cent. Norway exported 71 billion Sm^3 gas in 2003. Figure 1.9.1 illustrates crude oil price trends in 2003.

Figure 1.8.1
Oil and gas production on the Norwegian continental shelf 1971-2003



1.9.2 Production royalty

The basis for calculation of the royalty is the value of the produced petroleum at each production area's loading point. As it is not customary to calculate the price of petroleum products at the loading point, the calculation basis applied is in practice the difference between the gross sales value and the costs incurred between the taxation point and the point of sale.

Since on some fields oil and NGL are a single product at the loading point and the NGL is separated at a later stage, royalty will be paid on the NGL for these fields. On the other hand, royalty will not be levied on NGL in those fields where NGL is part of the gas at the loading point.

Total production royalty

In 2003, licensees on the Norwegian shelf paid royalties totaling NOK 765 451 758 to the Norwegian Petroleum Directorate. Table 1.9.1 shows the breakdown for the various petroleum products for 2002 and 2003. Figure 1.9.2 shows paid production royalty for the period 1993-2003.

Production royalty on oil

In 2003, NOK 765 211 989 was paid in royalties for oil from the Statfjord, Oseberg and Gullfaks fields. This is a reduction of 42 per cent compared with the previous year. The Ula and Ekofisk payments are due to coverage of transportation costs for royalty oil received and the State's coverage of removal costs in connection with removal of the pumping installation on the Norpipe oil pipeline. The production royalty for Statfjord and Ula was discontinued as of the end of 2002. The production royalty for oil is normally taken out in oil (royalty oil). Sale of the State's royalty oil is handled by Statoil, which makes monthly payments to the Norwegian Petroleum Directorate.

The received quantity of royalty oil was reduced by 38 per cent in 2003. The reduction in quantity is the result of two specific factors. Firstly, there was a general decline in production in 2003 in those fields which still pay production royalty. Secondly, the reduction is linked to the gradual tax relief that was implemented for all fields from 1 January 2000. This reduction has been partially offset by the State's sale of ownership interests in Gullfaks and Oseberg.

This has meant that the percentage of production on fields subject to production royalty has increased. In 2003, the royalty oil was settled at an average price of appro-

Figure 1.9.1
Crude oil prices in 2003, Brent blend, USD/barrel, source IEA

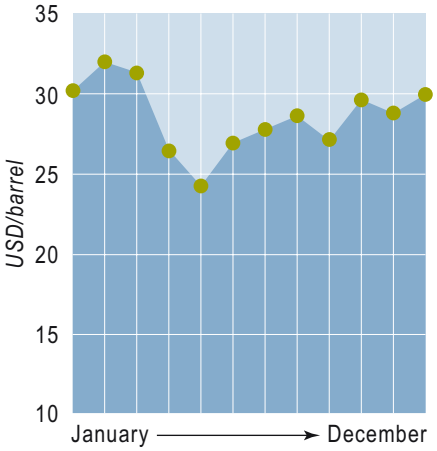


Table 1.9.1 Total paid production royalty in 2002 and 2003 (million NOK)

Product	Field/area	2002	2003
Oil	Ekofisk area, Ula and Valhall	-2.2	-1.5
"	Statfjord	330.9	15.0
"	Oseberg	437.3	289.5
"	Gullfaks	552.5	462.2
"	Heimdal	0.4	0.0
Total oil		1318.9	765.2
NGL	Ula	1.1	0.2
Total NGL		1.1	0.2
Total		**1 320.0**	**765.4**

ximately NOK 207 per barrel, compared with NOK 217 per barrel in 2002.

Production royalty on NGL
In 2003, production royalties totaling NOK 239 769 were paid for NGL from Ula. This payment relates to production royalties accrued for 2002.

After the production royalty was repealed for the Ula field in 2002, no further royalties will be collected on NGL.

Figure 1.9.2
Royalties paid 1994-2003

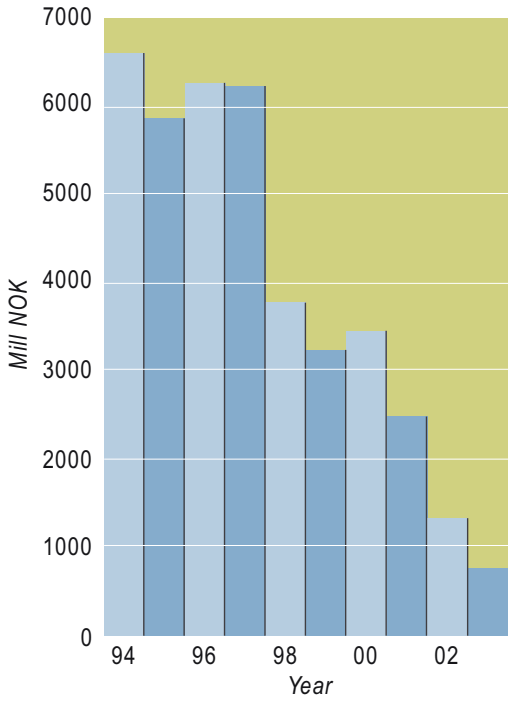


Table 1.9.2 Area fee divided among award years

Area fee			
Award year	**NOK**	**Award year**	**NOK**
1965	34 228 251	1987	5 292 000
1969	18 271 992	1988	24 909 936
1971	3 900 600	1989	8 752 754
1973	11 466 000	1991	11 195 244
1975	1 722 000	1992	1 134 000
1976	25 536 000	1993	23 993 277
1977	4 595 400	1995	3 704 929
1978	14 658 000	1996	16 717 655
1979	46 914 000	1998	2 751 189
1981	7 488 600	1999	5 544 000
1982	16 073 400	2000	14 890 613
1983	33 390 000	2001	8 505 000
1984	64 054 200	2002	1 317 556
1985	40 068 000	2003	2 247 000
1986	37 511 847	**Total**	**490 833 443**

1.9.3 Area fees

In 2003, the Norwegian Petroleum Directorate collected NOK 490 833 443 in gross area fees, prior to rebates. The amount is broken down for the various award years as shown in Table 1.9.2. The area fee divided among the award years 1998 through 2003 applies mainly to production licences that are partitioned off from existing production licences and awarded as new production licences pursuant to Section 3-10 of the Petroleum Act in these years. The rate of the area fee follows the original production licence.

The Norwegian Petroleum Directorate has refunded NOK 30 911 851 in area fees in 2003. This represents the deductible portion of the area fee in the royalty settlement for production licences 019A, 019B, 037, 050, 053 and 079.

Figure 1.9.3 shows the net area fee receipts for 1994 - 2003. There is an increase of NOK 13 million from 2003 as compared with 2002. The reason for this increase is higher rates, as well as lower rebates because fewer fields now pay production royalty.

Production royalties and area fees in 2003 accounted for four per cent of the total taxes and fees paid from the petroleum activities. Figure 1.9.4 shows total taxes and royalties paid for 1994-2003.

Figure 1.9.3
Net area fee paid 1994-2003

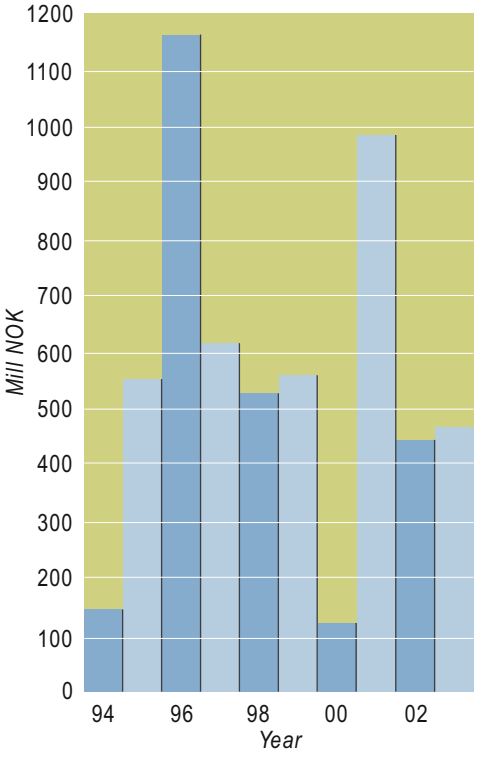
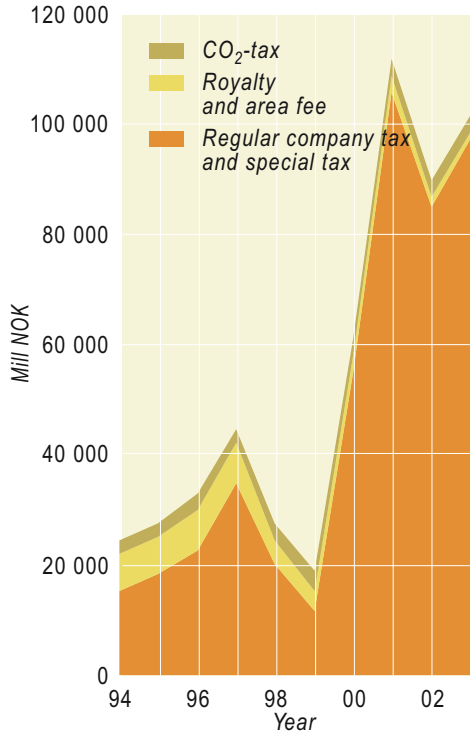


Figure 1.9.4
Total taxes and royalties paid 1994-2003



1.9.4 CO_2 tax

The Act of 21 December 1990 No. 72 relating to tax on emissions of CO_2 in the petroleum activities on the continental shelf entered into force on 1 January 1991. The Norwegian Petroleum Directorate has the authority to collect the CO_2 tax and to make the necessary decisions to implement the statute. The tax is calculated on petroleum that is burned and natural gas or pure CO_2 released to air from installations utilized in connection with production or transportation of petroleum The CO_2 Tax Act also obliges the companies to calculate the tax for activity on Norwegian installations for transport of petroleum that extend beyond the continental shelf. For fields that extend beyond the median line to another state, the CO_2 is calculated only on the Norwegian assets.

The CO_2 tax rates in the second half of 2002 and the first half of 2003 were fixed at NOK 0.73 per Sm^3 gas/0.45 per liter diesel and NOK 0.72 per Sm^3 gas/0.46 per liter diesel. Starting from 1 January 2002, the authorities have reduced the CO_2 tax rate for diesel used on the offshore installations to the same rate charged for normal purchase of diesel. The tax is paid on a six-month basis with a three-month term of payment (as of 1 October and 1 April in the following year) by the operator of the individual fields and installations.

Table 1.9.3 shows the total tax paid in 2003. The tax is distributed among the various fields and transportation systems. New fields/installations subject to the tax are Sigyn and Valhall Flanke Sør. Corrections relating to previous six-month periods are included. CO_2 taxes totaling NOK 3 056 147 300 were paid in 2003. Figure 1.9.5 shows the annual receipts of CO_2 tax for 1994-2003, and Figure 1.9.6 shows changes in the tax rate.

Figure 1.9.5
CO_2 tax paid 1994-2003

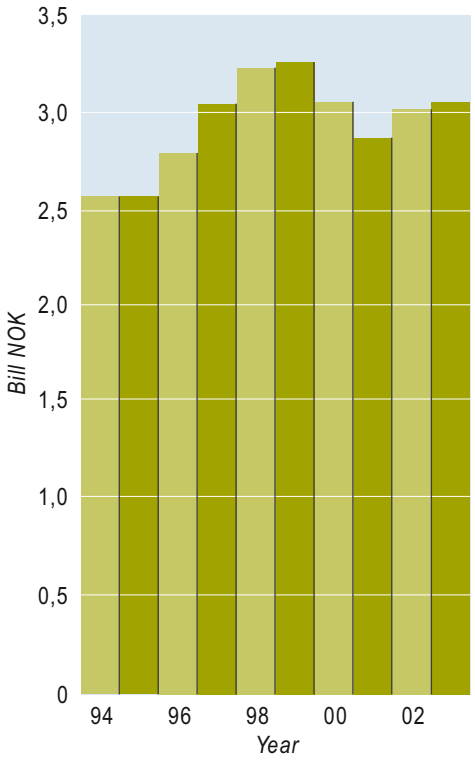


Figure 1.9.6
Tax rate for CO_2 tax 1994-2003

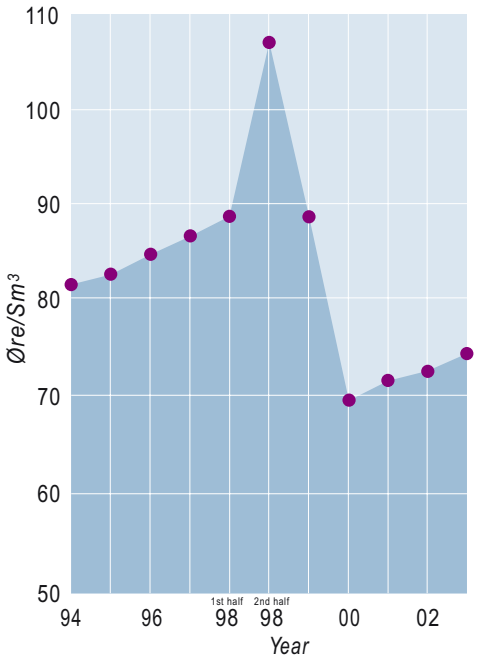


Table 1.9.3 CO_2 tax paid in 2003

Field	First half-year	Second half-year	Total 2003
Balder	12 809 113	19 136 278	31 945 391
Brage	27 261 632	28 185 230	55 446 862
Draugen	21 816 085	22 666 299	44 482 384
Ekofisk area	172 745 644	170 654 297	343 399 941
Frigg	4 155 844	3 799 829	7 955 673
Glitne	10 909 646	10 588 863	21 498 509
Gullfaks A/B/C	159 331 158	164 261 458	323 592 616
Gyda	12 152 870	10 734 877	22 887 747
Heidrun	56 436 693	55 745 045	112 181 738
Heimdal	25 377 408	29 079 200	54 456 608
Hod	32 310	31 464	63 774
Huldra	4 538 304	-1 847 349	2 690 955
Jotun	19 049 836	20 150 833	39 200 669
Murchison	5 730 125	5 748 956	11 479 081
Njord A/B	29 584 970	29 928 240	59 513 210
Norne	59 367 915	56 765 579	116 133 494
Oseberg A/B/C/D	143 282 840	146 587 400	289 870 240
Oseberg Sør	29 371 750	31 395 300	60 767 050
Oseberg Øst	23 911 341	15 115 210	39 026 551
Sigyn	347 035	8 985 674	9 332 709
Sleipner	108 483 429	113 192 394	221 675 823
Snorre A/B	62 695 762	69 990 089	132 685 851
Statfjord A/B/C	166 029 303	175 065 936	341 095 239
Troll A	427 598	848 796	1 276 394
Troll B	48 117 730	48 099 030	96 216 760
Troll C	41 769 310	43 057 780	84 827 090
Ula	20 755 067	21 988 743	42 743 810
Valhall	36 604 394	37 279 849	73 884 243
Varg	8 651 984	7 081 569	15 733 553
Veslefrikk	24 403 857	25 439 130	49 842 987
Visund	28 790 316	28 523 046	57 313 362
Åsgard A/B/C	134 339 714	146 269 703	280 609 417
Transportation systems			
Norpipe	3 741 709	4 162 554	7 904 263
Statpipe	2 191 252	2 222 054	4 413 306
Total	**1 505 213 944**	**1 550 933 356**	**3 056 147 300**

1.10 NATURAL GAS MARKET

In 2003, Norway exported gas to the United Kingdom, Germany, the Netherlands, Belgium, France, Italy, Spain, Austria, Czechia and Poland. Exports from Norway amounted to 71 billion Sm³. This is an increase of approx. 6.8 billion Sm³ (about 11 per cent) gas compared with the previous year. The average energy content in the exported gas was approx. 40 mega joules per cubic metre.

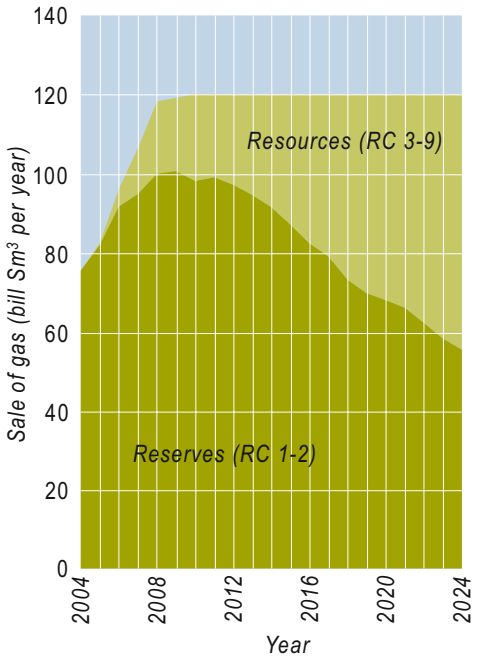
Future gas exports from the Norwegian continental shelf
It is expected that Norway's total gas sales for export may reach 120 billion Sm³ per year in the course of the next 7-12 years.

Figure 1.10.1 shows anticipated future gas sales used as a basis for the revised national budget for 2004. In addition to sales from the Norwegian shelf come the gas volumes used for injection in Norwegian fields, as well as production of power for operating field installations and transportation systems.

Use of gas in Norway
The most important Norwegian gas market is the market for injection gas on the continental shelf. The gas is injected in order to achieve increased oil recovery. The largest consumers are Oseberg, Åsgard, Statfjord, Gullfaks, Njord, Snorre, Visund and Grane. Primarily gas produced from the field itself is used for these purposes. The most important exceptions are Oseberg and, in the future, Grane, which import significant volumes of injection gas from other Norwegian fields. Gas is also the most important source of energy for operation of fields and transportation systems. In 2003, a total of 37.7 billion Sm³ gas was used for injection and 3.7 billion Sm³ gas was used for fuel on the continental shelf.

Gas has been landed in Norway since Statpipe began operations in 1985. The

Figur 1.10.1
Anticipated sale of gas



gas is landed at Kårstø in northern Rogaland, at Kollsnes in Hordaland and at Tjeldbergodden in Møre og Romsdal. Production of methanol got underway at Tjeldbergodden in 1997. Total gas consumption is 0.7 billion Sm³ per year.

In 2002, the Ormen Lange licensees decided that the gas from the field will be landed and processed at Nyhamna on Aukra in Møre og Romsdal.

In northern Rogaland, an agreement has been signed regarding smaller deliveries to the distribution company Gasnor. The company Naturgass Vest has started developing a distribution network for natural gas from Kollsnes in Øygarden.

In 1994, Statkraft, Statoil and Norsk Hydro set up a joint company, Naturkraft. Naturkraft plans to build gas power plants at Kårstø and Kollsnes. Total consumption of gas in the planned gas power plants will be 0.9 billion Sm³ gas per year.

PART 2

2 Health, Environment and Safety

2.1 PERSONAL INJURIES

The number of personal injuries exhibited a significant decline from 2002 to 2003.

Figures 2.1.1 and 2.1.2 show the frequency of personal injuries for the various main types of activities on permanent and mobile installations.

It emerges from the figure that the decline in the injury rate for employees on permanent installations continues. The decline is evenly distributed among all functions.

For mobile installations, injuries in "Marine operations" have been moved from the "Administration" category to "Operations and Maintenance" starting from 1999 when this function was introduced.

The statistics for mobile installations show a more varied picture than for permanently situated installations. There is an increase

Figure 2.1.1
Personal injury frequency on permanently placed installations

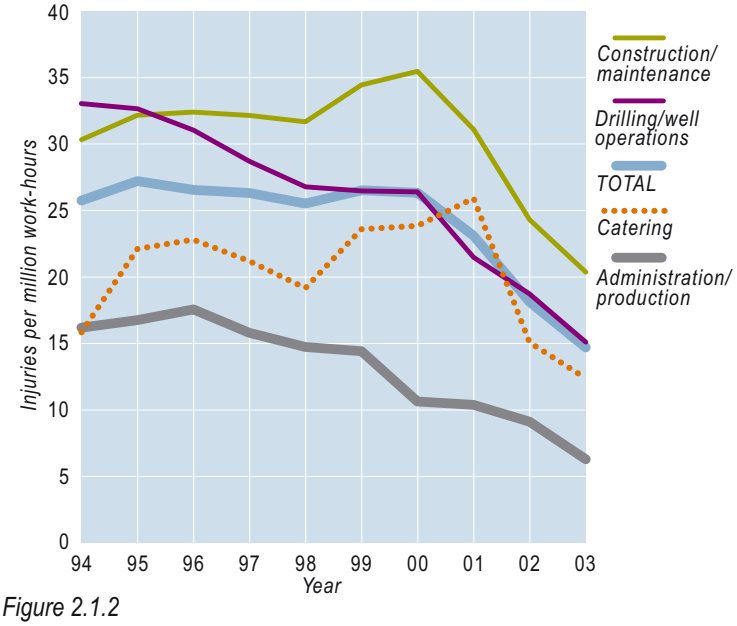
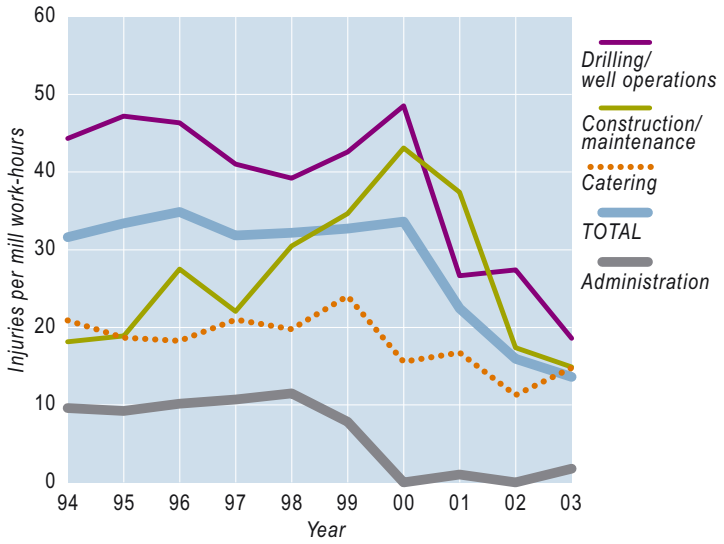


Figure 2.1.2
Personal injury frequency on mobile installations

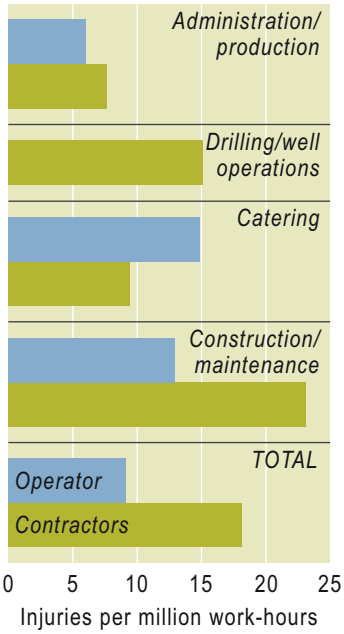


within "Catering", while there is a substantial decrease in "Drilling and well operations". There is also a decline in "Operations and maintenance". The overall injury rate for mobile installations is sinking, but not as much as for the permanently situated installations.

Figure 2.1.3 shows a lower injury rate for employees of operating companies as compared with contractor companies, with the exception of the "Catering" category. There is an increase in the injury rate within "Administration and production" for contractor employees from 2002 to 2003. There is a slight rise within "Catering" for operator employees and a significant decline for contractor employees. Compared with last year, both groups have a significant decline for the other functions.

The decline shown in the statistics may be the result of long-term work on reducing personal injuries.

Figure 2.1.3
Personal injury rate by operators and contractors on permanently placed installations 2003



2.2 WORK-RELATED DISEASES

Work-related diseases inflict substantial costs on the community and the companies, in addition to suffering for the individual. The incidence of work-related disease can be an indicator of the quality of the working environment, and the Petroleum Safety Authority Norway is working to ensure that the companies utilize information on the incidence and causes of such diseases in the preventive work on safety and working environment.

The Directorate received reports of 570 cases of work-related diseases in 2003. This is a reduction of more than ten per cent compared with the previous year, and thus brings the number down to approximately the same level as in 2001. However, fluctuations from year to year must be evaluated cautiously, as there is reason to believe that there is still some degree of variation in reporting from the companies. Therefore, the 2002 figures are somewhat higher than those cited in the previous annual report.

Figure 2.2.1 shows that noise-induced hearing loss still accounts for a significant portion of the reported cases, and constitutes the largest diagnosis group in 2003. It must be expected that this group of ailments will fluctuate somewhat, without this necessarily reflecting changes in the working environment as regards noise loads. Muscular and skeletal disorders accounted for the second-largest diagnosis group in 2003. Thus, the offshore petroleum activities do not vary much from other industrial and commercial activity in Norway.

Skin ailments constitute another large diagnosis group. A large percentage of these cases relate to eczema on the hands after contact with oil-based drilling mud.

The group "undiagnosed conditions" includes ailments such as sleep disturbances. Many people experience sleep disturbances after having worked a so-called swing shift. The percentage of cases attributed to this has declined in recent years. This reduction may be due to the fact that more and more companies have discontinued the swing shift system. However, significant use of sleeping medications on the installations could indicate a certain under-reporting of sleep problems.

Figure 2.2.2 shows how muscular and skeletal disorders are distributed among various groups of causes. The two most important groups of causes are heavy loads or lifts, and repetitive, monotonous work. These groups account for nearly two-thirds of all cases. It may seem difficult to explain that heavy lifting accounts for such a large percentage in light of increasing mechanization. However, this just highlights the importance of good work organization.

Figure 2.2.3 shows how the reported cases are distributed in terms of position categories. Maintenance personnel still account for the largest percentage of work-related diseases. As regards the drilling and well operations group, the percentage has declined substantially after significant increases in the past two years. Drilling and well personnel emerge as being a vulnerable group as regards noise loads. Changes in the distribution among position categories can therefore be viewed in context with the developments in the hearing-loss diagnosis group.

2.3 DAMAGE TO LOAD-BEARING STRUCTURES AND PIPELINES

The Norwegian Petroleum Directorate receives reports of damage to and incidents in connection with load-bearing structures and pipeline system. The information is compiled in the CODAM database, which now contains data on nearly 6000 incidents. In 2003, there were reports of 29 incidents related to pipeline systems and nine incidents related to load-bearing structures.

Damage and incidents are classified in the categories "insignificant", "minor" and "major". The two first are incidents that

Figure 2.2.1
Distribution of work-related diseases on diagnosis groups 2001-2003

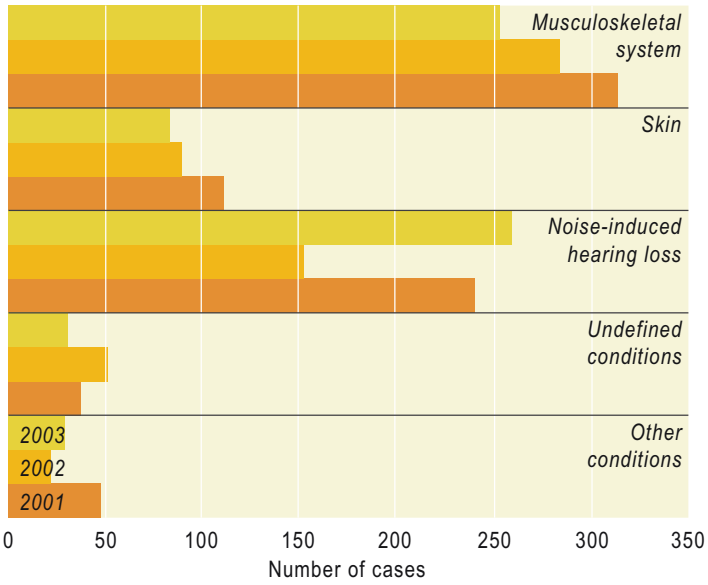


Figure 2.2.2
Exposure - musculoskeletal conditions

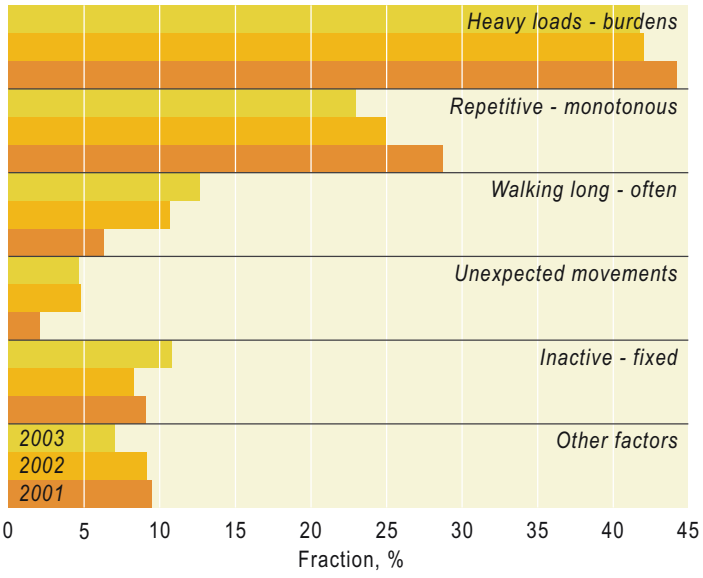
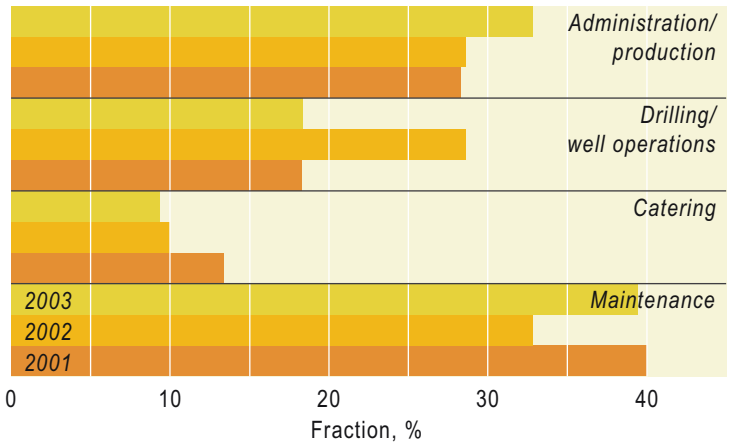


Figure 2.2.3
Distribution of work related diseases on work categories



do not require much repair or follow-up. Incidents in the "major" category include, leaks in pipelines and risers, incidents involving buckling of pipelines, as well as external and internal corrosion, depending on the scope of the damage and criticality.

As regards pipeline systems, two of the reported damage incidents related to breaks in the anchor lines for gas injection risers. These two incidents are classified in the "major" category. The minor incidents included six cases of leaks from pipelines and subsea facilities and three cases of corrosion on production and gas lift risers.

As regards load-bearing structures in 2003, there were two incidents and damage classified in the "major" category. Both incidents occurred when a vessel collided with two installations during an unloading operation.

Two collisions between vessels and installations were reported in 2003. This relates to the same incident described above.

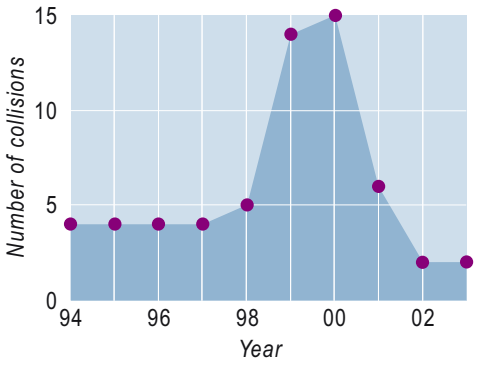
Figure 2.3.1 shows that the frequency of these types of incidents has leveled off in 2003 compared with previous years.

One of the causes of the reduction in collisions in recent years appears to be the increased attention on the part of the Norwegian Petroleum Directorate and the industry concerning such incidents, as well as measures instituted to reduce this type of risk.

2.4 HYDROCARBON LEAKS AND FIRES

The number of hydrocarbon leaks greater than 0.1 kg/s has shown relatively large variations over the last three years. The number of fires in 2003 was reduced to about the level exhibited in the years 1999

Figure 2.3.1
Collisions between vessels and installations 1994-2003



and 2001. However, the variation lies within a statistical range of uncertainty, so that no certain conclusions can be made on this basis.

Leaks greater than 0.1 kg/s are classified as major. Even the smallest of these leaks - from 0.1 to 1 kg/s - could have serious consequences if they are ignited, particularly in closed rooms. To illustrate the scope of the leaks, a leak rate of 1 kg/s will fill a room the size of a medium-sized classroom with an explosive gas mixture in less than one minute. In open areas, it will take longer, or the leak would have to be larger in order for ignition to have the same serious consequences as in a closed room.

The causal relationship to leaks from equipment, valves, couplings or breaches are often found in less than optimal design, inappropriate purchases, as well as deficient or faulty maintenance.

The causal relationship to operational errors, which accounts for the largest group of causes, will often be a combination of human, organizational and technical factors. Such factors can be uncovered through investigation of incidents. The purpose of investigating such incidents is primarily to help arrive at effective measures to prevent recurrence.

Only fires that are evaluated as being critical according to specific criteria are to be reported to the Norwegian Petroleum Directorate (the Petroleum Safety Authority Norway from 2004), while it is assumed that other fires and near-fires will be handled by the companies' own follow-up procedures. Figure 2.4.3 shows that the number of critical fires has been relatively constant over a number of years. None of the fires in 2003 entailed personal injuries, and all were rapidly extinguished. All of the fires started in rotating equipment. Three occurred in the process area and one in a fire pump.

Figure 2.4.1
Hydrocarbon leaks distributed according to size category 1996-2003

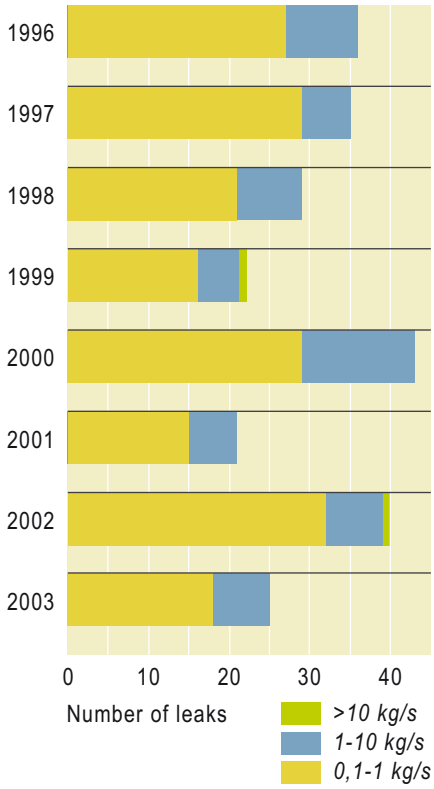


Figure 2.4.2
Main group of faults resulting in gas leaks 2003

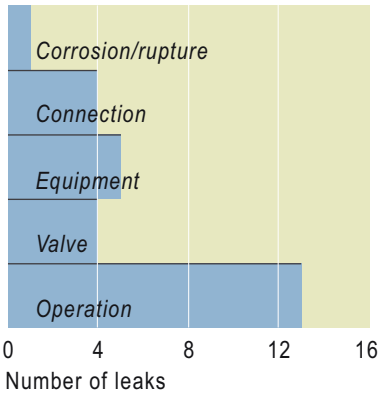
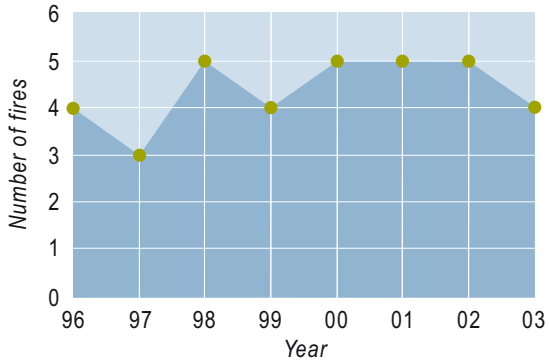


Figure 2.4.3
Critical fires 1996-2003

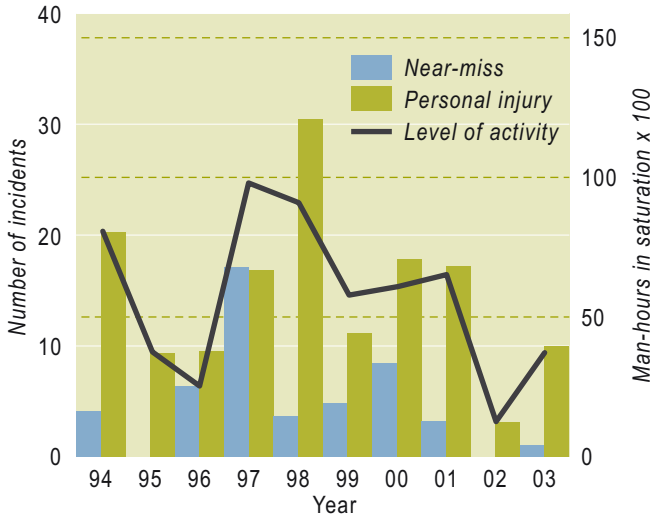


2.5 DIVING ACTIVITY

In 2003, saturation diving was carried out amounting to approximately 38 229 man-hours in saturation on the Norwegian continental shelf and on Norwegian pipelines on the continental shelves of other countries. This is more than three times as much as the previous year, when diving activity was at a historical low.

Figure 2.5 shows the number of undesirable incidents in connection with diving activity reported to the Norwegian Petroleum Directorate over the last ten years. It emerges that the number of personal injuries in 2003 increased compared with the previous year, which corresponds to a high level of activity. No serious personal injuries were reported in 2003. Most injuries took the form of ear infections. One near-miss was reported.

Figure 2.5.1
Incidents in saturation diving



3 The Petroleum Activities and the Environment

Consideration for the environment
Consideration for the external environment has attained a central position in the formulation of petroleum and energy policy. The external environment is safeguarded as an integral part of the work aimed at proper management of the Norwegian petroleum resources.

The main activities in this work are stipulation of regulations and other frameworks for the activities, preparation of reports and professional advice to the responsible ministries, and supervision of the activities on the shelf. Other activities are related to participation in national and international forums that work on external environmental issues. A large portion of the work that is done out of consideration for the safety of personnel and financial assets also has a positive effect on the external environment.

Authorities and framework
The Norwegian Petroleum Directorate and the Norwegian Pollution Control Authority have the authority to supervise the petroleum activities under the Petroleum Act and the Pollution Act. The Norwegian Petroleum Directorate also enforces the Act concerning CO_2 tax on the shelf.

The Petroleum Act requires that all activities be carried out in a responsible manner which safeguards the safety of personnel, the environment and financial values. The Pollution Act has the objective of ensuring proper environmental quality so that pollution and waste do not lead to health hazards, do not affect general well-being or harm nature's capabilities of production and self-renewal.

As part of the Ministry of Petroleum and Energy's responsibility for the sector as regards environmental aspects, the Norwegian Petroleum Directorate is responsible for energy efficiency and safety on installations and in connection with facilities. This applies also to limiting potential accidental discharges and emissions that are harmful to the environment.

Supervision of the activities
Security against pollution is also covered under the safety concept as it is applied in the petroleum activities. Supervision of environmental measures and environmental activities is an integral part of the Norwegian Petroleum Directorate's supervision activities. The Norwegian Petroleum Directorate also carries out supervision of internal control systems for operators and contractors in order to ensure that the activities are planned and implemented in accordance with the authorities' requirements and the companies' acceptance criteria goals.

In its supervision of exploration drilling in environmentally sensitive areas, the Norwegian Petroleum Directorate has placed particular emphasis on preventive measures which the operators implement. In addition, the Directorate has followed up the operators' work on stipulating acceptance criteria for environmental risk, in other words, the risk the operator itself can accept for its activity. The Norwegian Petroleum Directorate also carries out supervision of the use of equipment which measures fuel consumption and the quantity of gas used for flaring and cold venting. Collection of the CO_2 tax on the shelf is the responsibility of the Norwegian Petroleum Directorate, and the Directorate makes an annual evaluation of the companies in order to assess the impact of the tax on CO_2 emissions.

Evaluation of environmental aspects
When the Norwegian Petroleum Directorate evaluates applications for award of production licences, regional impact assessments, PDOs, PIOs and applications for consent, the environmental aspects are a natural and fully integrated part of the Directorate's evaluation. The Directorate shall be a driving force to get the industry to develop and put to use technology that reduces emissions to air and discharges to sea, and thus maximize the value creation from the activities in a life-cycle perspective.

Together with the Ministry of Petroleum and Energy, the Norwegian Petroleum Directorate has again in 2003 prepared a publication that provides an overview of environmental aspects on the Norwegian continental shelf: "Environment 2003. The Petroleum Sector in Norway".

The oil industry's Environmental Forum is a continuation of the Miljøsok work concluded in 2000. The Environmental Forum has 45 members, and the Director General of the NPD participates in the Forum's Executive Committee. The Directorate has also taken part in the Environmental Forum's working group on "Oil/Fisheries". This group has considered potential measures that can contribute to ensuring that various players have access to adequate data on how the various users of the sea areas affect the marine environment.

In 2003, the Norwegian Petroleum Directorate participated in a working group for preservation of corals under the direction of the Directorate of Fisheries. The working group has reviewed current regulations and has made its proposals for how preservation of corals can be established in the statutes.

The Norwegian Petroleum Directorate has contributed in 2003 to the work on a study of the Lofoten - Barents Sea (ULB) which focused on year-round petroleum activity in this area. All activities will be based on the objective of zero discharges to sea, will be adjusted to conflict-free coexistence with the fishery industry and will use the best available technology to reduce emissions to air. This work included a report addressing which technology can be used to achieve the discharge goals established in the study program.

Within the arena of international cooperation under the Oslo and Paris Convention (OSPAR), the participating countries seek, among other things, to arrive at common standards and goals for reducing discharges to sea. Together with other Norwegian authorities, the Norwegian Petroleum Directorate has contributed to this work, which in 2001 resulted in resolutions for reduced discharges of oil in produced water by 2006. The concentration of oil in the discharges must be reduced to a maximum of 30 mg/l, and the member countries' total discharges must be reduced by 15 per cent compared with the discharge level in 2000. The Norwegian Petroleum Directorate participates in the Ministry of Environment's advisory committee on the "Marine Preservation Plan". In 2003, the committee submitted recommendations for formulation of the first preservation plan for protected marine areas in Norway.

In cooperation with a number of operators, the Norwegian Petroleum Directorate has continued work in 2003 to evaluate the potential for using CO_2 for injection into oil fields to improve recovery. The Norwegian Petroleum Directorate has estimated the potential for improved oil recovery from CO_2 injection on the Norwegian continental shelf at 240 – 320 million Sm^3 oil. The Directorate also follows up the ongoing work in the Gullfaks licence concerning mixable gas injection, where CO_2 is one of the alternatives.

Emissions and discharge from the activities on the continental shelf

The most significant emissions to air from the activities on the shelf are CO_2, NO_X and volatile organic compounds (nmVOC and methane). In addition come discharges of chemicals, oil and other organic components to the sea. Each year, the Norwegian Petroleum Directorate compiles historical emission/discharge data and prepares forecasts for the activities with main emphasis on emissions to air and produced water. The emission/discharge data is an important basis from which to evaluate policy instruments so that national and international commitments may be followed up in a cost-effective manner. For more information on up-to-date emission/discharge trends, please see the Norwegian Petroleum Directorate's web site and the publication

PART 2

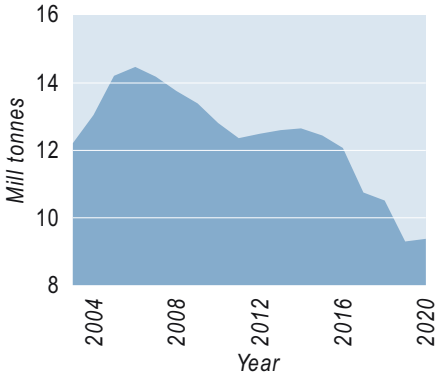
The Petroleum Activities and the Environment

"Environment 2004. The Petroleum Sector in Norway" on the Ministry of Petroleum and Energy's web site.

In 2003, the Norwegian Petroleum Directorate has worked with SFT and OLF to establish a joint database for discharges to sea and emissions to air from the petroleum activities (Environmental Web). Up to now, the operators have reported annual emissions/discharges to the Norwegian Petroleum Directorate, the Norwegian Oil Industry Association and the Norwegian Pollution Control Authority. These bodies have each independently quality-assured and processed the figures. Starting with the reporting of 2003 figures, all operators who carry out petroleum activities on the Norwegian continental shelf must report emission/discharge data directly into the joint database. This will enable both the operators themselves and the authorities to conduct analyses of the historical emissions/discharges in a more complete and consistent manner than before - and much easier.

Emissions of carbon dioxide (CO_2)
Preliminary figures from the Norwegian Petroleum Directorate show that the total CO_2 emissions from the continental shelf increased slightly from 2002 to 2003. The forecast shows increasing CO_2 emissions as a result of expected increased activity up to 2006. Figure 3.1.1 shows CO_2 emissions from 2003-2030, both historical and forecast.

Figure 3.1.1
Total emissions of CO_2 from the Norwegian petroleum activities



Increased total emissions do not mean that there has been a lack of environmental improvements. However, improvements in energy exploitation and a reduction in flaring have not been large enough to offset the increased energy consumption that is a result of a higher activity level. An indication that the activity has become more efficient is that the emissions per sold unit of petroleum are increasing less than the increase in the total emissions.

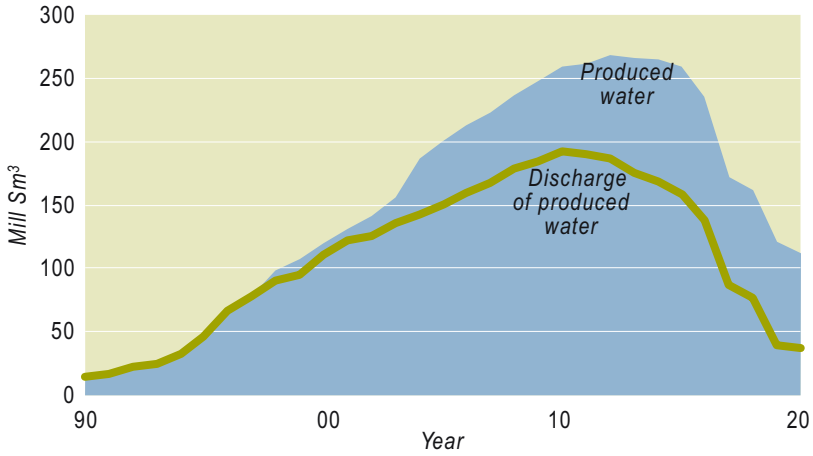
In 2003, the Norwegian Petroleum Directorate completed a study on flaring. The study included an evaluation of the possibilities of achieving additional emission reductions for greenhouse gases in connection with flaring. The study concluded that the most important technical measures have largely been implemented. In order to achieve additional reductions in flaring, there must be more focus on the companies' operations routines and operational regularity.

In connection with introduction of the EU's IPPC Directive (IPPC = Integrated Pollution Prevention and Control), the Norwegian Petroleum Directorate cooperated with SFT on the status, alternatives and costs associated with increased energy efficiency and implementation of emission-reducing measures for emissions to air.

In 2003, the Norwegian Petroleum Directorate organized a seminar for all operating companies with fields in operation on the Norwegian continental shelf as a step in the annual follow-up to evaluate the effect of the CO_2 tax. The seminar highlighted the importance of cooperation between the authorities and the industry, so that good ideas and technical measures can be studied and implemented.

The work on nitrogen oxides (NO_X)
In the operations phase, emissions of NO_X are not yet regulated on the continental shelf other than in any conditions stipulated in connection with consideration of the

Figure 3.2.1
Produced water and discharge of produced water - historical and forecast



PDO. In 1999, Norway signed the international Gothenburg Protocol, which inter alia stipulates requirements for reduction of national NO_x emissions equivalent to a 29 per cent reduction in 2010 compared with the 1990 level. This should be done in the most cost-effective manner possible. The Norwegian Petroleum Directorate has looked into alternatives for achieving this requirement and has made recommendations to the Ministry of Petroleum and Energy.

Produced water

Preliminary figures show that water production on the Norwegian continental shelf in 2003 was ten per cent higher than in the previous year, while discharges of produced water increased by eight per cent. Figure 3.2.1 shows what water production is expected to increase to in 2012, however, an increasing portion of the produced water will be reinjected.

Several of the largest fields have now entered such a mature stage that they are producing more water per unit of oil and gas from the wells than before. This contributes to an increase in the volume of produced water, and thus increased discharges of oil and other components dissolved in the water.

There has been a positive development in 2003 in the use of improved cleaning methods for produced water discharged to sea. The Directorate has cooperated with other authorities (SFT and the Institute of Marine Research) and the industry on implementation of the zero discharge philosophy. The zero discharge goal entails the main rule that environmentally hazardous substances shall not be discharged. The goal of zero discharges applies immediately for new developments, while the goal must be achieved by the end of 2005 for existing fields. Data reported by the companies in 2003 shows that substantial environmental improvements have already been achieved, and the discharge forecast for 2006 is promising. Technological development is important if we are to achieve our objective, and field-specific solutions will be required which safeguard considerations for the environment, resources, safety and costs.

In the research program "Long-term effects of discharges to sea from the petroleum activities – PROOF", the industry and the authorities are working together to increase knowledge of some of highest priority problems. The program is run by the Research Council of Norway. It started in 2002 and will run through 2008 with an annual budget of approximately NOK 20 million.

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Projects

FORCE

FORCE ("Forum for Reservoir Characterization, Reservoir Engineering and Explorati on Technology Co-operation") is a cooperation forum on problems related to exploration and improved oil recovery.

FORCE started in 1995 with a three-year period. Good experiences led to FORCE being continued in Phases 2 and 3 (Phase 3 from 2002 til 2004). FORCE had 18 members in 2003, as well as the Research Council of Norway as an observer. BP holds the chairmanship in Phase 3, while the Norwegian Petroleum Directorate has a permanent secretariat function.

One of the main objectives of FORCE is to contribute to improving oil recovery on the Norwegian continental shelf. The potential for increased oil recovery is huge and in part time-critical. The Forum is also an important arena for cooperation on problems related to new technology in the exploration phase that could have an impact on the Norwegian continental shelf. The players in FORCE discuss and initiate research, development and demonstration of methods and tools that contribute to future improved oil recovery and better exploration technology.

The FORCE members have broad-based expertise and experience in their respective organizations, which provides a unique opportunity for solving problems together, or initiating cooperation projects with external suppliers. FORCE's role is to facilitate the companies' discussion of important issues with each other, with the authorities, and with representatives from research institutions and the supplier industry.

The Forum contributes as an initiator, driving force and communicator of project proposals in the industry. In 2002 and 2003, FORCE has had increased focus on initiating projects. Permanent arenas have been set up between the university communities, the research institutions and the oil companies. The "Fresco" committee has the overall responsibility of being a driving force in connection with initiating and implementing projects. Upon an initiative by the seismic committee, a cooperation project was established to promote increased use of seismic "prestack data". A lot of work has also been invested in starting a major geology project related to exploration.

There have been some adjustments of organizational structure in FORCE, which now includes technical committees within the following areas:

- Recovery Processes
- Advanced Wells
- Seismic Methods
- Sedimentology and Stratigraphy
- Visualisation
- Reservoir Characterization
- Structural Geology

At a board meeting in September 2002, a decision was made to actively market FORCE in various arenas. In 2003, FORCE was represented at EAGE (Stavanger Forum), OG21 Forum (Kjeller) and Petroforsk (Stavanger Forum).

Organization of seminars and workshops within the Forum's core area is an important part of the transfer of experience among the members, research institutions and the industry. The following seminars and workshops were held in 2003:

- Lysing & Lange Formation Workshop
- "Non-reservoir Mudstones, Opportunities and Challenges for improved Exploration and Development Success"
- "Future Directions in Cooperative Petroleum Research"

- "Structural Geomodelling Workflow Workshop"
- Deepwater Seismic Challenges
- Modelling, Stratigraphy and Sedimentology of Turbidites - Seminar in the Ainsa Basin

A total of 3544 persons have participated in FORCE seminars and workshops since 1995. 574 of these attended in 2003. For more information on FORCE and the activity in the committees, please check the web site (www.force.org).

FUN

FUN *(Forum for* **F***orecasting and* **Un***certainty Evaluation Related to Petroleum Production)* is a cooperation forum relating to problems within the areas of preparing forecasts and uncertainty evaluations for future oil and gas production. FUN was started in May 1997 and has 13 oil companies and the Norwegian Petroleum Directorate as members. The Ministry of Petroleum and Energy and the Norwegian Oil Industry Association are observers in the forum. The forum is organized with a board consisting of representatives from all of the members. The Norwegian Petroleum Directorate currently holds the chairmanship. The secretariat is located in the Norwegian Petroleum Directorate.

In 2003, FUN has been used actively in connection with the national budget reporting in order to discuss reporting changes. The forum has also been used for feedback to and from operators.

In 1999, FUN also initiated a project relating to best practice within the field of forecasting and decision-making under uncertainty. The project is divided into three phases. The initial phase of the best practice project has consisted of mapping current practice in the companies and the authorities and was completed in the first half of 2000. Phase Two of the project started in 2001. In this part of the project, a teaching system has been developed in which focus is placed on making decisions under uncertainty from exploration to cessation of production.

Three five-day courses have been organized with a total of 64 participants from 13 oil companies, in addition to the Norwegian Petroleum Directorate. Phase Three of the project was implemented in 2003. A three-day course was developed at the management level with focus on manning under uncertainty. Two courses have been conducted involving 27 participants from five oil companies in addition to the Norwegian Petroleum Directorate. A five-day course involving 15 participants was also organized.

FUN organized two seminars in 2003, "Uncertainty in Production Forecasting - Capture P10 and Avoid P90" and "Stock Market influence on Decision Making". Please refer to the web site for more information: www.fun-oil.org.

SAMBA

The Norwegian Petroleum Directorate makes extensive use of modern data bases and analysis tools. This provides great advantages in connection with production of reports and analyses, and in the delivery of final reports with a high level of quality. The SAMBA project has been established in order for the Norwegian Petroleum Directorate to maintain the advantage of having good, quality-controlled databases based on modern IT technology in the future as well.

The SAMBA project was started with a pre-project in 1996. The first modules of the system were put into use in 1997. SAMBA consists of the following modules: Companies, production licences, agreement-based areas, fields, field sections, discoveries, deposits, resource estimates for

deposits, profile collections, transportation and exploitation facilities, parts of transportation and exploitation facilities, prospects and prospect estimates.

SAMBA entails a systematization and integration of information which provides the Norwegian Petroleum Directorate with a good overview of the activities on the Norwegian shelf. The project also emphasizes use of standards found in the market. POSC's (Petrotechnical Open Software Cooperation) Epicentre data model is used in the data modeling.

SAMBA is a key tool in connection with reporting for the national budget. The entire resource accounting is now found in the database. Provisions have been made which mean that the data is easily accessible both for ordinary end users and for advanced users who want to explore the database in more detail and assemble and analyze the data themselves.

DISKOS

The DISKOS project started as a collaboration between Saga Petroleum, Norsk Hydro, Statoil and the Norwegian Petroleum Directorate in 1993 for development and operation of a common national database (the DISKOS database) for technical petroleum data. The project now includes a total of 15 oil companies as well as the Norwegian Petroleum Directorate that are linked together in a high-speed electronic network. The DISKOS database includes most of the processed 2D and 3D seismic from the Norwegian shelf, in addition to all navigation and velocity data. The DISKOS database also contains quality-controlled well data and production data from the Norwegian shelf. The database has the functionality to carry out data swaps between the oil companies. Data swaps are administered by the Norwegian Oil Industry Association.

Data accessibility is governed by the rules and agreements for right of use entered into between the parties or laid down in the Petroleum Act. A comprehensive system of rights in the DISKOS database prevents unauthorized end-users from gaining access to proprietary data. The PetroBank software is used to manage the data in the DISKOS database.

A major project was concluded in 2003 which involved entering most of the historical well data from the Norwegian continental shelf into the database. The goal is to achieve a complete collection of all well data from the Norwegian continental shelf. New projects have been planned to enter the remaining data sets.

In 2002, the contract for operation of the DISKOS database was awarded to Schlumberger Infodata Norge AS - SINAS, and the main focus in 2003 was on transferring data and operations from the former operator, Petrodata, to SINAS. An important goal was for the database to be accessible to all users from 1 January 2004. The PetroBank software will still be used. The new contract regime includes improvements in the business model which will inter alia provide greater incentives to load more data to achieve a more efficient service for the authorities and the oil industry. The intention is to provide access to more user groups, such as service companies and universities.

The Norwegian Petroleum Directorate delivers quality-controlled administrative data to the database on a weekly basis. This data relates to production licences, blocks, fields, seismic navigation, well locations, pipelines, etc. The database now contains approximately 60 terabytes of data.

The cooperation in the DISKOS group is led by the Norwegian Petroleum Directorate. The costs of development and

operation are split among the users of the system.

The Norwegian Petroleum Directorate views DISKOS as being an important tool to improve accessibility to data for both the established oil companies and potential newcomers on the Norwegian continental shelf.

Participation in research and technology development programs

PROOF
The background for the program is the need for increased knowledge of the long-term effects of discharges from the offshore activities. This type of knowledge is necessary in order for the authorities to be able to manage the development in the activities and coordinate exploitation of the oil and gas resources with other users of the sea. The program was started in the autumn of 2002 and its planned duration is six years. The planned annual budget will be about NOK 20 million.

The following research needs will be given priority: effects on the water column of produced water, acute discharges of drilling fluids, connection between research and monitoring, special research tasks in Arctic areas, ongoing discharges from cuttings and long-term effects of acute discharges in coastal and beach zones. The Norwegian Petroleum Directorate is represented on the board.

The Oil and Gas Program (OG)
The paramount goal of the program is to contribute to value creation through research and development of technology (R&D).

The petroleum sector represents the industry in Norway with the highest value creation potential, and it will create a substantial portion of the nation's economic basis throughout this entire century. The prerequisite for this is a major, long-term commitment to research and development of technology. The return on R&D is higher than in any other sector, and most of this return falls to the Norwegian State. This is a high-tech industry with a considerable need for supply of key expertise.

The program's target group consists of companies and knowledge/expertise milieus that plan activie participation in R&D activity that will promote productivity and innovation in the Norwegian petroleum industry. This will include:

- Oil companies (upstream activity and application of natural gas)
- Supplier industry (equipment suppliers and suppliers of software and systems
- Research institutions and universities/ colleges

The Norwegian Petroleum Directorate is represented on the board.

DEMO 2000
The DEMO program was initiated in 1999 with the goal of contributing to ensuring that new offshore technology is tested and qualified for use. Public funds are granted via the Ministry of Petroleum and Energy's budget, which has also triggered a substantial commitment by the industry. The program is linked to the Research Council of Norway, and it addresses sub-areas within the OG21 strategy. The main focus has been on technological solutions for new, challenging developments on the seabed, in deep water and with transport solutions directly to land. About 80 projects have been initiated up to the end of 2003. The Norwegian Petroleum Directorate participates as an observer on the DEMO 2000 management committee.

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PetroForsk
The Norwegian Petroleum Directorate is represented on the board of the Research Council of Norway's research program "Fundamental petroleum research" (PetroForsk). The program is part of the long-term effort that is needed if we are to exploit the Norwegian oil and gas resources in an optimal manner. A total of 23 doctorates and 13 post-doctoral grants have been granted as of 31 December 2003. PetroForsk started in 1998 and will be concluded in the summer of 2004. The work will be continued as part of the new PETROMAKS program.

PetroForsk's technical goals are:
- Development of measurement and interpretation methods for better quantification of geological and technical reservoir parameters.
- Development of modeling tools that can give rise to new drillable prospects on the Norwegian continental shelf and an improved understanding of the process.
- Improvement of the basis and further development of methodology for improved prediction and monitoring of production processes.

Coordinated Offshore Research and Development (CORD)
The Norwegian Petroleum Directorate has observer status on the board of CORD. In this connection the following information is provided on the industrial cooperation which CORD represents as an arena for a joint effort for operation and maintenance of offshore petroleum installations.

In 2003, the board of CORD has sought to coordinate the activities with the work in OG21. This led to the board of OG21 accepting "Operations and Maintenance" as a temporary 10. Technology Target Area (TTA) in the summer of 2003. Work on a strategy memo is underway. Based on this, the OG21 board will consider whether "Operations and maintenance" should gain permanent status as a TTA in OG21.

CORD's vision is to contribute to increased competitiveness for oil and gas related activities in Norway by developing and exploiting Norwegian R&D in the field of operations and maintenance. In the spring of 2001, the CORD board assigned three project development groups to prepare draft project proposals within the following areas:
- Technical condition
- Remote operation of offshore & subsea installations
- Environment: emissions to air/discharges to water

The project proposals were presented in connection with the budget processes in the oil companies and in connection with national offshore R&D strategy. A decision was made to start three projects, a short description follows:

Optimal operation and management of offshore installations
The main goal of the project is to promote proposed changes that can help achieve more optimal operation and management of offshore installations than is the case today. Potential instruments can include remote control and balanced use of remote operations within production, maintenance and modification. Here, balanced use means finding the optimal ratio between work tasks carried out on land and offshore on the respective installations. Other potential instruments can also be envisaged that do not necessarily include introduction of remote control or remote operation, such as introduction of new technology combined with changes in current work processes both onshore and offshore, so that they become safer and more efficient.

Technical condition
The project is to find concrete solutions to some of the oil companies' priority

problem areas within offshore operations and maintenance, and follow-up of the technical condition of the plant and facilities. Moreover to develop general methods, guidelines and "cookbooks" that can be used for similar problems on other equipment units than the project worked on. Exchanging joint experience and knowledge between participating oil companies, R&D institutions, the industry and suppliers will be a key element.

The project will ensure good solutions in that they will be developed through case studies in close cooperation between oil companies, the industry, suppliers and research institutions. Generic information will be collected, structured and made available to all project participants.

Follow-up of safety-critical equipment, including valves
The specific goal of this project is to develop methods of following up safety-critical equipment in general, with special focus on valves. This entails an evaluation of which equipment is critical to safety, how to define acceptance criteria for the equipment and how this can be followed up. With regard to safety-critical valves, one must look at methods that can provide a better picture of the condition of the valve and its remaining lifetime than we have today.

The projects got underway in 2002 and the plan is to conclude them during the course of 2004.

OTHER PROJECTS

The Norwegian Petroleum Directorate's mapping of the outer boundaries of the Norwegian continental shelf
The United Nation's Law of the Sea Convention gives coastal states the right to extend the outer boundary of the continental shelf beyond the exclusive economic zone of 200 nautical miles. Norway ratified this convention in June 1996 and must present its claim with regard to this outer boundary to the UN within 2006.

The Ministry of Foreign Affairs is responsible for this work and, through the Ministry of Petroleum and Energy, has delegated responsibility for the necessary technical studies to the Norwegian Petroleum Directorate. It is also possible that boundaries of the continental shelf off the coast of the Norwegian possession in the southern hemisphere may be submitted.

In this connection in 2003, collection and processing of seismic data was conducted off the coast of Dronning Mauds Land. A total of 2440 km multi-channel reflection seismic data and nine sonar buoys (refraction seismic) were collected.

Chalk research
A decision was made to start up Joint Chalk Research (JCR) Phase 6 late in the year. This is a continuation of the cooperation between the licensees and the authorities, primarily on the Norwegian and Danish continental shelves, which has been ongoing in phases since 1980. The participating companies are: ConocoPhillips, BP, Amerada Hess, Shell, Total, Norsk Hydro, DONG and Petro-Canada. The Norwegian Petroleum Directorate participates, as well as the Danish Energy Agency.

Development of HSE expertise
In 2003, the Norwegian Petroleum Directorate received additional funding of NOK 5 million for development of internal HSE expertise. These funds are part of an effort to enhance expertise over a period of several years, starting in 2002 with an appropriation of NOK 7 million. There was an existing dedicated plan for development of expertise, particularly for cutting edge expertise in prioritized areas, with a view towards keeping pace with the

Projects

technological and organizational developments.

44 projects were initiated in 2003, 28 of which were continued from 2002. The rest are new projects that will run over several years. The projects can basically be divided into three main areas:

- Technological issues
- Audit methods
- Regulatory development

It is assumed that parameters drawn up in Storting White Paper No. 7 (2001-2002) On health, environment and safety in the petroleum activities shall be emphasized when assigning priority to measures. Relevant main topics for the projects have thus included:

- HSE with emphasis on prevention of serious personal injuries and major accidents, including interruptions in production and deliveries
- Methods and tools for managing HSE in dynamic change and decision processes, including decisions under uncertainty
- Risk-based management of complex technological and organizational systems, including information security and ICT vulnerability
- Opportunities and constrains for use of human resources in HSE work, including monitoring and control room functions
- Management of HSE knowledge and risk communication.

After a review and evaluation of the 2003 projects, it can be confirmed that the Norwegian Petroleum Directorate has already added new and valuable expertise and that this has also ensured the predictable planning of superior expertise projects in a multi-year perspective. Of the 44 projects implemented in 2003, most are within the main area of technological problems.

Petropol (1996-2005)
Petropol is a social-based research program under the direction of the Research Council of Norway. The Norwegian Petroleum Directorate is represented on the board. Petropol continues the significant research effort made through the Petro program. The objective is to enhance expertise and further raise the quality of the Norwegian community in the field of social petroleum research, for the benefit of both public authorities and the players in the petroleum industry.

”Internationalization and change - new challenges for Norwegian petroleum activities and the Norwegian society” is the focus of this program. The supported projects are found within four problem areas:

- Players’ strategies and their implications
- Energy market taking shape
- New petroleum provinces: ethical, normative and inter-cultural challenges
- The petroleum sector as human capital: source of new value creation?

Additional information and a complete list of projects may be found at www.forskningsradet.no

International Co-operation

COOPERATION WITH NORAD

In 2003, the Norwegian Petroleum Directorate's assistance work financed by NORAD amounted to approximately seven man-years. One man-year was recruited externally, while the rest of the work was carried out by about 40 employees who gained valuable work experience, both professionally and with regard to cross-cultural exposure.

Assistance has also been provided by a number of firms, mainly Norwegian. The majority of the assistance has been directed towards the following cooperating countries: Angola, Nigeria, Mozambique, Bangladesh and Vietnam. The Norwegian Petroleum Directorate has also had considerable cooperation with the Coordinating Committee for Coastal and Offshore Geoscience Programmes in East and South-East Asia (CCOP). In 2003, work was started in two new projects, in Nigeria and in East Timor, while the project on the Philippines was concluded.

As regards the majority of the projects, institutional cooperation agreements have been entered into with sister organizations, providing an opening for assistance within an extensive part of the Norwegian Petroleum Directorate's sphere of activities, both technically and administratively. Training and establishing a legal framework for the petroleum activities are central elements of all projects.

The Norwegian Petroleum Directorate also assists NORAD in connection with the preparation of new national strategies, evaluation of new project proposals, and also cooperates with other governmental institutions (the Norway axis) on executing these types of projects. Future cooperation with Sri Lanka on issues regarding the law of the sea is currently being considered.

Angola (Ministry of Petroleum - MINPET)
This is a three-year cooperation program started in the autumn of 2000. An adviser from the Norwegian Petroleum Directorate has assisted MINPET in their work and has also assisted in the implementation of the program. The main activity has been aimed at assistance in the development of regulations within the HES area, as well as within resource management and downstream activities for the oil and gas sector. A comprehensive study was made in 2002 of the future needs for manpower in the petroleum sector. The study was a collaboration with Statoil and Norsk Hydro. Access to qualified local labor will be a bottleneck for significant utilization of national goods and services. A "train the trainers" program is currently being financed by Intsok and final funding is likely to be taken over by the NPD/MINPET program. The teachers will be linked to the Petroleum Institute in Sumbe, which is starting a new course to train operators of subsea equipment for the petroleum sector.

Namibia (Ministry of Mines and Energy - MME)
The main activity in MME is aimed at organizing the future development of the country's gas resources. Disappointing appraisal wells on the Kudu offshore gas field have led to the evaluation of new and smaller development solutions. New owners of the licence are now investigating the possibility of using the gas for local power production. The cooperation program is in its final phase.

South Africa (Department of Mineral Resources and Energy - DME) Phase 2.
Organization of upstream oil and gas activities, establishment of framework conditions for marketing of natural gas, organization of sales of petroleum, organization of state ownership interests in the

petroleum sector and training are important areas for Norwegian assistance to DME.

The 860 km gas pipeline to the Temane and Pande fields in Mozambique was put in place during 2003, and start-up is planned for around 1 February 2004. The gas project will provide considerable growth impetus in both South Africa and Mozambique. In South Africa the gas will be used mainly in the production of liquid fuel and other petro-chemical activity. The NORAD-funded assistance to South Africa and Mozambique has been an important condition for the realization of this project. The focus is currently on organizing the government management of the petroleum activities, training and further de-regulation in the petroleum sector.

Mozambique (National Directorate for Coal and Hydrocarbons - NDCH)
NDCH has received support to follow up the development of the two major gas fields Pande and Temane and the associated transportation system for gas to Secunda in South Africa (approx. 865 km). The project, which has a total budget of approx. USD 1.3 billion, is planned to start in February 2004. The planned gas production or the next 25 years is expected to give Mozambique and South Africa total tax revenues of around USD 5 billion. Gas distribution is also being planned for Mozambique, and this will give good financial ripple effects for the country.

The Norwegian Petroleum Directorate has followed up its assistance to the NDCH concerning HES auditing of the project. Audits of the production and exploration wells were planned and conducted during 2003. The national data base for the petroleum sector is now in operation and there is a focus on training. This center is now assisting TPDC in Tanzania in safeguarding their petroleum data.

Considerable funds are being used for further university training abroad for NDCH employees, as well as for practical training in resource planning and audit activities. It has been decided to continue the project for another four years. The Norwegian Petroleum Directorate had an adviser stationed in Maputo until September.

The Norwegian Petroleum Directorate has also assisted Empresa Nacional de Hidrocarbonetos (ENH), the national state oil company, in obtaining consultancy support to follow up their ownership interests in the big natural gas project and to develop the company, including its subsidiaries.

Bangladesh
The Norwegian Petroleum Directorate has cooperated with Bangladesh for a number of years. In recent years, the cooperation has been carried out through the Hydrocarbon Unit (HCU) under the Ministry of Energy and Mineral Resources, which is the Norwegian Petroleum Directorate's cooperating organization.

The main work in the current phase of the project is aimed at the development of expertise within resource mapping, resource evaluation, data management and market evaluations of the potential for gas exports from Bangladesh.

Vietnam
The Norwegian Petroleum Directorate has entered into a new agreement with Petrovietnam for continued assistance on the development of safety regulations and training in the area of safety management. The Norwegian Pollution Control Authority cooperates with the Norwegian Petroleum Directorate and will continue its environmental project with Petrovietnam. This project has in the present year been focused on regulatory administration of safety management in Petrovietnam.

The "Vietnam Total Resource Assessment" project was approved at the end of 2002. The project is to provide assistance to Petrovietnam in improving methods of conducting resource analyses as a basis for resource planning. In 2003 there has been a focus on method development, regulations for data reporting and the establishing of suitable IT tools.

Nicaragua (Instituto Nicaraguence de Energia - INE)
The project is being continued at a low level, and the assistance was aimed at negotiation support in connection with the first announcement round, which has now been completed. A seminar has also been conducted in cooperation with Petrad in order to inform, at a regional level, of the planned petroleum activity. The first awards are expected in 2004.

CCOP
The Norwegian Petroleum Directorate has provided assistance to the cooperation organization CCOP in Eastern and Southeastern Asia which works on the mapping of petroleum resources in the area and lays plans for exploitation of these resources. The new program, "Petroleum Policy and Management" has been started with the assistance of an adviser from the Norwegian Petroleum Directorate in Bangkok. Four sample studies will be conducted of petroleum basins in the region with differing maturity levels in order to increase knowledge of resource planning.

East Timor
The Norwegian Petroleum Directorate cooperates with the authorities on East Timor to develop a program for enhancing expertise in the field of petroleum management. The program got underway in the spring of 2003. One local and one Norwegian adviser are employed in the project. An analysis of future needs for expertise was started as a basis for the training initiatives that will be implemented. In this project, the Norwegian Petroleum Directorate also cooperates with three Norwegian UN advisers who work in the petroleum administration.

Nigeria
The cooperation with Nigeria within the petroleum sector has gone on for several years. The Norwegian Petroleum Directorate has contact with the Department of Petroleum Resources (DPR), which has a similar function in Nigeria as the Norwegian Petroleum Directorate has in Norway. An institutional cooperation is planned in order to further develop this contact, which is financed by NORAD.

DPR is interested in resource management and safety, information and knowledge about new technology, whether it is deepwater technology or other advanced technology associated with petroleum production. They are also interested in technology and methodology linked to metering of oil and gas, as well as systems established to follow up ongoing development and operations activity as well as information flow and data management.

A planning meeting was conducted in Nigeria in January 2003 where an updated cooperation program was prepared and this, together with the updated application for financial support, was sent to NORAD in February 2003. On the basis of this application, a four-week course which Petrad was responsible for, was organized during the spring of 2003 on the subject of petroleum administration. Later, during the autumn, two DPR employees participated in a training program on safety and the environment which took place in Norway. A number of DPR representatives also participated in a course in metering techniques which took place in Nigeria.

PART 3

International Co-operation

Cooperation with PETRAD
As a result of a pilot project carried out by the Norwegian Petroleum Directorate for NORAD during the period 1989-1993, Petrad was established as an independent foundation by the Norwegian Petroleum Directorate and NORAD on 1 January 1994.

The objective of the foundation is to place Norwegian expertise and expertise in the fields of management and administration of petroleum resources at the disposal of managers from the authorities and national oil companies in Africa, Asia, Latin America, Oceania and the CIS (Commonwealth of Independent States). This is accomplished by adapting seminars to the inquiries and needs of the authorities in the above-mentioned regions, in addition to the organizing of two eight-week courses each year, "Petroleum Policy and Management" and "Management of Petroleum Operations" in Stavanger. All Petrad activities are aimed at senior and middle management personnel.

During the course of 2003, the Norwegian Petroleum Directorate contributed through implementation of two courses abroad which Petrad was responsible for. In addition, the Norwegian Petroleum Directorate's employees held lectures during several meetings and courses which Petrad organized in Stavanger. Of particular importance here is Petrad's annual eight-week course which was held in the Norwegian Petroleum Directorate's offices in the period 25 August – 16 October 2003. In this connection a "NPD day" was organized. This activity contributes to professional exposure to and understanding of different cultures while simultaneously increasing the overall expertise for those employees of the Directorate who are involved.

COOPERATION WITHIN RESOURCE MANAGEMENT

Annual meetings with the authorities in the North Sea area
As an oil and gas province, the North Sea is divided between the UK, the Netherlands, Germany, Norway and Denmark. Even though the individual fields are quite different, there are many similarities in the problems encountered in management of the petroleum resources. The objective of the meetings is primarily to exchange opinions and experience from the respective activities. This particularly applies to areas that cover environmental issues, data management, improved recovery, development of small fields and unitization.

Annual meetings with other countries' authorities - exploration phase
Since 1983, annual meetings on technical issues have taken place between the Norwegian Petroleum Directorate and state administration units in other Northern and Western European countries with responsibility for exploration for oil and gas: England, Ireland, Denmark, Germany, the Netherlands, France, the Faeroe Islands and Norway.

The main issues of discussion at the meetings are geo-technical, exploration technology and data management issues, as well as challenges faced by the various countries in their efforts towards efficient discovery of new oil and gas resources. The responsibility for hosting the meetings is on a rotation basis among the various countries. The British Department of Trade and Industry (DTI) hosted the meeting in 2002.

Annual meetings with other countries' authorities - fiscal metering
In those countries where Norwegian petroleum is landed, the authorities' responsibility and roles are stipulated in treaties and cooperation agreements. There is extensive cooperation on the part of the authorities in order to safeguard the individual country's requirements for fiscal metering. An important forum in this cooperation is annual meetings in which status and future activities in the area of metering technology are reviewed. The Norwegian Petroleum Directorate has established cooperation agreements with German, Belgian, British and French authorities.

Cooperation with Russian authorities
The Norwegian Petroleum Directorate is involved in cooperation with Russia. The Norwegian – Russian energy cooperation has been going on since 1992, and the Norwegian Petroleum Directorate's involvement started in 1994. The purpose has been to contribute Norwegian expertise in managing petroleum resources. Through a series of seminars and meetings, several aspects of petroleum management have been highlighted and discussed. About 40 working meetings and seminars have been conducted in all. This cooperation has led to good relations with central Russian authorities at a federal level, the authorities in a number of regions as well as a series of Russian research institutes and universities.

During the first few years, cooperation was largely linked to the Norwegian – Russian Forum for Energy and the Environment, where the Ministry of Energy was the natural cooperation partner. In later years our cooperation has become more closely linked with the Ministry of Natural Resources and the management areas they are responsible for, particularly after the cooperation agreement with this ministry was signed in 2002.

During 2003 there was a joint major conference on improved recovery, one joint seminar and two joint working meetings regarding the management of petroleum resources.

Based on the results of these gatherings, there are now plans for further cooperation where there is a strong interest in involvement from both the Norwegian and the Russian side.

Research cooperation regarding improved oil recovery organized by the International Energy Agency (IEA)
Since 1979, Norway has participated in IEA's cooperation on enhanced oil recovery (EOR). There are currently 12 countries participating in the cooperation, including Canada, Russia, the USA and Venezuela. The cooperation largely consists of a commitment for a certain scope of research in specific areas and the exchange of results. From the Norwegian side, research institutions in Bergen and Stavanger are active participants. The annual meeting for 2003 was held in Regina, Canada. In addition to a review of the cooperation projects, there was also a symposium on CO_2 injection. The Norwegian Petroleum Directorate represents Norway in the management committee, and in 2003 the Norwegian representative was also elected chairman of the committee.

COOPERATION WITHIN HEALTH, SAFETY AND ENVIRONMENT MANAGEMENT

International coo peration agencies
The Norwegian Petroleum Directorate cooperates extensively with international technical institutions and government agencies, either directly or indirectly through Norwegian government agencies. The purpose of this cooperation is to:

- contribute to ensuring that safety and the working environment in the petroleum activities at least meet accepted international standards,
- ensure access to relevant information for competence building and regulatory development,
- contribute insight and experience in an international context in order to promote a positive development in safety and the working environment.

In general, the cooperation has consisted of participation in international governmental cooperation in Europe and in agencies of the United Nations, but also more direct cooperation with the various types of international and regional professional institutions. Key cooperation forums in the area of safety and working environment in 2003 have been the International Regulators Forum (IRF) and the North Sea Offshore Authorities Forum (NSOAF).

IRF - International Regulators Forum
The International Regulators Forum (IRF) was established in 1994 by a group of authorities who wanted to promote a common understanding of issues related to safety, health and the environment.

The forum provides for exchange of ideas and opinions regarding methods and principles applied to efficient exercise of the supervision of safety and working environment, and exchanges facts regarding the supervision activities and informs one another regarding relevant technical issues, regulatory development, etc.

Within the possibilities and limitations stipulated through national frameworks for the activities, this will contribute to promoting a common understanding among the members with regard to issues such as: the role of the supervision authorities, use of policy instruments in the supervision, supervision methods, competence development, the relationship between the authorities and industry, etc.
The following participate in the cooperation in addition to Norway: Australia, the Netherlands, Canada, New Zealand , Brazil, the United Kingdom and the USA.

NSOAF - North Sea Offshore Authorities Forum
In the field of health, safety and environment, the Norwegian Petroleum Directorate participates in the North Sea Offshore Authorities Forum (NSOAF), where representatives from all the North Sea countries' governmental authorities in charge of supervision of offshore petroleum activities take part. The goal of the forum is to ensure continuous improvement in health, safety and the environment in the petroleum activities in the North Sea.

The members of NSOAF meet for an annual working meeting where the activities are summarized and new tasks are discussed and initiated. Two independent working groups have been appointed by the forum, and the Norwegian Petroleum Directorate is represented in these.

One of the groups works towards mutual acceptance of methods of documenting compliance with national regulatory requirements. This group is chaired by a Norwegian.

Audit teams have been established under this working group made up of representatives from several of the member countries. In 1999, these teams conducted for the first time joint audits directed towards five mobile drilling installations on the respective shelves of the participating countries. Following this, a further three joint audits have been conducted, most recently in 2003. The overall experiences from such joint audits are considered to be very positive, both with regard to the development of a common understanding of the countries' different regulatory and supervision strategies, and with regard to the actual findings

and observations made. The experience from the international activities is an important contribution to further cooperation in an NSOAF context in order to unitize and harmonize important authority issues in the North Sea basin.

The working group is also cooperating with the international drilling contractor organization IADC. An important milestone in this cooperation was reached in 2003, when IADC launched "North West European HES Case Guidelines", which are guidelines for an application for use of mobile drilling installations in the five North Sea countries participating in NSOAF's working group. The guidelines describe the requirements that are common for all the countries, and then describe requirements particular to the individual countries in separate appendices. The authorities expect that use of these guidelines will simplify the work associated with application documentation and verification, both for the authorities and for the industry, when an installation is to be moved across shelf boundaries.

The other group, which has a Danish chairman, is working to achieve mutual acceptance of the requirements for safety training in the various North Sea countries. Previously, the member countries have agreed on which elements of the training programs are mutually acceptable and in which areas there are different requirements. This applies both to basic safety and emergency preparedness training and to different kinds of special training. This work forms the basis for a further simplification of the training requirements and of the systems for mutual acceptance of training modules across shelf boundaries.

Cooperation with Russian supervisory authorities - "The Boris Project"

The cooperation with the Russian supervision agency Gosgortekhnadzor (GGTN) continued in 2003. The Russian authorities want to increase their expertise in safety management and supervisory methodology.

Through seminar activity and implementation of supervision according to Norwegian principles and methods, GGTN personnel gain insight into the supervision methods employed on the Norwegian shelf.

PART 3

Organisation

REGULATIONS AND DELEGATIONS

An overall presentation of the regulations for the petroleum activities with associated information has been provided on the Norwegian Petroleum Directorate's web pages at www.npd.no:

The duties of the Norwegian Petroleum Directorate are set out in the special instructions of 1 October 1992. Duties have also been assigned to the Norwegian Petroleum Directorate by delegation of authority. Such authority is delegated either directly pursuant to acts/regulations or by individual delegation decisions by a superior authority.

Delegations of responsibility in the resource management area:

a) The Petroleum Act of 29 November 1996, No. 72
   Including:
   The Petroleum Regulations, Royal Decree of 27 June 1997
   The Petroleum Register Regulations, Royal Decree of 19 June 1997
b) The CO_2 Tax Act of 21 December 1990, No. 72
c) Regulations relating to scientific research for natural resources on the Norwegian continental shelf, etc., Royal Decree of 31 January 1969

Delegations in the area of health, safety and the environment:

a) The Petroleum Act of 29 November 1996, No. 72
   Including:
   The Framework Regulations, Royal Decree of 31 August 2001
b) The Working Environment Act of 4 February 1977, No. 4
   Including:
   The Working Environment Regulations, Royal Decree of 27 November 1992
   Certain joint regulations for land and at sea issued with authority in the Working Environment Act
c) The Tobacco Act of 9 March 1973, No. 14
d) Regulations concerning safe practices in scientific research and exploration for petroleum deposits on Svalbard, Royal Decree of 25 March 1988

ACTIVITY PLAN

The annual activity plan is prepared on the basis of "Functional requirements for public financial administration" and guidelines from the Ministry of Petroleum and Energy and the Ministry of Labor and Government Administration.
The plan contains governing goals, performance goals, performance indicators and priority tasks assigned by the above-mentioned ministries. The following is an extract of priority tasks in 2003:

- Work on the 18th licensing round
- Work on awards in pre-defined areas in the North Sea
- Further develop the licensing policy framework.
- Highlight the potential for increased value creation from the Norwegian shelf, identify measures necessary to realize the potential and to be a driving force to realize this.
- Conduct assessments associated with the transport and production of petroleum in delimited areas where value creation can be increased by taking an overall view of different production licenses.
- Work actively for the implementation of technology and production methods that can contribute to increased value creation.
- Identify any barriers that prevent good resource management in the tail-end phase and provide recommendations on how to overcome such barriers.
- Contribute to resource-optimal solutions in the development of new fields.

- Prioritize the most important new fields, e.g. Ormen Lange. Field follow-up must be seen in relation to the work of area optimization.
- Map resources associated with deposits where there is no planned activity and assess what can be done to increase it.
- Assist the Ministry of Petroleum and Energy in the further development of the gas management system, including conducting of resource and transport analyses.
- Conduct socio-economic assessments when the authorities are processing PDOs/PIOs and cessation plans.
- Continue the work of identifying technological challenges in the different phases.
- Evaluate environmental requirements under the Norwegian Petroleum Directorate's sphere of authority and ensure a high level of technical integrity.
- Continue the work of minimizing emissions/discharges that are a burden on the external environment and ensure that the industry facilitates and contributes to national goals and international obligations being met.
- Assess various measures to reduce emissions/discharges and the policy instruments and costs associated with these.
- Prepare emission/discharge forecasts.
- Prioritize work associated with discharges to sea, hereunder participating actively in the zero discharge work.
- Take national responsibility for ensuring that data and information from the activities are available and contribute to value creation for the authorities, players and research communities.

The activity area Data, information and knowledge

The Norwegian Petroleum Directorate's many activities and tasks are based on professional expertise and management of knowledge. Its role as a data, information and knowledge bank is a key function. The Norwegian Petroleum Directorate has a unique position in that it is the only government body with access to all important data from the continental shelf. The Norwegian Petroleum Directorate considers data and information to be resources and important raw material in the production process which enable us to have a complete overview of the resources on the Norwegian continental shelf at all times and enable us to describe the status of production, costs, emissions/discharges, incomes and assets, etc.

Our tasks as the national manager of data and information on the petroleum activites, and our tasks as keeper of the state's "Register of Deeds" for our continental shelf, must be carried out and further developed. This provides the authorities and the industry with a common basis for evaluations and decisions.

The Norwegian Petroleum Directorate shall contribute to data and information generated in the petroleum activities being stored, quality-assured and made available in an efficient way with regard to value creation and improved resource management on the Norwegian shelf.

All of the Norwegian Petroleum Directorate's work centers on transforming data and information concerning natural and man-made conditions on the continental shelf into knowledge. This knowledge is managed by the Norwegian Petroleum Directorate's employees and is continually used in the follow-up of individual cases as well as in strategic assessments with a longer-term perspective. Another key task for the Norwegian Petroleum Directorate

is to contribute to good communication in joint arenas and in knowledge development projects in cooperation with the industry and research institutions. The Norwegian Petroleum Directorate considers it very important that key elements of this knowledge also is communicated to other users, the general public and the media.

Our work of streamlining the storage, quality-assurance and handling of data within both resource management and HES management has continued. Great emphasis has been put on having updated data in integrated databases and continuous publication of relevant data on our web pages, e.g. on the facts pages. The Norwegian Petroleum Directorate has prepared a unique, interactive map service with updated information on the petroleum activity on the Norwegian continental shelf. The fact maps are integrated with the Norwegian Petroleum Directorate's fact pages, and provide a complete overview of production licences, exploration wells, discoveries and fields. The industry has shown a great interest in using the released resource data. The release is now largely taking place in an efficient way via the Norwegian Petroleum Directorate's web pages.

The main publications in 2003 were the annual report "Offshore Norway 2002", the report "The Petroleum resources on the Norwegian continental shelf", four issues of the Norwegian Petroleum Diary and one report on the risk level on the Norwegian continental shelf. In addition, information material was published on the division of the Norwegian Petroleum Directorate. A brief presentation of the Norwegian Petroleum Directorate's publications is available on www.npd.no

PERSONNEL

At the end of 2003, the Norwegian Petroleum Directorate had 361 employees. An additional 17 employees were on leave. In terms of gender distribution, 56 per cent were men and 44 per cent were women. Twenty-four employees were hired in permanent positions. Nine permanent employees have left their positions, four of them as retirees.

Thirty per cent of the managers were female.

EXPENSES

A total of NOK 346.1 million was spent on the Norwegian Petroleum Directorate's operations in 2003. The amount was allocated as follows:

Wages/compensation incl. employer's contribution	*167 059 780*	
Goods and services	*89 188 252*	
Total operating expenses, item 01		*256 248 033*
Wages/compensation incl. employer's contribution	*9 100 714*	
Supervision expenses	*15 465 507*	
Assignments and co-operation	*39 262 881*	
Surveys	*19 394 529*	
Total operating expenses, item 21		*83 223 631*
Major equipment purchases, item 45		*6 614 361*
TOTAL EXPENSES, Chapter 1810		***346 086 024***

In connection with the reporting for the National Accounts 2003, the Norwegian Petroleum Directorate has applied for transfer of funds to 2004, cf. authorizations granted in the Award Letter for 2003, Chapter 1810, Item 01, in the amount of NOK 4,785,000.

REVENUES

In addition to paid production royalties, area fees and CO_2 taxes totaling NOK 4.28 billion, the Norwegian Petroleum Directorate received NOK 124.4 million in miscellaneous revenues under Chapter 4810.

Fee and tax income	*3 620 055*
Assignment and co-operation income	*48 646 343*
Reimbursement of supervision expenses	*61 618 433*
Sale of publications	*0*
Misc. income	*1 678 402*
Income kindergarten	*3 886 050*
Reimbursement	*616 946*
Reimbursement of labour market measures	*292 000*
Reimbursement maternity benefit	*1 952 976*
Reimbursement trainees	*165 667*
Reimbursement sick benefit	*1 878 047*
TOTAL INCOME, chapter 4810	***124 354 919***

GREEN STATE – GREEN NORWEGIAN PETROLEUM DIRECTORATE

Since 2002, the Norwegian Petroleum Directorate has integrated environmental management in the management system for internal HES work. Each year we measure environmental indicators that were developed in the Green State pilot project 1998-2001. During the autumn of 2003 we started working on more environmentally efficient purchasing routines. The recent years' commitment to the use of information and communication technology for internal streamlining of environmental efficiency means that purchases of paper have been reduced by about 35 per cent from 1998 to 2003. A focus on energy efficiency has led to a continual reduction is electricity consumption since 1998.

Appendix

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Table 1.1.2 Historical production from shutdown fields and production from fields in operation

Field	Oil mill Sm³	Gas bill Sm³	NGL mill tonnes	Condensate mill Sm³	Oil equiv. [1] mill Sm³	Discovery year [2]
Albuskjell	7.4	15.5	1.0	0.0	24.8	1972
Cod	2.9	7.3	0.5	0.0	11.2	1968
Edda	4.8	2.0	0.2	0.0	7.2	1972
Frøy	5.6	1.6	0.0	0.1	7.3	1987
Lille-Frigg	1.3	2.2	0.0	0.0	3.5	1975
Mime	0.4	0.1	0.0	0.0	0.5	1982
Nordøst Frigg	0.0	11.6	0.0	0.0	11.7	1974
Odin	0.0	27.3	0.0	0.2	27.5	1974
Tommeliten Gamma	3.9	9.7	0.6	0.0	14.6	1978
Vest Ekofisk	12.2	26.0	1.4	0.0	40.9	1970
Yme	7.9	0.0	0.0	0.0	7.9	1987
Øst Frigg	0.0	9.2	0.0	0.1	9.3	1973
Total shutdown fields	46.3	112.4	3.8	0.4	166.3	
Balder [a]	16.3	0.0	0.0	0.0	16.3	1967
Brage	43.1	2.0	0.7	0.1	46.6	1980
Draugen	95.3	0.7	0.9	0.2	97.9	1984
Ekofisk	329.3	123.6	10.9	0.0	473.6	1969
Eldfisk	73.9	34.1	3.3	0.0	114.4	1970
Embla	8.2	2.6	0.3	0.0	11.4	1988
Fram	0.6	0.0	0.0	0.0	0.6	1987
Frigg	0.0	115.3	0.0	0.5	115.8	1971
Glitne	4.6	0.0	0.0	0.0	4.6	1995
Grane	0.9	0.0	0.0	0.0	0.9	1991
Gullfaks [b]	304.7	20.7	1.6	0.8	329.2	1978
Gullfaks Sør [c]	16.2	5.5	0.4	0.2	22.6	1978
Gungne [3]	0.0	0.0	0.9	2.8	4.5	1982
Gyda [d]	31.6	5.3	1.7	0.0	40.2	1980
Heidrun	91.0	6.7	0.2	0.1	9 8.1	1985
Heimdal	6.3	43.6	0.0	0.0	49.9	1972
Hod	7.6	1.4	0.2	0.0	9.4	1974
Huldra	2.5	5.7	0.0	0.0	8.2	1982
Jotun	18.3	0.6	0.0	0.0	19.0	1994
Mikkel	0.0	0.5	0.1	0.2	0.8	1987
Murchison	13.4	0.3	0.3	0.0	14.3	1975
Njord	16.1	0.0	0.0	0.0	16.1	1986
Norne	55.6	2.6	0.2	0.1	58.7	1992
Oseberg	311.2	13.0	1.3	1.3	327.9	1979
Oseberg Sør	15.3	0.0	0.0	0.0	15.3	1984
Oseberg Vest	1.1	0.0	0.0	0.0	1.1	1984
Oseberg Øst	12.6	0.0	0.0	0.0	12.6	1981
Sigyn	0.0	0.9	0.3	1.1	2.6	1982
Sleipner Vest and Øst [3]	0.0	95.5	14.7	46.5	170.0	1974

Field	Oil mill Sm³	Gas bill Sm³	NGL mill tonnes	Condensate mill Sm³	Oil equiv. 1) mill Sm³	Discovery year 2)
Snorre	117.8	4.9	3.4	0.7	130.0	1979
Statfjord	534.7	47.6	10.7	3.5	606.1	1974
Statfjord Nord	28.2	1.5	0.4	0.1	30.6	1977
Statfjord Øst	28.3	2.3	0.7	0.2	32.0	1976
Sygna	6.6	0.0	0.0	0.0	6.6	1996
Tambar	3.7	0.0	0.1	0.0	3.9	1983
Tor	21.7	10.6	1.1	0.0	34.5	1970
Tordis f)	40.2	3.1	1.0	0.2	45.3	1987
Troll g)	138.5	163.1	0.0	3.9	305.5	1979
Tune	1.2	0.0	0.0	0.0	1.2	1996
Ula	64.7	3.8	2.4	0.0	73.1	1976
Vale	0.2	0.1	0.0	0.0	0.3	1991
Valhall	79.1	15.9	2.6	0.0	100.0	1975
Varg	6.4	0.0	0.0	0.0	6.4	1984
Veslefrikk	43.6	2.1	1.1	0.2	47.8	1981
Vigdis	25.7	0.0	0.0	0.0	25.8	1986
Visund	9.9	0.0	0.0	0.0	9.9	1986
Åsgard	35.3	21.7	3.1	8.5	71.4	1981
Production from fields in operation	**2661**	**758**	**65**	**71**	**3613**	
Total sold and delivered	**2708**	**870**	**69**	**71**	**3779**	

1) 1.9 is the conversion factor for tonnes NGL into Sm³.
2) Discovery year is discovery year for the oldest discovery well in the field
3) Gas production on Gugne, Sleipner Vest and Øst is measured together

a) Balder includes Ringhorne
b) Gullfaks includes Gullfaks Vest
c) Gullfaks Sør includes Gullveig and Rimfaks
d) Gyda includes Gyda Sør
e) Sleipner Øst includes Loke
f) Tordis includes Tordis Øst and Borg
g) Troll includes TOGI

Appendix

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Table 1.1.3 Fields in production and fields with approved plans for development and operation

Field	Reserves Mill Sm³ o.e.	Discovery year [4]	Operator as of 31 December 2003	Production licence/ Agreement-based area
Balder	79.7	1967	Esso Exploration and Production Norway A/S	001
Brage	51.4	1980	Norsk Hydro Produksjon AS	Brage
Draugen	141.8	1984	A/S Norske Shell	093
Ekofisk	706.3	1969	ConocoPhillips Skandinavia AS	018
Eldfisk	181.0	1970	ConocoPhillips Skandinavia AS	018
Embla	26.0	1988	ConocoPhillips Skandinavia AS	018
Fram	19.9	1992	Norsk Hydro Produksjon AS	090
Frigg	117.0	1971	Total E&P Norge AS	Frigg
Glitne	6.9	1995	Statoil ASA	048 B
Grane	120.0	1991	Norsk Hydro Produksjon AS	Grane
Gullfaks	368.7	1978	Statoil ASA	050
Gullfaks Sør	75.7	1978	Statoil ASA	050
Gungne	15.5	1982	Statoil ASA	046
Gyda	45.8	1980	Talisman Energy Norge AS	019 B
Heidrun	220.6	1985	Statoil ASA	Heidrun
Heimdal	49.3	1972	Norsk Hydro Produksjon AS	036 BS
Hod	10.4	1974	BP Norge AS	033
Huldra	17.8	1982	Statoil ASA	Huldra
Jotun	26.0	1994	Esso Exploration and Production Norway A/S	Jotun
Kristin[1]	85.7	1997	Statoil ASA	Haltenbanken Vest
Kvitebjørn[1]	73.1	1994	Statoil ASA	193
Mikkel	41.8	1987	Statoil ASA	Mikkel
Murchison	14.8	1975	CNR International (UK) Limited	Murchison
Njord	23.0	1986	Norsk Hydro Produksjon AS	Njord
Norne	104.4	1992	Statoil ASA	Norne
Oseberg	449.7	1979	Norsk Hydro Produksjon AS	Oseberg
Oseberg Sør	66.2	1984	Norsk Hydro Produksjon AS	Oseberg Sør
Oseberg Vest	8.0	1984	Norsk Hydro Produksjon AS	Oseberg
Oseberg Øst	25.3	1981	Norsk Hydro Produksjon AS	053
Sigyn	15.3	1982	Esso Exploration and Production Norway A/S	072
Skirne [1]	8.3	1990	Total E&P Norge AS	102
Sleipner Vest	152.0	1974	Statoil ASA	Sleipner Vest
Sleipner Øst	114.2	1981	Statoil ASA	Sleipner Øst
Snorre	253.9	1979	Statoil ASA	Snorre
Snøhvit [1]	188.6	1986	Statoil ASA	Snøhvit
Statfjord	641.2	1974	Statoil ASA	Statfjord
Statfjord Nord	44.0	1977	Statoil ASA	037
Statfjord Øst	42.5	1976	Statoil ASA	Statfjord Øst
Sygna	10.2	1996	Statoil ASA	Sygna
Tambar	9.6	1983	BP Norge AS	065
Tor	41.8	1970	ConocoPhillips Skandinavia AS	Tor
Tordis	66.3	1987	Statoil ASA	089

Field	Reserves Mill Sm³ o.e.	Discovery year [4]	Operator as of 31 December 2003	Production licence/ Agreement-based area
Troll [2]	1617.9	1979	Norsk Hydro Produksjon AS	Troll
Troll [3]		1983	Statoil ASA	Troll
Tune	15.7	1996	Norsk Hydro Produksjon AS	190
Ula	84.3	1976	BP Norge AS	019
Vale	3.5	1991	Norsk Hydro Produksjon AS	036
Valhall	201.4	1975	BP Norge AS	Valhall
Varg	9.3	1984	Pertra AS	038
Veslefrikk	59.2	1981	Statoil ASA	052
Vigdis	46.0	1986	Statoil ASA	089
Visund	101.5	1986	Statoil ASA	Visund
Åsgard	380.3	1981	Statoil ASA	Åsgard

1) Fields with approved development plans where production was not underway as of 31 December 2003
2) The resources comprise the total resources on Troll, also the part operated by Den norske stats oljeselskap a.s.
3) The resources are included in the above row.
4) Discovery year is discovery year for the oldest discovery well in the field.

Appendix

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Table 1.1.4 Original saleable volume and remaining reserves in fields in production

	Original saleable [1]					Remaining reserves [4]				
Field	**Oil mill Sm³**	**Gas bill Sm³**	**NGL mill tonnes**	**Conden-sate mill Sm³**	**Oil equiv[2] mill Sm³**	**Oil mill Sm³**	**Gas bill Sm³**	**NGL mill tonnes**	**Conden-sate mill Sm³**	**Oil equiv[2] mill Sm³**
Balder [a]	76.9	2.8	0.0	0.0	79.7	60.5	2.8	0.0	0.0	63.3
Brage	47.4	2.5	0.8	0.0	51.4	4.2	0.5	0.1	0.0	4.9
Draugen	132.2	6.0	1.9	0.0	141.8	36.8	5.3	1.0	0.0	44.1
Ekofisk	496.8	182.7	14.1	0.0	706.3	167.5	59.1	3.2	0.0	232.8
Eldfisk	120.3	52.0	4.6	0.0	181.0	46.4	17.9	1.2	0.0	66.6
Embla	16.4	8.0	0.8	0.0	26.0	8.2	5.4	0.5	0.0	14.6
Fram	16.1	3.7	0.1	0.0	19.9	15.5	3.7	0.1	0.0	19.3
Frigg	0.0	116.6	0.0	0.5	117.0	0.0	1.3	0.0	-0.0	1.3
Glitne	6.9	0.0	0.0	0.0	6.9	2.3	0.0	0.0	0.0	2.3
Grane	120.0	0.0	0.0	0.0	120.0	119.2	0.0	0.0	0.0	119.2
Gullfaks [b]	341.9	22.8	2.1	0.0	368.7	37.2	2.1	0.5	-0.8	39.4
Gullfaks Sør [c]	34.0	34.4	3.9	0.0	75.7	17.7	28.9	3.5	0.0	53.2
Gungne [5]	0.0	9.9	1.3	3.1	15.5	0.0	9.9	0.5	0.3	11.0
Gyda [d]	36.2	6.1	1.9	0.0	45.8	4.5	0.8	0.1	0.0	5.6
Heidrun	175.0	40.7	2.6	0.0	220.6	84.0	33.9	2.4	0.0	122.5
Heimdal	7.1	42.2	0.0	0.0	49.3	0.8	0.0	0.0	0.0	0.8
Hod	8.3	1.6	0.2	0.0	10.4	0.7	0.2	0.0	0.0	1.0
Huldra	4.7	12.9	0.1	0.0	17.8	2.3	7.2	0.1	-0.0	9.6
Jotun	25.4	0.6	0.0	0.0	26.0	7.1	-0.0	0.0	0.0	7.1
Kristin [3]	0.0	34.9	8.5	34.6	85.7	0.0	34.9	8.5	34.6	85.7
Kvitebjørn [3]	0.0	51.8	0.5	20.4	73.1	0.0	51.8	0.5	20.4	73.1
Mikkel	0.0	23.9	5.9	6.7	41.8	0.0	23.5	5.8	6.5	40.9
Murchison	13.6	0.4	0.4	0.0	14.8	0.3	0.1	0.1	-0.0	0.5
Njord	23.0	0.0	0.0	0.0	23.0	6.9	0.0	0.0	0.0	6.9
Norne	87.4	13.7	1.8	0.0	104.4	31.8	11.0	1.6	0.0	45.8
Oseberg	355.5	94.2	0.0	0.0	449.7	44.3	81.2	-1.3	-1.3	121.8
Oseberg Sør	58.2	7.9	0.0	0.0	66.2	42.9	7.9	0.0	0.0	50.9
Oseberg Vest	2.0	6.0	0.0	0.0	8.0	0.9	6.0	0.0	0.0	6.9
Oseberg Øst	24.5	0.8	0.0	0.0	25.3	11.9	0.8	0.0	0.0	12.8
Sigyn	0.0	6.7	1.9	5.0	15.3	0.0	5.8	1.6	4.0	12.8
Skirne [3]	1.6	6.7	0.0	0.0	8.3	1.6	6.7	0.0	0.0	8.3
Sleipner Vest	0.0	108.2	8.2	28.3	152.0					
Sleipner Øst [e]	0.0	63.5	12.4	27.1	114.2					
Sleipner Vest and Øst [5]						0.0	76.1	5.9	8.8	96.1
Snorre	236.9	6.9	5.3	0.0	253.9	119.1	2.0	1.8	-0.7	124.0
Snøhvit [3]	0.0	161.0	5.1	17.9	188.6	0.0	161.0	5.1	17.9	188.6
Statfjord	556.6	57.2	14.4		641.2	21.9	9.6	3.7	-3.5	35.1
Statfjord Nord	39.7	2.6	0.9	0.0	44.0	11.5	1.1	0.5	0.0	13.5
Statfjord Øst	35.8	4.0	1.5	0.0	42.5	7.5	1.7	0.8	0.0	10.7

	Original saleable [1]					Remaining reserves [4]				
Field	**Oil mill Sm³**	**Gas bill Sm³**	**NGL mill tonnes**	**Conden-sate mill Sm³**	**Oil equiv[2] mill Sm³**	**Oil mill Sm³**	**Gas bill Sm³**	**NGL mill tonnes**	**Conden-sate mill Sm³**	**Oil equiv[2] mill Sm³**
Sygna	*10.2*	*0.0*	*0.0*	*0.0*	*10.2*	*3.6*	*0.0*	*0.0*	*0.0*	*3.6*
Tambar	*7.3*	*2.0*	*0.2*	*0.0*	*9.6*	*3.5*	*2.0*	*0.1*	*0.0*	*5.7*
Tor	*27.4*	*12.0*	*1.3*	*0.0*	*41.8*	*5.7*	*1.3*	*0.1*	*0.0*	*7.2*
Tordis [f]	*58.1*	*5.0*	*1.7*	*0.0*	*66.3*	*18.0*	*1.9*	*0.7*	*0.0*	*21.2*
Troll [g]	*230.6*	*1325.7*	*31.6*	*1.6*	*1617.9*	*92.1*	*1162.6*	*31.6*	*-2.3*	*1312.5*
Tune	*2.7*	*12.9*	*0.1*	*0.0*	*15.7*	*1.6*	*12.9*	*0.0*	*-0.0*	*14.5*
Ula	*78.6*	*4.0*	*3.0*	*0.0*	*88.3*	*14.0*	*0.2*	*0.5*	*0.0*	*15.2*
Vale	*0.9*	*2.6*	*0.0*	*0.0*	*3.5*	*0.7*	*2.4*	*0.0*	*0.0*	*3.1*
Valhall	*166.5*	*26.9*	*4.2*	*0.0*	*201.4*	*87.4*	*11.0*	*1.6*	*0.0*	*101.4*
Varg	*9.3*	*0.0*	*0.0*	*0.0*	*9.3*	*2.9*	*0.0*	*0.0*	*0.0*	*2.9*
Veslefrikk	*55.0*	*2.2*	*1.1*	*0.0*	*59.2*	*11.4*	*0.1*	*0.0*	*0.0*	*11.5*
Vigdis	*42.1*	*3.2*	*0.4*	*0.0*	*46.0*	*16.4*	*3.2*	*0.3*	*-0.0*	*20.2*
Visund	*33.3*	*55.5*	*6.7*	*0.0*	*101.5*	*23.4*	*55.5*	*6.7*	*0.0*	*91.6*
Åsgard	*69.6*	*193.1*	*37.7*	*45.9*	*380.3*	*34.3*	*171.4*	*34.7*	*37.4*	*309.0*
Total	*3891.8*	*2840.9*	*188.8*	*191.1*	*7282.6*	*1230.5*	*2084.8*	*124.0*	*121.4*	*3672.3*

1) The table states expected values. All estimates are subject to uncertainty
2) The conversion factor for NGL in tonnes is 1.9
3) Fields that are approved for development but have not started producing as of 31 December 2003
4) Negative figures for remaining reserves in some fields are due to the fact that the product is not reported under original recoverable volume. This applies to produced NGL and condensate.
5) Gas production for Gungne, Sleipner Vest and Øst is measusred together.

a) Balder includes Ringhorne
b) Gullfaks includes Gullfaks Vest
c) Gullfaks Sør includes Gullveig and Rimfaks
d) Gyda includes Gyda Sør
e) Sleipner Øst includes Loke
f) Tordis includes Tordis Øst and Borg
g) Troll includes TOGI

Appendix

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Table 1.1.5 Reserves in discoveries which the licensees have decided to develop

Field	Oil mill Sm^3	Gas bill Sm^3	NGL mill tonnes	Condensate mill Sm^3	Oil equiv.[1] mill Sm^3 o.e.	Discovery year [2]
34/10-47 S Gulltopp	4.1	0.5	0.2	0.0	4.8	2002
6305/5-1 Ormen Lange	0.0	375.3	0.0	22.1	397.4	1997
Total	**4.1**	**375.8**	**0.2**	**22.1**	**402.3**	

1) 1.9 is the conversion factor for tonnes NGL into Sm^3.
2) Disc. year is the discovery year for the oldest discovery well included

Table 1.1.6 Resources in discoveries in the planning phase

Field	Oil mill Sm^3	Gas bill Sm^3	NGL mill tonnes	Condensate mill Sm^3	Oil equiv.[1] mill Sm^3 o.e.	Discovery year [2]
15/12-12	1.1	4.5	0.0	1.2	6.7	2001
15/5-1 Dagny	0.0	3.8	0.2	1.2	5.3	1978
15/9-19 S Volve	11.7	1.2	0.2	0.0	13.4	1993
2/12-1 Freja	2.9	0.6	0.0	0.0	3.5	1987
24/6-2 Alvheim	23.7	4.2	0.0	0.0	27.9	1998
25/11-16	3.6	0.0	0.0	0.0	3.6	1992
25/5-5	4.3	0.0	0.0	0.0	4.3	1995
3/7-4 Trym	0.0	3.3	0.0	0.8	4.1	1990
30/6-17	0.0	1.5	0.0	0.0	1.5	1986
30/9-19	2.3	5.9	0.0	0.0	8.1	1998
33/12-8 A Skinfaks	2.5	1.0	0.2	0.0	3.9	2002
35/9-1 Gjøa	6.5	29.4	1.5	0.0	38.8	1989
6406/2-1 Lavrans	0.0	13.9	0.0	3.9	17.8	1995
6407/1-2 Tyrihans Sør	22.0	25.3	4.3	0.0	55.5	1983
6507/3-3 Idun	0.6	17.4	0.0	0.0	18.0	1999
6507/5-1 Skarv [3]	16.8	36.0	6.0	4.0	68.1	1998
6608/10-6 Svale	11.1	0.6	0.0	0.0	11.6	2000
7122/7-1 Goliat	8.1	0.0	0.0	0.0	8.1	2000
Total	**117.0**	**148.5**	**12.4**	**11.1**	**300.2**	

1) 1.9 is the conversion factor for tonnes NGL into Sm^3.
2) Disc. year is the discovery year for the oldest discovery well included
3) 6507/5-1 Skarv has resources in categories 4F and 5F

Table 1.1.7 Resources in discoveries where development is likely, but not yet resolved

Field	Oil mill Sm^3	Gas bill Sm^3	NGL mill tonnes	Condensate mill Sm^3	Oil equiv.[1] mill Sm^3 o.e.	Discovery year [2]
1/2-1	2.1	0.0	0.0	0.0	2.1	1989
1/3-6	1.1	1.8	0.0	0.3	3.2	1991
1/5-2 Flyndre	5.1	1.6	0.0	0.0	6.6	1974
15/3-1 S Gudrun	14.0	7.7	0.0	0.5	22.2	1975
15/3-4	7.7	3.9	0.0	0.0	11.6	1982
15/5-2	0.0	4.9	0.0	0.4	5.3	1978
15/8-1 Alpha	0.0	4.1	0.5	1.0	6.1	1982
16/7-2	0.0	1.8	0.3	0.5	2.9	1982
2/4-10	2.1	0.0	0.0	0.0	2.1	1973

Field	Oil mill Sm³	Gas bill Sm³	NGL mill tonnes	Condensate mill Sm³	Oil equiv.[1] mill Sm³ o.e.	Discovery year [2]
2/4-17 Tjalve	1.0	1.6	0.1	0.0	2.8	1992
2/5-3 Sørøst Tor	1.0	0.0	0.0	0.0	1.0	1972
2/7-19	3.6	3.4	0.0	0.0	7.1	1990
24/6-1 Peik	0.0	5.3	0.0	1.2	6.5	1985
24/9-5	7.8	0.9	0.0	0.0	8.7	1994
25/8-4	1.0	0.0	0.0	0.0	1.0	1992
30/7-6 Hild	4.3	33.2	0.0	7.7	45.2	1978
33/9-6 Delta	0.5	0.0	0.0	0.0	0.6	1976
34/10-23 Valemon	0.0	12.8	0.0	1.3	14.1	1985
34/7-18	1.7	0.0	0.0	0.0	1.7	1991
34/8-12 S	1.0	0.0	0.0	1.0	2.0	2001
35/8-1	0.0	15.3	0.0	2.6	17.9	1981
6406/1-1	0.0	1.1	0.0	0.3	1.4	2001
6406/2-6 Ragnfrid	0.0	2.7	0.0	1.8	4.5	1998
6406/2-7 Erlend	0.0	1.7	0.0	1.3	2.9	1999
6406/3-2 Trestakk	5.3	1.8	0.0	0.0	7.0	1986
6407/9-9	0.3	0.3	0.0	0.0	0.6	1999
6506/11-2 Lange	1.0	0.5	0.0	0.0	1.5	1991
6506/11-7	2.2	1.0	0.0	0.0	3.1	2001
6506/12-3 Lysing	1.5	0.3	0.0	0.0	1.8	1985
6506/6-1	0.0	118.0	0.0	0.0	118.0	2000
6507/2-2	0.0	19.8	0.0	0.0	19.8	1992
6507/3-1 Alve	0.0	6.1	0.0	1.4	7.5	1990
6507/7-13	0.9	0.0	0.0	0.0	1.0	2001
6608/10-9 Lerke	0.6	0.1	0.0	0.0	0.7	2003
6608/11-2 Falk	1.0	0.0	0.0	0.0	1.0	2000
6707/10-1	0.0	38.3	0.0	0.0	38.3	1997
7/7-2	2.4	0.1	0.0	0.0	2.5	1992
7/8-3	1.5	0.0	1.8	0.0	5.0	1983
7121/4-2 Snøhvit Nord	0.0	3.5	0.0	0.2	3.7	1985
7121/5-2 Beta	3.1	3.3	0.0	0.2	6.6	1986
Total	**73.7**	**296.9**	**2.7**	**21.5**	**397.2**	

1) 1.9 is the conversion factor for tonnes NGL into Sm³.
2) Disc. year is the discovery year for the oldest discovery well included

Table 1.1.8 Resources in new discoveries where evaluation is not complete

Discovery	Oil mill Sm³	Gas bill Sm³	NGL mill tonnes	Condensate mill Sm³	Oil equiv.[1] mill Sm³ o.e.	Resource category	Diccovery year [2]
25/4-9 S	4	0.4	0.0	0.0	4.4	7F	2003
6405/7-1	35	0.0	0.0	0.0	35.0	7F	2003
6406/1-2	0	14.6	6.6	0.0	27.1	7F	2003
Total	**39**	**15.0**	**6.6**	**0.0**	**66.5**		

1) 1.9 is the conversion factor for tonnes NGL into Sm³.
2) Disc. year is the discovery year for the oldest discovery well included

Appendix

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Table 1.1.9 Discoveries that in 2003 are reported as parts of other fields/discoveries.

Discovery	Reported in field	Discovery year [1)]
15/12-10 S	Varg	1996
15/9-17 Loke	Sleipner Øst	1983
15/9-20 S	Gungne	1994
16/7-7 S	Sigyn	1997
2/11-10 S	Hod	1994
2/1-9 Gyda Sør	Gyda	1991
2/7-8	Eldfisk	1973
25/5-4 Byggve	Skirne	1991
25/7-3 Jotun	Jotun	1995
25/8-1 Ringhorne	Balder	1970
25/8-10 S Ringhorne	Balder	1997
25/8-11 Ringhorne	Balder	1997
25/8-14 S	Balder	2003
25/8-8 S Jotun	Jotun	1995
25/8-C-20	Balder	2003
30/3-6 S	Veslefrikk	1994
30/3-7 A	Veslefrikk	1998
30/3-7 B	Veslefrikk	1998
30/3-7 S	Veslefrikk	1995
30/3-9	Veslefrikk	2000
30/6-14	Oseberg Øst	1984
30/6-18 Kappa	Oseberg	1986
30/6-19 Beta Sadel	Oseberg Øst	1986
30/6-26 Gamma Vest	Oseberg	2001
30/6-27	Oseberg	2001
30/8-3	Tune	1998
30/9-10 Oseberg Sør	Oseberg Sør	1990
30/9-13 S Oseberg Sør	Oseberg Sør	1991
30/9-15 Oseberg Sør	Oseberg Sør	1994
30/9-16 K Oseberg Sør	Oseberg Sør	1994
30/9-20 S	Oseberg Sør	2002
30/9-4 S Oseberg Sør	Oseberg Sør	1985
30/9-5 S Oseberg Sør	Oseberg Sør	1985
30/9-6 Oseberg Sør	Oseberg Sør	1987
30/9-7 Oseberg Sør	Oseberg Sør	1988
30/9-9 Oseberg Sør	Oseberg Sør	1989
31/4-11	Brage	2000
33/9-0 Murchison NØ Horst	Murchison	1989
34/10-17 Rimfaks	Gullfaks Sør	1983
34/10-34 Gullfaks Vest	Gullfaks	1991
34/10-37 Gullveig	Gullfaks Sør	1995
34/10-43 S	Gullfaks Sør	2001
34/10-44 S Rimfaks Lunde	Gullfaks Sør	2001

Discovery	Reported in field	Discovery year 1)
34/10-45 S	Sum	2002
34/10-46 A	Gullfaks	2002
34/10-K-2 H Gullveig	Gullfaks Sør	1998
34/7-21 Borg	Tordis	1992
34/7-22 Tordis Øst	Tordis	1993
34/7-23 S	Vigdis	1994
34/7-25 S	Tordis	1996
34/7-29 S	Vigdis	1998
34/7-31	Vigdis	2001
34/8-4 S	Visund	1991
35/11-2	Fram	1987
35/11-7	Fram	1992
35/11-8 S	Fram	1996
6507/8-4 Heidrun Nord	Heidrun	1990
6608/10-4	Norne	1994
7120/7-1 Askeladd Vest	Snøhvit	1982
7120/7-2 Askeladd Sentral	Snøhvit	1983
7120/8-1 Askeladd	Snøhvit	1981
7120/9-1 Albatross	Snøhvit	1982
7121/7-1	Snøhvit	1984
7121/7-2 Albatross Sør	Snøhvit	1986
9/2-3	Yme	1990
9/2-6 S	Yme	1996
9/2-7 S	Yme	1997
9/2-9 S	Yme	1999
6506/12-1 Smørbukk	Åsgard	1985
6506/12-3 Smørbukk Sør	Åsgard	1985
Discovery	**Reported in discovery**	**Discovery year 1)**
2/7-31	2/7-19	1999
24/6-4 Alvheim	24/6-2 Alvheim	2003
24/9-6	24/9-5	1994
25/4-7 Alvheim	24/6-2 Alvheim	2003
30/7-2	30/7-6 Hild	1975
33/12-8 S Skinfaks B	33/12-8 A Skinfaks	2002
33/12-8 S Skinfaks S	33/12-8 A Skinfaks	2002
35/8-2	35/8-1	1982
35/9-2	35/9-1 Gjøa	1991
36/7-1	35/9-1 Gjøa	1996
6407/1-3 Tyrihans Nord	6407/1-2 Tyrihans Sør	1984
6507/5-3 Snadd	6507/5-1 Skarv	2000
6608/10-8 Stær	6608/10-6 Svale	2002

1) Disc. year is the discovery year for the oldest discovery well included

Appendix

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Table 1.8.1 Production in million Sm³ oil equivalents

	PRODUCTION			CONSUMPTION		SALEABLE PRODUCTS			
				Gas	Gas				
2003	Oil	Gas	Condensate	Flare	Fuel	Oil	Gas	NGL / Condensate	Total
Balder	3.959	0.253		0.016	0.029	3.959	0.032		3.991
Brage	1.904	0.200		0.007	0.067	1.878	0.098	0.081	2.057
Draugen	7.434	0.420		0.005	0.053	7.434	0.166	0.466	8.066
Ekofisk	16.925	3.139		0.014	0.320	17.173	2.690	0.623	20.486
Eldfisk	2.356	1.142		0.001	0.106	2.419	0.754	0.142	3.315
Embla	0.386	0.175				0.402	0.096	0.033	0.531
Fram	0.674	0.097				0.610			0.610
Frigg		0.721	0.001		0.010		0.708	0.001	0.709
Glitne	1.686	0.087		0.009	0.021	1.686			1.686
Grane	0.868	0.013		0.020	0.014	0.850			0.850
Gullfaks	9.506	5.100		0.074	0.373	9.506	0.622	0.253	10.381
Gullfaks Sør	3.379	1.683				3.379	2.542	0.449	6.370
Gungne		1.649	1.023					1.080	1.080
Gyda	0.647	0.109		0.001	0.028	0.650	0.065	0.049	0.764
Heidrun	9.069	2.131		0.019	0.131	9.070	2.099	0.140	11.309
Heimdal		0.342	0.059	0.006	0.059	0.057	0.396		0.453
Hod	0.291	0.061				0.330	0.054	0.014	0.398
Huldra		3.106	0.909	0.000		1.181	2.958	0.020	4.159
Jotun	2.235	0.099		0.005	0.046	2.235	0.048		2.283
Mikkel		0.581					0.463	0.347	0.810
Murchison	0.113	0.012		0.002	0.013	0.114			0.114
Njord	1.764	2.951		0.006	0.072	1.764			1.764
Norne	8.552	1.885		0.006	0.147	8.551	0.756	0.147	9.454
Oseberg	10.315	10.353		0.024	0.379	9.175	4.958	1.025	15.158
Oseberg Sør	5.053	1.699		0.004	0.083	5.060			5.060
Oseberg Øst	2.204	0.281		0.005	0.034	2.188			2.188
Sigyn		0.911	1.682				0.913	1.648	2.561
Sleipner Vest		7.783	3.049	0.006	0.085			3.152	3.152
Sleipner Øst incl. Loke and sale-able gas from Sleipner Vest		5.538	2.160	0.005	0.226		13.233	2.264	15.497
Snorre	13.815	2.098		0.020	0.207	13.598	0.406	0.667	14.671
Statfjord	7.754	5.182		0.063	0.396	7.754	1.194	0.624	9.572
Statfjord Nord	2.836	0.215				2.836	0.184	0.138	3.158
Statfjord Øst	1.989	0.282				1.990	0.242	0.180	2.412
Sygna	1.636	0.099				1.635			1.635
Tambar	1.463	0.341				1.463		0.072	1.535
Tor	0.162	0.029			0.008	0.163	0.017	0.006	0.186

	PRODUCTION			CONSUMPTION		SALEABLE PRODUCTS			
				Gas	Gas				
2003	**Oil**	**Gas**	**Condensate**	**Flare**	**Fuel**	**Oil**	**Gas**	**NGL / Condensate**	**Total**
Tordis	4.108	0.468				4.115	0.329	0.260	4.704
Troll	21.077	26.847	0.638	0.023	0.239	20.910	26.169	1.515	48.594
Tune		3.204	1.116			1.139		0.042	1.181
Ula	1.070	0.189		0.003	0.054	1.071	0.050	0.084	1.205
Vale		0.110	0.135			0.150	0.119		0.269
Valhall	3.590	1.003		0.006	0.080	4.155	0.861	0.197	5.213
Varg	0.921	0.282		0.005	0.011	0.921			0.921
Veslefrikk	1.709	0.686		0.009	0.056	1.686	0.031	0.023	1.740
Vigdis	3.362	0.272				3.362	0.038	0.053	3.453
Visund	2.021	2.598		0.014	0.070	2.021			2.021
Åsgard	6.980	21.711		0.048	0.329	6.980	10.073	7.862	24.915
Total 2003	**163.813**	**118.137**	**10.772**	**0.426**	**3.746**	**165.620**	**73.364**	**23.657**	**262.641**
Total 2002	173.408	107.518	9.306	0.415	3.574	173.649	65.501	19.608	258.758
Total 2001	180.508	94.569	8.592	0.551	3.402	180.940	53.878	17.387	252.205
Total 2000	181.641	90.266	8.749	0.685	3.267	181.181	49.748	13.498	244.427
Total 1999	170.693	80.255	9.812	0.660	2.647	168.690	48.479	13.488	230.657
Total 1998	170.039	72.594	9.433	0.441	2.890	168.744	44.190	13.388	226.322
Total 1997	178.388	70.365	10.133	0.411	3.034	175.914	42.950	14.474	233.338
Total 1996	177.282	59.456	8.400	0.448	2.833	175.422	37.407	12.674	225.503
Total 1995	157.926	47.190	6.971	0.409	2.640	156.776	27.814	11.668	196.258
Total 1994	147.674	45.393	5.300	0.364	2.630	146.282	26.842	9.952	183.076
Total 1993	133.770	41.576	1.464	0.340	2.544	131.843	24.804	6.072	162.719
Total 1992	125.936	42.444	0.615	0.309	2.449	123.999	25.834	5.013	154.846
Total 1991	110.513	39.717	0.603	0.356	2.257	108.510	25.027	4.955	138.492
Total 1990	96.844	37.065	0.560	0.556	2.132	94.542	25.479	5.059	125.080
Total 1989	88.266	39.320	0.587	0.474	2.013	85.983	28.738	4.951	119.672
Total 1988	66.882	36.302	0.631	0.336	1.818	64.723	28.330	4.893	97.946
Total 1987	58.538	34.499	0.614	0.434	1.443	56.959	28.151	4.171	89.281
Total 1986	50.579	33.924	0.376	0.258	1.311	48.771	26.090	3.906	78.767

3 Appendix

Units of measurement for oil and gas

Oil and gas are often stated in volumetric units under defined ISO standard conditions (temperature = 15°C and pressure = 1.01325 bar). Oil volumes are stated in million Sm^3 (10^6 Sm^3) and gas volumes in billion Sm^3 (10^9 Sm^3).

Oil and gas volume units are converted to oil equivalents when adding or comparing oil and gas resources and when an exact figure for the quantity is not needed.

The conversion to oil equivalents is based on the amount of energy that is released during oil and gas combustion.

As of 1 January 1996 the Norwegian Petroleum Directorate states the total petroleum resources in Sm^3 oil equivalents (Sm^3 o.e.). The following conversion factors are used for conversion to Sm^3 o.e.:

1 000	Sm^3 gas is equivalent to:	1 Sm^3 o.e.
1	Sm^3 oil is equivalent to:	1 Sm^3 o.e.
1	Tonne NGL is equivalent to:	1.9 Sm^3 o.e.
1	Sm^3 condensate is equiv. to:	1 Sm^3 o.e.

For conversion of NGL from tonnes to Sm^3 o.e., a factor of 1.3 tonnes/Sm^3 o.e. has previously been used. This has now been changed to 1.9 tonnes/ Sm^3 o.e.

Other conversion factors		
Gas	1 cubic metre	35.30 cubic feet
Crude oil	1 Sm^3	6.29 barrel
	1 Sm^3	0.84 tonne o.e.
	1 barrel	159 litre
	1 tonne	7.49 barrel

The geological time scale