

50 fantastic years

Scaring off students

Pundit ponders



NORWEGIAN

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SHELF

A JOURNAL FROM THE NORWEGIAN PETROLEUM DIRECTORATE

NO 1 - 2015

CONTENTS

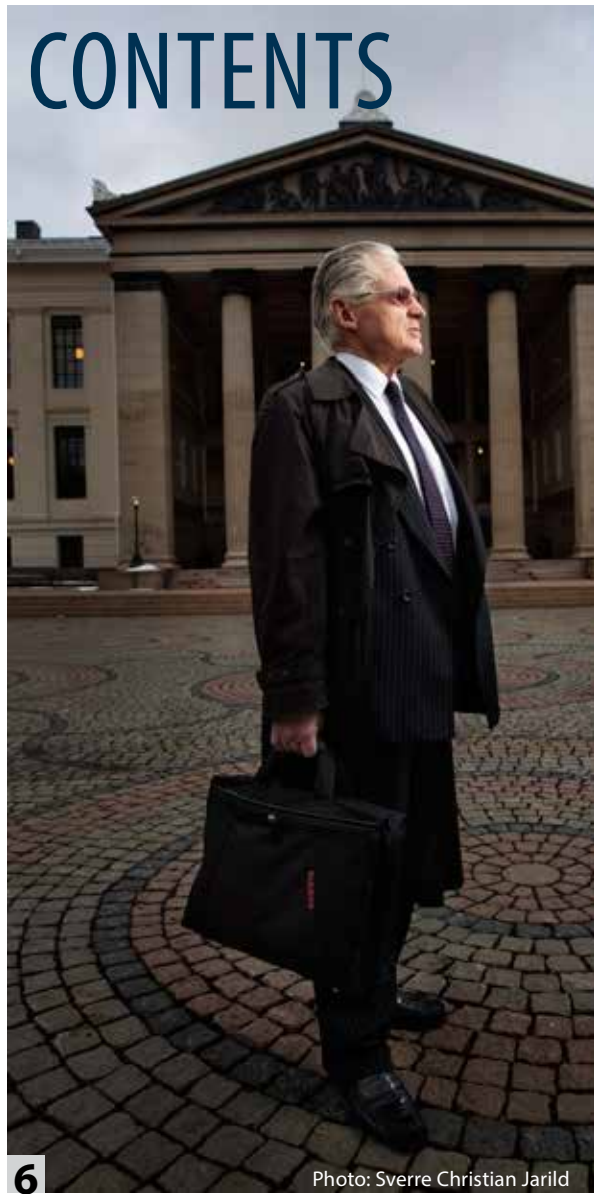


Photo: Sverre Christian Jarild



FRONT COVER

Key figures from the history of oil city Stavanger. Former law-of-the-sea minister Jens Evensen (1), former Statoil CEOs Arve Johnsen (2), Harald Norvik (9) and Helge Lund (10), first Norwegian petroleum and energy minister Bjartmar Gjerde (3), former mayor Arne Rettedal (7), and former top NPD staffers Fredrik Hagemann (8), Gunnar Berge (5) and Farouk Al-Kasim (6) – while 19th century novelist Alexander Kielland (4) looms in the background. (Illustration: Roar Hagen)

Past achievers	4
With law shall the land be built	6
In at the start	11
Found his field	14
First to find	16
Dry debut	17
Drawing lessons	18
Celebrating wise choices	21
Work for generations	22
The interview: Watcher in the wings	24
Doubts return over oil jobs	30
A move closer to chess in schools	33
NPD profile: Passionate communicator	34
Facts for the future – or scaremongering?	36
Rockshot: Raining ash	39
Facts sited	40
Oil Facts	40



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Learn from the past

History is full of far-sighted people, and that holds true for Norway's oil saga as well. We should learn from them, particularly when many observers are talking down the Norwegian oil and gas sector.

This issue gives space to several oil pioneers who deserve the nation's thanks. In the years before and after the first offshore licensing round in 1965, they laid the basis for today's activity on the NCS.

They were visionary, and they

security. While this North Sea field alone will provide thousands of jobs for several decades to come, it represents an exception and more such giant finds are fairly unlikely.

Many discoveries still lack a plan for development and operation (PDO), but only a few are genuinely time-critical – such as "Trestakk" and "Maria" in the Norwegian Sea.

A lot of these finds, particularly in the North Sea, will be developed with subsea solutions

recent years to recruit more engineers and geoscientists.

The level of activity on the NCS is pretty certain to remain high for the next two decades. So we will need more good brains to replace those of today's personnel who are now in their 50s.

All the cuts mean that many people are chasing each new job which comes on the market. We have advertised four vacancies, and received around 230 applications.

But what worries us is long-term recruitment to the industry. And the oil companies do not appear to have learnt anything from the last downturn. They should take the time to read the comments from Norway's oil pioneers in this issue.

The whole nation is still benefiting from the legal framework and the organisation shaped at that time.

thought and acted for the community. The whole nation is still benefiting from the legal framework and the organisation shaped at that time.

NOK 200-250 billion is due to be invested annually on the NCS over coming years. That is on a par with a few years back, when all the indicators seemed to point sky-high. We in the NPD were concerned at an early stage that a high level of activity would put pressure on prices – and boost costs.

Eight development projects are currently under way on the NCS. We are still seeing great interest by the industry in new licences, and the long-term activity picture looks good.

In that perspective, it is important that Johan Sverdrup does not create a false sense of

tied back to existing facilities.

The level of activity is declining, and the number of exploration wells drilled this year is likely to be below the 2014 figure of 56.

We are assuredly experiencing a crisis where many people have lost their jobs. Those who have failed to find new employment are naturally suffering personally and in their pocket.

But these conditions are likely to be transitory. So it is depressing to see that the cuts being made by the companies en masse are once again frightening young people away. The decline in applications to study petroleum-related subjects at university is dramatic.

That makes it reasonable to ask whether the oil companies have thought this through properly, given the struggle over



Bente Nyland

Bente Nyland
director general



Oil pioneers in government and civil service during the 1960s, depicted by Roar Hagen. This cartoon occupies a central place in the Norwegian Petroleum Museum's new exhibition.

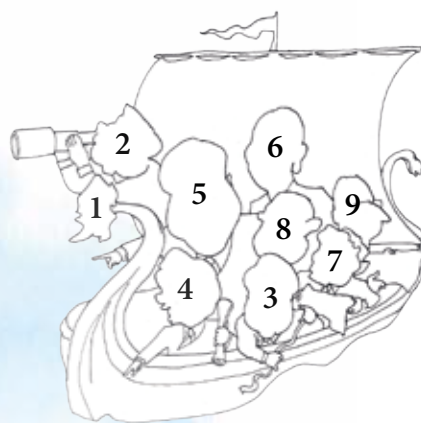
Prime minister Einar Gerhardsen (1) and his government declared Norwegian sovereignty over natural resources on the NCS in 1963. Key figures behind this decree were Jens Evensen (2) at the foreign ministry and his colleagues Leif Terje Løddesøl (3) and Carl August Fleischer (4).

Nils B Gulnes (5) at the industry ministry played a key role as Norway's first oil bureaucrat in work on

the initial licensing round. Conservative politician Sverre Walter Rostoft (6) became industry minister after the 1965 general election.

The following year, Gulnes acquired two new colleagues – geologist Fredrik Hagemann (7) and engineer Olav K Christiansen. Farouk Al-Kasim joined the team in 1968.

And the discovery of Ekofisk was announced immediately before Christmas 1969.



Past achievers

| Bjørn Rasen and Roar Hagen (illustration)

A group of young Norwegian civil servants are wreathed in satisfied smiles on 13 April 1965. The government's official gazette has invited the oil companies to apply in the country's first offshore licensing round.

An extensive and groundbreaking effort to bring Norway into the oil age is over. What matter, then, that a light rain is falling in Oslo and the temperature is only 3-4°C.

At the same time, in a sunnier London, four other young men are recording the song *Help!* at the Abbey Road studio – another event which helped to shape history.

Fifty years have passed since that first round on the NCS, and production is set to last at least another 50. The Beatles are gone, but nobody would be surprised if their music is still being played as the giant Ekofisk and Johan Sverdrup fields near their end.

Norwegian Continental Shelf has interviewed three key figures about what had to be done before drilling could begin in Norway's North Sea.

To safeguard the sub-surface resources, it was first necessary to clar-

ify which parts of the continental shelf belonged to Norway – a subject covered by lawyer Carl August Fleischer.

Two of the first officials working on oil in the Ministry of Industry's mining office, Nils B Gulnes and Fredrik Hagemann, also explain how they had great freedom of action.

Virtually without political interference, they and their colleagues quickly put in place the legislation and organised the new activity.

That was at a time when the film version of *The Sound of Music* was a big hit across Norway – its audience record of 681 000 in Oslo remains unbeaten.

This issue also carries an interview with pundit Hans Henrik Ramm, who has kept tabs on the Norwegian oil adventure since the 1970s.

And, not least, newspaper cartoonist Roar Hagen contributes his take on the industry – in words and images – in his own distinctive way.

Hagen's cartoons have a key place in an exhibition which opens at the Norwegian Petroleum Museum in Stavanger on 9 June to celebrate the 50th anniversary of Norway's first licensing round.



With law shall the land be built

Much would have looked different today had Norway failed to take possession of its offshore resources 50 years ago. Ownership was proclaimed with a special Act penned by Carl August Fleischer.

| Astri Sivertsen and Sverre Christian Jarild (photos)

“... and it says the following here ...” Fleischer refers to the note he wrote in 1962, which formed the basis for the Act passed the following year.



“Farsighted? This wasn’t about being farsighted,” Fleischer snorts. He points to a newspaper article on Jens Evensen, and says the hero status accorded to his old boss and Norway’s first and last law-of-the-sea minister is exaggerated.

The former civil servant sits with a bundle of newspaper cuttings and documents from the 1960s one floor above the law faculty library at the University of Oslo - an impressive mid-19th century building.

Fleischer wants to correct errors in the presentation of events where he played a key role after joining the legal department of the Ministry of Foreign Affairs as a 24-year-old law graduate in November 1960.

Evensen became a director general in the ministry the following year, and by 1962 the legal department understood that something was brewing.

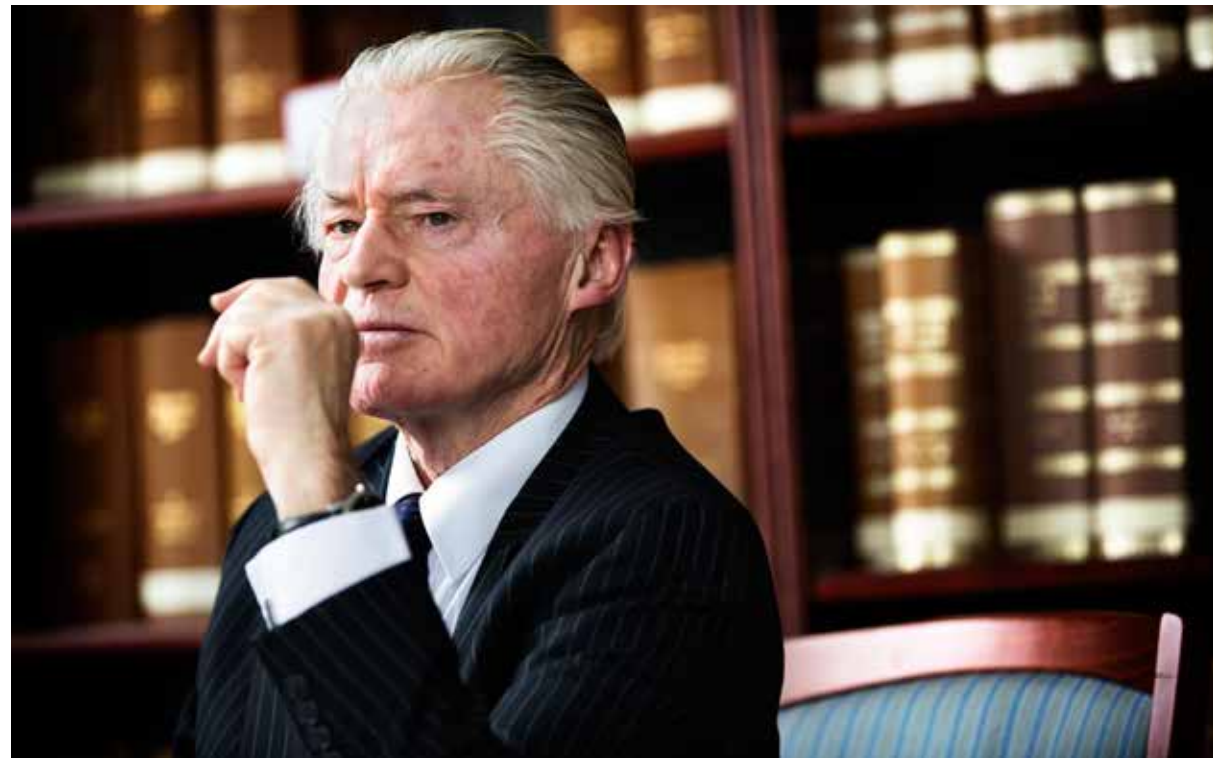
Division head Einar-Fredrik Ofstad had a meeting in late October with US oil independent Phillips Petroleum, which presented plans to hunt for oil in the North Sea.

During the winter and spring, similar approaches were received from several other oil companies. Five permits to conduct seismic surveys, for instance, were awarded in this period.

“It was clear, of course, that not seeking to safeguard Norwegian interests would be nothing less than a dereliction of duty,” says Fleischer.

Together with Ofstad and Evensen, he began drafting a Bill to regulate petroleum operations on the NCS – not because Norwegian sovereignty was in doubt, but to prevent what he calls “unfortunate dispositions” and to give the govern-

“We must admit in retrospect that we were pretty farsighted and pretty smart.”



Norway's sovereignty over the continental shelf has never been in doubt, says Carl August Fleischer.

ment a management tool in this area.

Where the sovereignty issue is concerned, Fleischer sharply criticises an assertion in a 1992 history of Norwegian oil – which has since become received wisdom – that the continental shelf was not under national jurisdiction.

“That’s completely wrong,” he says. “I can’t think who the authors can have talked to.”

He points out that the UN’s Geneva conference on the law of the sea in 1958 made it unequivocally clear that the coastal state has sole rights to the continental shelf.

Nobody else can conduct activities there without the coastal state’s consent. And no formal

proclamation of sovereignty is necessary.

“But if you’re going to forbid somebody to do something in Norway, you have to have enabling legislation,” Fleischer explains.

Although nobody could know whether oil existed in the sub-surface off Norway, he says that this was not reason enough to refrain from safeguarding the country’s national interests.

“The probability was relatively high, or at least sufficiently high to be worth passing a law.”

According to Fleischer, there was no reason to underestimate the oil industry. Several companies had already begun to prepare seismic surveys covering

parts of Norway’s North Sea sector.

The country ran the risk that these players might take matters into their own hands, make discoveries, install platforms and claim ownership of discoveries in the area.

So getting an Act in place was a matter of urgency. Fleischer observes that work on a piece of legislation in Norway can take 20 years or more, and neither the justice nor the industry ministries were moving fast enough to satisfy Evensen’s team.

The industry ministry had its hands full anyway, in part because of the Kings Bay mining disaster which occurred in Svalbard during November 1962.

This meant that the job of drafting the legislation devolved on the foreign ministry – for the first and last time in its history.

“Evensen’s dynamism and efficiency were a key reason why it was accepted that we should prepare the text, rather than waiting for the other ministries to do lengthy studies,” says Fleischer.

The legal framework was in place less than seven months after the first meeting with Phillips, mainly and in all modesty penned by Fleischer.

This Act no 12 of 21 June 1963 on exploration for and exploitation of submarine resources served as enabling legislation and remained in force until the first Petroleum Act of 1985.

It declared that resources on and beneath the seabed off Norway were state property, and that it was for the Crown to decide who could pursue offshore operations.

Such an outcome was by no means given. Denmark, for example, chose a completely different model, giving shipowner A P Møller a sole licence to produce oil along with Gulf and Shell.

Phillips had sought a similar solution in Norway, but failed to achieve it – something Norwegians and tomorrow’s pensioners have every reason to be pleased about.

After the Act had been unanimously passed by the Storting (parliament) on 21 June 1963, administrative responsibility for

the oil business returned the industry ministry, its natural home.

“But it was the legal department of the foreign ministry which changed Norway,” comments Fleischer

Unclearified

The Act might have been passed, but some unclearified issues remained to be tackled by the foreign ministry’s lawyers – including undefined boundaries with the other North Sea states.

Problems might have arisen here – not least because of the Norwegian Trench, a submarine valley up to 100 kilometres wide which hugs Norway’s south-west coast.

This feature descends to depths of more than 700 metres. Had the boundary been drawn on the Norwegian side of it, the country’s oil adventure would never have happened.

Fleischer joined the ministry in 1960 to work on one of the biggest and most difficult foreign policy issues of the day – extending Norway’s fishing limits from four to 12 nautical miles.

Experience from these negotiations, and the knowledge gained about international law and politics, proved very useful when the offshore boundaries with Britain and Denmark came to be drawn.

The Geneva convention on

the continental shelf built on the median line principle for establishing offshore boundaries between two states.

However, it also contained a formulation that continental shelf jurisdiction was limited to waters less than 200 metres deep unless resources could feasibly be recovered from greater depths – but in any event not beyond the median line with other states.

“The median line was approved almost unanimously at the 1958 Geneva conference,” says Fleischer. “When oil was later found, however, a number of states discovered it didn’t pay for them.”

According to Norway, this principle should apply without reservations. And it maintained that the Norwegian Trench had no significance.

“But we ran the risk of somebody pushing the opposite argument,” Fleischer points out, and says that the result could have been lengthy legal disputes.

“And if you do end up in court, you basically never know how things will turn out.” One lesson he is happy to pass on is never to become involved with the international legal system.

Fortunately, the UK representative at the Geneva conference had stated openly that a chance depression like the Norwegian Trench should not play any role.

In reality, therefore, the median line negotiations with Britain presented no difficulties,



Fleischer has alternated during his long working life between academia and practical foreign policy.

says Fleischer, who had a special responsibility for them as acting head of division.

A boundary line treaty was signed by the two countries on 10 March 1965, just a year after the UK had contacted Norway to secure a clarification of this issue.

The British had sent maps to the foreign ministry, which were validated by Norwegian mapping experts. Fleischer remembers “as if it were yesterday” lying on the floor of his fine office and studying the maps with colleague Leif Terje Løddesøl.

They could find no fault with them, but Fleischer had heard that paper could shrink and cause distortions. For safety’s sake, he wanted the Geographical Survey of Norway to do an extra check.

The geodesy specialists at the latter said that the UK had sent over maps based on the Mercator projection without correcting for the fact that the Earth is actually spherical.

This meant that the boundary line was displaced closer to the Norwegian coast, and would in other words give the British a bigger area than they were entitled to.

Although it only involved a few kilometres, Fleischer says the deviation could have cost “some of

the minor things around Ekofisk.” But the error was discovered and the boundary corrected.

The Danes were next in line, and negotiations with them were more complicated since, according to Fleischer, they tried their hand at double-dealing.

They sought an agreement on the median line with a secret clause which would allow any deal to be renegotiated if this principle was not accepted by other North Sea states.

A story has circulated among the Danes in later years that they “lost” Ekofisk to Norway because of the Danish foreign minister’s irresponsible relationship with alcohol.

Fleischer rejects this tale as pure myth. Had the request for a secret clause been accepted by the Norwegian negotiators, however, Ekofisk could well have ended up in Denmark’s sector.

The distance from this major field to the boundary with the Danes is not great, so a relatively minor adjustment might have put it on the other side.

“If we hadn’t found a solution in 1965, we might have had to continue talks with Denmark,” Fleischer concedes. “And, depending on how weak our negotiators were, a different solution in our disfavour might obviously have been possible.”

In the end, the Danes yielded and a treaty based on the median line principle and without secret clauses was finally signed on 8 December 1965.

That occurred, in other words, after the first-round licences had been awarded. Because of the unclear position, Norway held back from including some blocks along the proposed boundary.

Rotating

Fleischer is no ivory-tower theorist, but has spent 55 years rotating between the foreign ministry – where he remains a special adviser on international legal issues – and

the University of Oslo. He is now a professor emeritus in jurisprudence.

His professional career has thereby been a combination of academia and practical foreign policy. Over the years, he has negotiated with other governments on pipelines, tax rules and unitisation of shared offshore petroleum deposits.

“Among other things, I helped to make Statoil a big company,” he observes.

Under the unitisation agreement on Statfjord with the UK government, which he helped to negotiate, Statoil was to take over as operator of this field from USA’s Mobil after ten years.

The British nevertheless asserted that they could demand the retention of Mobil. But Fleischer was unbending – consent for a change of operator was already enshrined in the original deal.

He maintains that the Norwegian government was initially ready to yield to the UK view. But its resolve stiffened after he had provided Knut Dæhlin, the senior industry ministry official leading the negotiations, with legal arguments.

The government refused to allow Mobil to continue, and Statoil could thereby move into the driving seat for the North Sea’s biggest oil field in 1987.

“When things get too difficult, we usually turn Fleischer loose on them,” Dæhlin is alleged to have said by a central source in Norway’s oil administration. “Them” in this case was the UK.

Fleischer has not been involved in active negotiations during the present century, but is much in demand by the foreign ministry as an adviser.

He looks back on the events of more than 50 years ago, and characterises the 1963 Act as Norway’s “most extensive law on property ever in geographical terms.”

And he concludes: “We must admit in retrospect that we were pretty farsighted and pretty smart.”



Nils B Gulnes and his colleagues in the Ministry of Industry were allowed to work for five years without political interference. “And that meant we could create a system which is still doing its job today,” he says. “I don’t believe the result would have been the same with political involvement.”

In at the start

Law graduate Nils B Gulnes was the first person hired by the Ministry of Industry to deal with “oil”. He got the job in late 1964 because his future boss heard from a neighbour that he could probably speak English.

| Bjørn Rasen and Sverre Christian Jarild (photos)

The first administrative and legislative work for the coming oil nation was done by the Ministry of Foreign Affairs, with senior official Jens Evensen taking the lead.

“His presence was a godsend,” says Gulnes. “The way he worked – commercially minded, open to fresh ideas and not frightened to get involved in new things – meant we got a very good system for the NCS.”

The continental shelf committee chaired by Evensen, with Leif Terje Løddesøl as secretary and lawyer Carl August Fleischer, submitted the recommendation which led to the royal decree of 9 April 1965 on petroleum exploration and exploitation on the NCS.

Aged 79, Gulnes retired on 31 March from his final employment as adviser to the Norwegian subsidiary of Japan’s Idemitsu oil

company. He says it has been a fantastic 50-year journey.

The Ministry of Industry took over the baton from the foreign ministry on 1 January 1965, and its mining office was given the job of launching Norway’s first offshore licensing round.

The office already had many duties, and was a little nervous about taking on responsibility for the oil business as well – with the English skills that this called for.

Applications were invited from lawyers who could speak the language and would work on something called “oil”. Nobody responded.

Division head Thorgrim Haga was worried and asked his neighbour whether she knew a forthcoming law graduate who might work for him. The woman said Gulnes was a naval officer, which

meant he could probably speak English.

“She suggested I paid Haga a visit,” Gulnes recalls. “After a 30-minute chat, he asked me to pen two lines: ‘I hereby apply for the job of temporary secretary’. I was given the job on the spot.”

Clean

Gulnes began work on 2 January 1965. After that, everything happened fast. The legislation was in place by 9 April, and 278 blocks on the NCS were put on offer four days later.

“It was Norway’s biggest-ever licensing round,” Gulnes says. “We received 11 applications by the 15 June deadline, and awarded the first licences on 17 August.”

Nine of the 11 applicants were successful. The round embraced

“Without the advice from the British about the work programme, it could have taken many more years before we’d found oil.”

all the blocks south of the 62 parallel (the northern boundary of the North Sea) except for some along the boundary with Denmark.

A lot has been said and written about Norway’s North Sea boundary with the Danes, but Gulnes maintains that most of this is rubbish. There was never any question of Ekofisk becoming Danish.

Noting that the relevant documents become public this year, after half-a-century, he says nobody is likely to find any nuggets of gold there.

“Most things were dealt with orally and we didn’t have time to write it all down. We solved the problems and didn’t commit that much to paper.”

Report no 22 to the Storting (parliament) in 1965 was the first White Paper to deal with oil, and Gulnes says that the politicians had no comments.

“I was so disappointed. There was a 30-minute debate, which focused largely on whether seismic surveys could damage fishing activity. Few people, if any, believed in the oil business.”

Best

At the same time, the lack of debate on the big issues in the Storting was the best that could happen. Gulnes says they were able to work for five years without political interference.

“And that meant we could create a system which is still doing its job today. I don’t believe the result would have been the same with political involvement. That wouldn’t be possible today.”

Gulnes recounts how, as secretary to the petroleum council, he wrote letters with Evensen in the foreign ministry, which then landed on his desk at the industry ministry. “And that was that. The senior ministry officials supported us in everything we did.”

The basis was laid before 1965, when Evensen and his team got

help from the British to draw up Norwegian legislation – but this differed in some respects from the UK provisions.

In Gulnes’ view, Norway was fortunate. During negotiations on the North Sea boundary, the British agreed that the Norwegian baseline should be drawn to include the country’s outermost islands.

“That was fantastic, given that the UK had no equivalent to our skerries. This concession gave us a bigger share of the continental shelf.”

The initial well drilled in 1966 found sedimentary rocks. So the first requirement for oil was in place. The politicians began to get interested after Ekofisk was found in 1969.

“Prime minister Per Borten ordered all members of the Cabinet to take lessons from us on the oil business,” Gulnes explains.

“We lectured from 17.00 to 22.00. Borten was interested. When the rest of the ministers left, he kept us behind for another hour to learn more.”

The Storting’s standing committee on industry also wanted lessons. “That gave us an advantage, because we got to shape them,” says Gulnes.

Meetings

He highlights the many working meetings held by the industry ministry team with Angus Beckett, under-secretary at the time in Britain’s Ministry of Power.

“He gave us the most valuable advice we could get – namely, that we should have a work programme which was expressed in wells down to a certain depth rather than in money spent.”

The UK had found in 1964 that drilling wells was very costly, and a work programme specified in cash was soon exhausted. Nor did the government have any way of enforcing further activity.

That was crucial to the discov-

ery of Ekofisk, Gulnes emphasises. “Operator Phillips came to us in 1969 and said it had drilled four times without success.

“The company wanted to skip the final well in the programme. We answered that this was fine, but it would then have to pay what the well would have cost.”

The US operator also had *Ocean Viking* on a long-term charter. So it opted to drill the last well – and discovered Ekofisk.

“Without that advice from the British about the work programme, it could have taken many more years before we’d found oil,” says Gulnes.

Ekofisk is now halfway through its producing life, and he recalls that the original recovery factor for the field was 12-14 per cent of the oil in place.

“We’re now up to 50 per cent. That’s quite fantastic. Technological progress has been incredibly rapid. Norwegian industry was interested from the start and saw the opportunities.

“Shipping companies and fishing boat owners were quick to adapt their vessels. And Aker built the first Norwegian platform as well as developing new concepts.”

Gulnes cannot see that the business he has now left is even close to being a sunset industry. On the contrary, he thinks Norway’s oil sector will last for at least another century.

He points to the recent massive Johan Sverdrup discovery as evidence that “it’s never too late to explore”, and feels today’s debate is based on a misunderstanding.

“We’ve had oil price reductions several times. They last a few years, and then recover. The oil companies have again been stupid and started firing people.

“Then they have to start anew later. That’s very short-sighted, and reflects their preference for thinking in terms of quarterly results.

“Their focus is on the stock market, which is destructive for a long-term business. And it’s silly,

Nils B Gulnes quit the industry ministry as a deputy director in 1973 to build up the oil department at DnC over 12 years and then to serve as the head of Amerada Hess’ Norwegian subsidiary for 15 more. He subsequently worked as a lawyer for a decade until reaching 75, and ended his career on 31 March at the age of 79 as an adviser for Idemitsu.



after all, because the government meets the bulk of the bill for employees.

“Pay is a tax-deductible operating expense, and retaining people accordingly costs little. However, things are different for the supplies industry.”

He says that this is not the first time the industry has suffered a depression. In 1969, the oil companies – including Phillips – said they wanted to pull out of the NCS because they did not believe any oil was to be found.

“That was perhaps our first oil crisis. And a number of people in the ministry wondered if we hadn’t backed the wrong horse.”

Revenues

Gulnes and his industry ministry colleagues – Fredrik Hagemann (see separate article), Olav K Christiansen and Iraqi geologist Farouk Al-Kasim – began to see the revenues rolling in.

“Some of us wanted Norway to buy controlling interests in non-oil companies, like Nestlé, in order to develop other types of Norwegian industry,” he says.

“That idea was proposed in 1971-72, but it didn’t happen, of course. In the end, we got the petroleum fund. I didn’t agree with it at the time.

“We also wanted a holding company to look after the agreements on state participation we’d

negotiated with the oil companies. We’d become licensees and sat in licence management committees. That was a hopeless role.”

The ministry had three hats. It was responsible for safety on the NCS, it acted as the licensing authority, and it handled the government’s commercial interests through deals with the companies. This was an untenable position.

Gulnes says the safety responsibility was not made any easier because Norway already had a Labour Inspection Authority, a Maritime Directorate and a Civil Aviation Authority.

If these three were allowed to act independently, the ministry felt the oil companies would find themselves in an impossible position – and prevented from doing their job. Coordination was necessary.

“We needed a technical agency to help us, which became the NPD, and then a company which could deal with the government’s commercial interests,” Gulnes explains.

“Our aim wasn’t to build up a state oil company. That came later. What we wanted was an equivalent to today’s state-owned Petoro enterprise.”

But that was not how it turned out. Arve Johnsen and Jens Christian Hauge, respectively president and chair of Statoil, had other ideas.

And Finn Lied came into government with the Labour Party. This trio knew each other well, and

the state oil company accordingly developed along different lines than originally envisaged.

Gulnes recalls that some wanted Norsk Hydro to take this role, and the Borten government increased the state stake in the industrial group from 48 to 51 per cent.

“That wasn’t what we wanted. We couldn’t give a free gift to the 35 per cent of Hydro’s shareholders who were French citizens. That was out of line with our thinking in the ministry.”

Nor were the civil servants keen on getting three Norwegian oil companies – Statoil, Saga Petroleum and Hydro. But Den norske Creditbank (DnC) wanted to merge various small players.

“At a lunch, the bank asked if we were opposed to the merger of several small enterprises into a single Norwegian company,” Gulnes reports. “We said it was fine. So we got Saga.”

At the end of his professional career, Gulnes sums up the development he has witnessed from the sober society of the 1960s to an international community today.

“Norway’s become a completely different country. We’ve managed to handle all the money we’ve gained. But the wealth hasn’t only been good for us.

“We’ve become a bit spoilt, and things are a little too easy for us. At the same time, it’s created an incredible range of opportunities for many people.”



Found his field

A long-standing fascination with the petroleum industry meant young government geologist Fredrik Hagemann was quick to shift from seeking water to oil prospecting when the chance arose in 1966. He later became the NPD's first director general.

| Bjørn Rasen (text and photo)

Fredrik Hagemann headed the NPD from its creation in 1972 until 1996. His portrait hangs in the directorate.

The year after the first licences were awarded on the NCS, Hagemann secured a temporary job with the Ministry of Industry's mining office.

Here he joined lawyer Nils B Gulnes (see separate article) and engineer Olav K Christiansen. "Some seismic surveys had been done, but we knew little at that time," he recalls.

Hagemann had previously worked on water exploration with the Norwegian Geological Survey (NGU), and his colleagues thought he was mad to leave.

"I didn't actually get a permanent job to begin with," he observes. "I was on leave of absence from the NGU for the first year."

He is also quick to deny any involvement with the NGU's notorious comment in a letter to the Ministry of Foreign Affairs in February 19578.

This put matters bluntly: "The chances of finding coal, oil or sulphur on the continental shelf off the Norwegian coast can be

discounted."

Hagemann notes that the definition of what constituted Norway's coastline was crucial. The boundary negotiations with the UK in the North Sea were like going back a millennium.

"We hadn't pursued territorial claims since the Viking Age," Hagemann points out. "The base line was set at the outermost islets, and our negotiators knew every rock at low tide.

"That meant we got our boundary pushed further west. And that's obviously interesting when we see the big North Sea discoveries close to or straddling the boundary."

Potential

Unlike the NGU, the trio in the mining office believed in the potential, he says. "Everyone else was pessimistic, including the politicians and industry.

"We can moreover thank God that the politicians didn't interfere

with us. We were able to put a lot in place during the early years before Ekofisk became a reality."

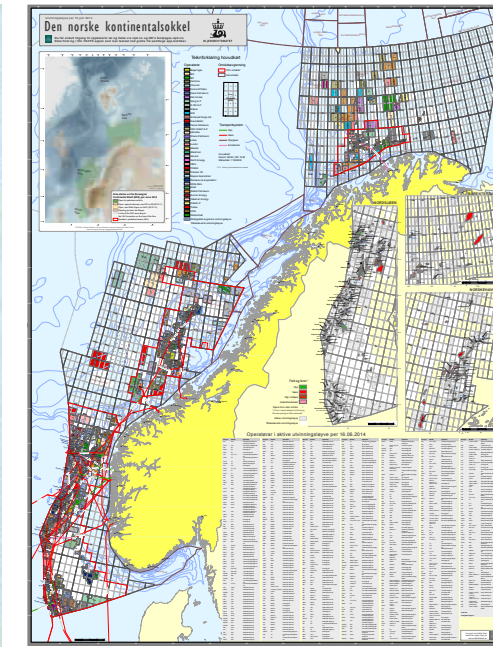
The mention of this field brings up the story of the way its discoverer, Phillips Petroleum, tried to secure a licence for the whole NCS in exchange for investing in an exploration programme.

Submitted in 1962, the company's request remained unanswered until 1986 – when the ministry admitted that it had taken some time to reply, but that the application was regretfully rejected.

Hagemann says that this response was sent after 24 years because Phillips used every festive occasion to remind the government that no answer had been received.

"The ministry was formally responsible for issuing the rejection, since the letter from Phillips had been addressed to it."

Once the companies had launched their seismic surveys, it quickly became clear that the



Maps of the NCS in 1965 and 2014.

“We can moreover thank God that the politicians didn't interfere with us. We were able to put a lot in place during the early years before Ekofisk became a reality.”

NGU's conclusion was wrong.

Hagemann began visiting the companies to study their seismic charts, which was not well received in the ministry. The feeling was that the companies should come to it, not the other way round.

In addition, Jens Evensen – the foreign ministry official who played a key role in organising Norway's offshore activities – had issued strict instructions to avoid corruption.

"We explained that this was only for practical reasons," says Hagemann. "And we wanted to learn. Nobody opposed or checked up on us. The companies had been bluntly told not to try anything. We got no more than cup of coffee."

After 33 wells without a serious commercial discovery, pessimism began to spread and Phillips tried to avoid the final drilling operation in its lowest-priority licence.

"However, the small print in the terms said that the operator would have to pay the government what a well would have cost if it deviated from the work programme," Hagemann recalls.

"Combined with its long-term charter for *Ocean Viking*, that persuaded Phillips to drill the final well – and discover Ekofisk in 1969. Without that, we'd have had a big delay on the NCS."

Optimism continued to prevail in the mining office. Hagemann consoled himself with the thought that the wells so far were pinpricks – not enough to write off a whole continental shelf.

He also points to the recent Johan Sverdrup discovery, where earlier wells had been drilled only a few hundred metres away without locating the reservoir.

Head

Hagemann applied to head the new NPD in 1972, and held that job until 1990. He served as acting director general for another six years while successor Gunnar Berge continued his political career.

The move from Oslo to Stavanger was welcome, not least to his family. He found that the

latter city had prepared better plans for hosting the NPD and state oil company Statoil than rivals Bergen and Trondheim.

"I sat on a committee which assessed these locations," he recalls. "We asked Trondheim what it could offer in the way of homes for employees – and the answer was that they could join a housing cooperative.

"And Bergen envisaged that the NPD could obtain offices in a fire-damaged factory which had been used for manufacturing safes."

At the age of 86, Hagemann has retained his interest in the oil industry and still gives presentations, mostly based on a single overhead – the map of the NCS.

He feels that "a lot of strange things" are being said about the industry today, but wants to avoid taking part in the debate – almost.

"I've always maintained that we can't write off the Barents Sea," he emphasises. "We've only made some pinpricks there. Interest vanished for a while, but it's back again now."

First to find

Rolf "Rocky" Øverland was sitting in the control room when *Ocean Traveler* made the initial oil strike on the NCS. But it would take 32 years to bring this discovery on stream as the Balder field.

| Eldbjørg Vaage Melberg



Above: *Ocean Traveler* found Norwegian oil 2 283 metres beneath the seabed in 1967. (Photo: Nordal Torstensen/ Norwegian Petroleum Museum)

Right: On charter to Esso, *Ocean Traveler* found the first oil on the NCS in 1967. It was not commercial at the time, but could be developed 32 years later as the Balder field. (Photo: Norwegian Petroleum Museum)

The resources in well 25/11-1 were not initially commercial. Nor could they compare with the huge Ekofisk find two years later. Nevertheless, their discovery marked an important milestone in the history of the NCS.

Oil was encountered by the Odeco rig, on charter to Esso, in midsummer 1967 in 126 metres of water and at a depth of 2 283 metres beneath the seabed in production licence 001.

It was a normal day at work for Øverland, who had joined Norway's nascent offshore industry late the previous autumn on *Ocean Traveler* – the first rig to drill on the NCS.

His job in the control room

was to keep the vessel stable. Then as now, it involved a 12-hour shift followed by 12 hours off – and he spent one week on the rig with the next free.

Those were the days when North Sea personnel went to work wearing shirt, tie, overcoat and hat. Øverland was 22 years old at the time, and a qualified car mechanic.

He had previously worked for Brødrene Kverneland near Stavanger. His colleagues were Americans who had accompanied the rig from the USA, and other young Norwegians with backgrounds in industry, fishing or farming.

"The Americans wanted folk

they knew could work hard," recalls Øverland, who estimates Stavanger had about 250 people associated with the oil sector in 1966. Roughly 100 were Americans.

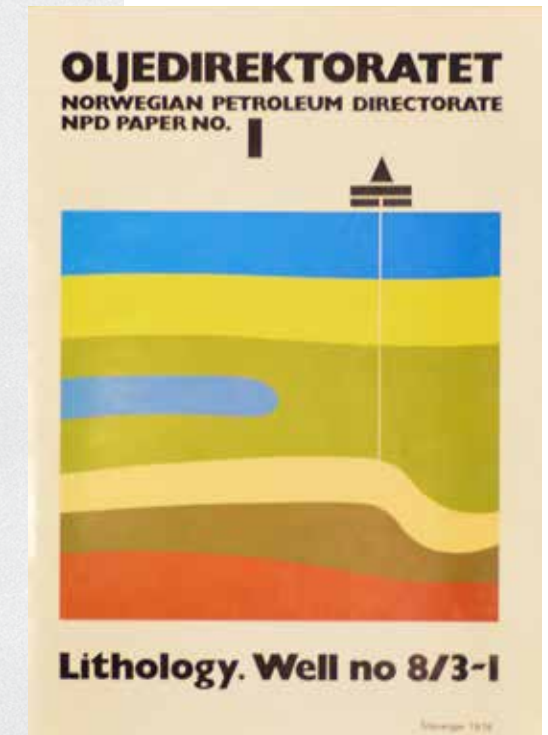
"There were otherwise personnel in the operator companies, the rig contractors and other suppliers, the supply base, the helicopter service – and at Rogaland Radio, which kept us in touch with land."

Øverland's job on *Ocean Traveler* marked the start of a long career in the oil business, which did not come to an end until he retired last Christmas after 48 years in the industry.

Dry debut

It took Esso less than a year from receiving a production licence in Norway's first offshore licensing round during 1965 to spudding a well with *Ocean Traveler* in North Sea block 8/3. But this first probe on the NCS found nothing.

| Bjørn Rasen



NPD Paper No 1 – *Lithology. Well no 8/3-1* is a 24-page publication with fold-out presentations of lithography in the well. (Photo: Arne Bjørøen)

That was more than three years before Ekofisk became the discovery which really sparked the Norwegian oil adventure, after 32 wells had been drilled since 8/3-1.

Esso Exploration and Production Norway A/S did find oil in 1967 with its second well, but the discovery was not considered commercial at the time. Thirty-two years later, it was brought on stream as the Balder field.

Cod ranked as the first discovery to be declared commercial, when oil was found by *Ocean Viking* on 10 June 1968 in the ninth well and the second drilled by Phillips Petroleum.

"But it wasn't developed until later because the compa-

nies devoted all their energies to exploration," says senior engineer Alf Stensøy at the NPD.

"And when Phillips found Ekofisk, that took all the attention and capacity." Cod was not brought on stream until 26 December 1977.

Ocean Traveler spudded the well 163 kilometres south-west of Stavanger cathedral on 19 July 1966. This drilling debut was over 84 days later, on 10 October.

Five cores were taken from the well at depths from 2 075 to 3 015 metres. Measuring a total of 25 metres in length, they are still available in the NPD's rock store.

The first well was naturally an event, and the NPD's specialists assembled available data several

years later and published NPD Paper No 1 to describe its lithology – sequence of geological layers.

Stensøy notes that the government wanted an interpretation which could be published. This and later papers from the NPD were often used for educational purposes among Europe's continental shelf nations.

"We can probably say that the earlier NPD papers were among the first elements in what later became our fact pages," Stensøy observes.

All well descriptions are now available as well data summary sheets on this part of the NPD website.



"I was on the moon – honest!" One of the prestige projects pursued by Jens Stoltenberg as Labour prime minister (2005-13) was the "moon landing" at Mongstad – a major scheme for carbon capture at this refinery north of Bergen. Claims were long heard that the carbon dioxide problem had been overcome.

Roar Hagen is one of Norway's most renowned political cartoonists. Born in Ørsta near Alesund in 1954, he trained as a graphic designer, worked as a newspaper cartoonist for *Stavanger Aftenblad* from 1978-86 and has since been with VG. He has also been a freelance contributor to *Sunnmørsposten*. His cartoons have appeared in such publications as *Time Magazine*, *Newsweek*, *New York Times*, *Le Monde* and *Der Spiegel*. They have also been purchased by the Norwegian Storting (parliament), Norway's National Gallery, Stavanger Art Museum, Statoil and the NPD, as well as by a number of international museums and galleries. Hagen has also won national and international awards for his work – Newspaper Cartoon of the Year in Norway for 1979 and International Caricatura Politica Italia in 2004. He is affiliated with Cartoon Arts International/New York Times Syndicate.



"We'll undoubtedly reach agreement on Statoil in the end ..." Statoil was the subject of heated arguments in the Conservative government headed by Kåre Willoch (centre) during the early 1980s. Stavanger's Arne Rettedal (right) strongly opposed a privatisation of the state oil company, which would quickly have been sold abroad.



"Blow me if it isn't time for lunch" – a comment on Norway's new values. Norwegians have allegedly become more concerned with lunch and holidays than work – clearly

Drawing lessons

I joined perhaps Norway's wealthiest daily paper, in the heart of Norway's "oil capital", when I started work at *Stavanger Aftenblad* in 1978. That was in the early days of the Norwegian offshore adventure.

One of my first assignments was to accompany Jan Hagland, the paper's well-informed oil reporter, to the ONS oil show in the city. Seeing the dimensions, exhibits, technology and international setting was an overwhelming experience.

I appreciated that this was something big, really big. Not only was the exhibition site itself large, but something even greater could be sensed – like an omen of a new era.

One of the first people we met was no less a personage than Arne Rettedal, Stavanger's legendary mayor, at the head of his delegation.

Hagland introduced me, and explained afterwards what a key role Rettedal had played in the city's development as an oil centre and for the country as a whole. He was an example of what we can call a "west Norwegian Conservative" – not very ideological, but all the more practical and dynamic.

Results are what count, rather than principles and craftiness. And results there were. Stavanger experienced huge growth, and was quickly transformed from a slightly run-down canning town into an international oil city.

In the years which followed, I met a number of very interesting players. Hagland and I were invited, for example, on a boat trip to Ryfylke north of Stavanger when Statoil president Arve Johnsen wanted to show Mexico's petroleum minister one of the giant con-

crete platforms being built.

In particular, I recall standing in the bows while Johnsen pointed at the huge columns and said: "Look, what a triumph for Norwegian technology."

I have seldom heard anything so visionary and optimistic. My thought was that this man wanted to achieve something for himself – for Norway and for society.

Eventually, I had the pleasure of drawing portraits of such notables as Fredrik Hagemann, director general of the NPD, geologist Farouk Al-Kasim, and petroleum ministers Bjartmar Gjerde and Kåre Kristiansen (who was said to get on particularly well with the Arabs).

Among others were Konrad B Knutsen, governor of Rogaland county, unionist Lars Anders Myhre, and engineer and Norwegian oil pioneer Olav K Christiansen. That was a fantastic



Norway's relationship with Saudi Arabia has been coloured by the two countries' shared interests. While staying outside Opec, the Norwegians have frequently hoped that the oil sheikhs would limit production and thereby keep prices high. Hardly surprising, then, that all Norwegian petroleum ministers must make an obligatory pilgrimage to the Arabian peninsula.

time, with room for groundbreakers.

Those who were sufficiently clear-sighted and visionary to see the potential of the NCS were naturally also highly interesting people who helped to shape Norway's future.

Viewed in retrospect, I would say that the features they had in common – apart from enthusiasm – were their grasp of the political decisions which made this possible, and their ability in their different ways to see themselves in a wider perspective. At least at that time.

The Norwegian oil sector eventually moved into a more mature phase. Safety and technology were much improved, routines were tightened up, and Norway also became a substantial gas supplier. The oil age became normality.

A visit to an oil platform provides a lifelong memory for those us lucky enough to have had this experience – the helicopter flight out, the safety precautions, the people on

board and the dimensions.

For most Norwegians, oil and gas are a kind of abstraction far out to sea which provide a huge cash flow to be shared out and managed.

Fortunately, a few farsighted politicians have ensured that part of the cash is diverted into the petroleum fund – a kind of reflex from Norway's old Protestant national character.

Even if this has become somewhat less dominant, it calls for prudence in all things, and for putting resources aside to cope with hard times.

Nevertheless, the oil money flows into every nook and cranny of society, and foreigners regard Norway today with a mixture of envy, amazement, respect and a little laughter.

The environmental aspect has come much more to the fore over time – although not so much with regard to oil itself, since Norwegians

believe they can deal with blowouts and spills.

Attention has focused instead on the consequences of burning fossil fuels, which almost certainly contributes to global warming. That has led to a very vigorous debate in Norway, which is hardly surprising given the dominance of its oil sector.

Much of what gets said is sensible, and the industry has been doing a lot to become more environmentally aware. But some aspects are directly laughable, such as the political notion of running offshore installations with power from shore.

In order to delay burning Norwegian gas until it reaches other countries and thereby reduce national carbon emissions, the country is building monster pylons in its finest landscapes.

Carbon dioxide, of course, recognises no frontiers. And burning represents the major application for



"What if this doesn't last ...?" The offshore industry has undoubtedly had an impact on the Norwegian national character.

natural gas, which is seen as environment-friendly in most countries.

Such ideas naturally have many amusing outcomes in Norwegian politics. The country lives off petroleum, but has a difficult relationship with it – and with gas in particular. So it ends up with a form of national split personality.

I am pleased to have been given the opportunity to reflect my nation's oil history through an anniversary exhibition at the Norwegian Petroleum Museum.

Technology, economics and the environment have been and remain the three main elements I use constantly, first in *Stavanger Aftenblad* and later in Oslo daily VG.

Being able to meet some of the people behind this miracle of Norwegian history is fantastic, and I cannot deny being a

little proud over what the country has accomplished.

A long thread runs from the first prehistoric people who settled Norway's coast to the present advanced Norwegian-built special ships, the offshore installations, the drilling engineers and the specialists at sea and on land.

In my view, this heritage of maritime know-how has never been broken. The country has also had some farsighted politicians who took the right steps when its future was shaped.

The Norwegian oil age may have peaked, but it is not over, and the experience acquired should be applicable to new opportunities in the future.

It is a privilege to be allowed to contribute to this story about Norway. Cartoons are my way of telling the tale.

Celebrating wise choices

| Bjørn Rasen and Astri Sivertsen (photo)

Commemorating the 50th anniversary of the first licensing round on the NCS in 1965 is natural for the Norwegian Petroleum Museum, says director Finn Krogh. "That year will remain a beacon in Norway's oil history."

An exhibition to mark this historic event opens at the museum on 9 June, and Krogh has issued invitations to key industry figures who played crucial roles in the early phase.

That was when the legal and political foundations were laid for Norway's oil future. Several of the personalities are due to speak at the opening.

"A lot of the things these people decided at the time, on the basis of limited knowledge, have proved to be wise choices," says Krogh.

Petroleum and energy minister Tord Lien will be conducting the official opening.

"When we see the development Norway has been through, and also know what impact our oil wealth has had on this, it's important to show how it all began," explains Krogh.

He is very pleased to have newspaper cartoonist Roar Hagen on board. "His cartoons have adorned VG – and *Stavanger Aftenblad* before that – over several decades. No other Norwegian cartoonist has worked more closely with the oil industry."

Geir Mossige Johannessen, head of exhibitions at the museum, reports that Hagen's many cartoons will have a central place in the show.

"We've also modernised and updated our *Petrorama* exhibit in honour of the 50th anniversary," he says. "This is our chronological presentation of key events in Norwegian oil history from the 1960s to the present day."

The petroleum museum moved into its newly built home in downtown Stavanger in 1999.



Director Finn Krogh (left) and exhibitions head Geir Mossige Johannessen have modernised and updated the petroleum museum's chronological time line.

Work for generations

The Johan Sverdrup field played hide-and-seek for 40 years with some of the world's leading oil prospectors before its discovery in 2010. Prospects for the NCS would have been significantly gloomier without it.

| Bjørn Vidar Lerøen

Norway's new North Sea giant is now under development, with dimensions in the same megaclass as the Ekofisk, Statfjord and Troll fields. The Norwegian oil sector has not been able to use such big words and numbers for a long time.

"Without Sverdrup, the NCS would be in a poor way," confirms Arne Sigve Nylund, the executive vice president at Statoil responsible for operations off Norway.

This field is indeed the big bright spot in an otherwise difficult time for the petroleum sector. Oil circles worldwide were astonished at the news of the massive strike on the Utsira High.

The small Lundin Norway company drilled the 16/2-6 discovery well in the autumn of 2010, while Statoil followed up with another well in the neighbouring licence the year after.

This established that the find was even bigger than first thought, ranking as the largest discovery that year in a world which still needs more energy and

depends on oil and gas.

Oil explorers first reached this part of the Norwegian North Sea in the early 1970s, and drilled fairly close to Johan Sverdrup. But it still took four decades to locate it.

The field extends over three licences, and was originally given two names – Avaldnes and Aldous Major South. But Ola Borten Moe, the Centre Party politician who was petroleum minister at the time, wanted something more Norwegian.

He amended the practice for naming fields on the NCS. Johan Sverdrup was a noted 19th-century Liberal politician and prime minister, and the father of parliamentary government in Norway.

"All power will be concentrated in this chamber," was his most famous declaration. And all oil in the field named after him has come to be concentrated in a unitised development.

But negotiating the division of this wealth in order to achieve such a coordinated approach proved less than easy, with a

lengthy discussion on percentage shares.

Statoil and its partners opted to submit the plan for development and operation (PDO) to the Ministry of Petroleum and Energy on Friday 13 February this year. Petroleum minister Tord Lien called it "a historic day for Norway."

Former premier Sverdrup's descendants in the Liberal party have stipulated two significant requirements for whichever government presents the development plan.

These are that installations on the Utsira High must be run with power from shore, and that the oil industry must not be allowed beyond the marginal ice zone in the far north.

Where Johan Sverdrup is concerned, Liberal pressure has been successful. Phase one of the field development will be powered by electricity from land.

The history of this discovery will extend far into the future. But it must first be brought into pro-



Johan Sverdrup, Norway's new giant North Sea oil field, is expected to produce for about seven decades. The goal is a recovery factor of no less than 70 per cent of reserves in place. (Illustration: Statoil)

duction, and work on that is now in full swing.

"This will be a massive project, but we have the reservoir on our side," says Nylund. "I'd characterise it as a friendly formation, with fantastic production properties."

He says Johan Sverdrup will be much easier to deal with than Gullfaks, for example. And he is well placed to make that judgement, having served as a platform manager on the latter.

Nylund has also been in charge of Statfjord, and cites it to illustrate the dimensions faced on the NCS – recoverable oil resources in this field have been upgraded by 1.7 billion barrels since it came on stream in 1979.

That is close to the lower estimate for recovery from Johan Sverdrup, which is expected to yield 1.8-2.9 billion barrels of oil equivalent – 95 per cent of it oil.

But Nylund emphasises that a number of other new discoveries are required to offset the decline in production from Norway's old offshore fields.

Johan Sverdrup nevertheless

represents a welcome addition to Norwegian oil output, which has been falling for the past 15 years.

More recently, too, oil prices have slumped, production costs have exploded and opposition to the industry's activities has risen among Norwegians.

Almost 50 years after the NCS was opened to oil exploration in 1965, Nylund observed in a speech that the workers who will shut down Johan Sverdrup have yet to be born.

When it comes on stream in 2019, at a cost of NOK 117 billion for stage one, the field is likely to remain in production for 70 years.

A phased development is essential given that the reservoir covers roughly 200 square kilometres and will call for several installations linked by a kilometre of bridges.

The first phase of Johan Sverdrup alone is expected to yield a daily output exceeding 300 000 barrels of oil, and this level of production will later be more than doubled.

Oil output is due to be trans-

ported north-eastwards for 274 kilometres through a 36-inch pipeline to the Mongstad complex north of Bergen.

Associated gas, which accounts for about five per cent of the field's reserves, will be piped for 156 kilometres through a 19-inch line to the Kårstø processing plant north of Stavanger.

Johan Sverdrup will thereby also help to strengthen the operational basis for Norway's most important oil and gas facilities on land, at Mongstad and Kårstø respectively.

The employment effect of the field will be substantial, with development alone demanding 50 000 work-years. An average operating year will require 2 700 work-years, with operator Statoil estimating that this figure could reach 3 400 at plateau.

When the first production well is opened in late 2009, the field will start building up until it accounts for 25 per cent of Norway's entire oil stream – as matters stand today.

Pundit Hans Henrik Ramm rejects all the dramatic statements about Norway's need to shift from oil to "other things". He points out that the nation has managed a 50-year upturn very well, and can also deal with a lengthy downturn in a good way.

Watcher in the wings

The willingness to act is the key, not resources, says Hans Henrik Ramm. He was 15 when Norway held its first offshore licensing round, and has since followed events as a political player or with a sharp eye through his *Behind the news* service.

| Bjørn Rasen and Sverre Christian Jarild (photos)

Ramm comes sauntering in from the side, as so many times before, puffing thoughtfully on a cigar. Yet another oil conference is about to start.

The Norwegian Oil and Gas Association is holding its annual meeting to confirm the industry's significance and discuss possible dark clouds which might have appeared over the past year.

Drawn into the world of oil through politics, Ramm studied science "for a time" but was also interested in journalism and society.

"Immediate gratification won out, and I got a job with [right-wing newspaper] *Morgenbladet*," he explains. "I was only 19 when I became Storting [parliamentary] correspondent."

"That allowed me to work on pretty much any subject I liked – and see my story make the front page. It was a fantastically exciting time."

After military service, as a reporter on the armed forces newspaper, he "changed sides" when the Conservative group in the Storting called him in as one of its secretaries.

"There were two of us at the time, doing a job which employs 30-50 people in the main parties today," Ramm observes.

He was made responsible for the "hard" issues – finance and industry. "And thereby for oil, which had become very important when I started there in 1973."

That was one year after Statoil and the NPD had been established, and two since the Ekofisk field began production in the Norwegian North Sea.

Deciding what kind of state oil company the young petroleum nation needed had

“ I certainly worry the industry's going to repeat the error and scare young people away. And the government is doing too little, standing by while field developments are postponed. These will accumulate to create a new bulge in activity. ”

been a lengthy process, with Storting representatives getting involved late but heavily.

White Paper no 25 to the Storting warned in 1974 that oil revenues could be substantial and that spending them would cause changes.

Ramm recalls the recommendation from the Ministry of Finance that, were these funds to have any purpose, they must be used to purchase goods and services from abroad.

Norway's own production of goods would accordingly decline, and the country faced a transition from manufacturing to the provision of services.

"A number of people wanted to ensure that change wasn't too rapid," Ramm says. "So we got a debate about the pace of oil revenues, and thereby of the industry as a whole. Few foresaw at the time that we'd develop a big and important supplies sector."

Maritime industries represented economic cornerstones in Norway at the time. Oil was something remote, which few Norwegians talked about. Public discussion did not really take off until Ekofisk was found in late 1969.

"Everyone then naturally became interested," Ramm recalls. "Norway was far from being a wealthy country, but people were optimistic."

Debate

Within five years, a political debate was in full swing about how much production Norway could tolerate if the level of social change fuelled by oil revenues was to stay at an acceptable level.

Another controversy in the 1970s concerned the role of the new state oil company. In Ramm's

view, the organisation of Statoil was a compound of politics and business.

That had occurred because Labour took over in 1971 from the centre-right coalition led by Per Borten. "Finn Lied and Arve Johnsen made big changes to the proposals from the civil servants for structuring the planned state company," says Ramm.

Lied was Labour's industry minister, while Johnsen served as the deputy minister who later became Statoil's first chief executive.

Ramm points out that Norway already had Norsk Hydro, a major industrial group at the time, the forerunners of Saga Petroleum, and a multitude of other companies keen to be involved in oil.

"A general view existed that we didn't possess enough capital and that no room existed for so many enterprises. Great interest existed in the Storting for creating a new national company.

"The representatives were then thinking only of acquiring a strong operational organisation, while the civil servants wanted one which could handle the state's negotiated rights."

Both the Conservatives and Labour had studied how this should be done, and both envisaged a new company with a combination of public and private ownership.

Once in government, however, Labour decided to merge these concepts and base the new state oil company on the rights secured by the state, with full public ownership. State power and rights were thereby used to build up Statoil.

From the fourth licensing round in 1978, the company was awarded a 50 per cent stake in all new licences and also benefited from a "sliding scale" system

The latter allowed Statoil's holding to be increased if a discovery was made. And the other licensees had to carry (pay) the company's share of exploration costs.

According to Ramm, this had the effect that Hydro and Saga were required to pay these costs on behalf of competitor Statoil while also having their stake reduced in the event of a find.

"In that way, Statoil acquired what amounted in reality to a right to tax the other companies while it also developed as an operational organisation."

Ramm says that the mixing of business and politics in Statoil initially aroused little discussion. That debate was to blossom later.

The main concern of the non-socialist parties to begin with was the "stop at the beach" principle – Statoil should confine its activities to the NCS.

Involvement

Questions were also raised about how heavily the company should become involved in petrochemicals, supply-base operation and seismic surveying.

The conclusion was that Statoil would be a wholly commercial enterprise and a fully integrated oil company with interests in petrochemicals, refining and marketing, as well as having opportunities to operate abroad.

In 1985, the state's direct financial interest (SDFI) was established as a separate legal unit under Statoil management. The company's licence holdings were split into two components, one which it retained while the other was transferred to the SDFI.

The associated rights to have exploration costs carried and to exercise the sliding scale were

also acquired by the new entity. The sliding scale was abolished in 1993.

Ramm maintains that the civil servants envisaged a solution in the late 1960s which by and large resembled today's Petoro, the state-owned company created in 2001 to manage the SDFI.

They did not want Statoil to have too many roles, but more than 30 years passed from the first discussions until Petoro was set up as a management company outside the ministry.

"It's easy to be wise after the event," says Ramm. "I think nevertheless that accepting the civil service proposal and creating a 'Petoro' would have given us a stronger Hydro and Saga.

"We'd also have had a different type of 'Statoil' with a bigger element of private ownership from the start, and thereby gained three strong oil companies competing on equal terms."

Possessing three companies was incredibly important for building up the supplies industry, Ramm says. "And the golden age was the mid-1990s, when we saw the development of subsea technology, for example."

Each of the Norwegian companies had a key industry partner at this time – Statoil and Kongsberg, Hydro plus Kværner and Saga with ABB, he adds.

"A trio of inspired teams competed with each other to find solutions. That's been lost – first through the tragedy that Saga was consumed by Hydro and Statoil, and then the tragedy of Hydro being taken over by Statoil.

"The last of these mergers was one of the most unfortunate developments we've seen, because it eliminated diversity and created a company with a very dominant role."

What he means by this is that the position of the NCS as one of the world's leading offshore technology



"It's easy to be wise after the event," says Hans Henrik Ramm. "I think nevertheless that accepting the civil service proposal and creating a 'Petoro' would have given us a stronger Hydro and Saga. "We'd also have had a different type of 'Statoil' with a bigger element of private ownership from the start, and thereby gained three strong oil companies competing on equal terms."

“... and we can deal with the lengthy downturn in a good way – without making it sound so terribly dramatic.”



“Attacking the supply side would undermine the whole delivery of energy,” maintains Hans Henrik Ramm. “That’s not particularly effective, and the world could become dangerous if energy supplies fail. This also has a moral aspect.”

diate future and the longer term,” says Ramm, who has heard most of the talk before.

He agrees that the industry and the nation have a problem in the short term: “During this cyclical downturn, petroleum investment is set to decline by 15-20, perhaps 25, per cent – with a risk of an even steeper drop in 2017-18.

“That’ll depend on oil price developments and strategic choices by the companies. How will the big players prioritise between investment, dividends and borrowing, for example? And when will they recover their ability and willingness to invest for the future?”

He is convinced that oil prices will recover – the question is when and by how much. “Then it’ll be business as usual, and we’re back on the long-term trajectory.”

Unlike the impression created by some of Norway’s leading politicians, Ramm believes the current downturn being experienced by the industry is unrepresentative of the long-term trend.

“There’s no need to start converting from oil to other areas yet, apart from limited changes because costs must be reduced. Finding other legs to stand on must come in addition.

“In historical terms, we’ve been through 50 years of growing activity. We now face 50 years of decline. And we’ve known that all along.

“We’ve managed the long upturn very well, and can deal with the lengthy downturn in a good way – without making it sound so terribly dramatic.”

The oil sector must cut costs. Once that is done, Ramm believes an oil price of USD 70-80 could be enough. “The industry can continue with a high level of activity, perhaps after some workforce downsizing.”

He is therefore concerned that

the sector does not lose too much expertise, so that it has to struggle once the cyclical recovery begins. The industry has made that mistake before.

“I certainly worry it’s going to repeat the error and scare young people away. And the government is doing too little, standing by while field developments are postponed. These will accumulate to create a new bulge in activity.”

He notes that one peak included 10 projects simultaneously, created not least by delaying several developments from 2008 to 2011. They were then launched when oil prices were high.

The same happened in 2004, he adds. This is the third cycle of its kind since 2000, with the industry acting like somebody with bipolar disorder as oil prices fluctuate.

Ramm believes the level of activity needs to be supported during downturns. If the crisis becomes too deep and affects the national economy, development projects will be postponed again.

That was what happened a few years ago, leading to another bulge in activity which the industry is currently struggling to escape from.

Tax

Ramm’s principal complaint is the tightening in the tax regime introduced in 2013, which reduced oil company opportunities to make deductions.

A government proposal in the revised national budget to cut the level of uplift in the special petroleum tax from 7.5 to 5.5 per cent over four years was strongly attacked by the industry.

“The finance ministry’s theory is that the capital-based deductions are too favourable, and thereby undermine cost-awareness,” Ramm explains.

Noting that this view is sharply

contested by other experts, he believes the government should reverse the change as soon as it can – and, indeed, introduce measures to improve recovery.

“That’s been promised to the Storting, and must be done as quickly as possible, both to support activity and to secure time-critical resources in mature fields.”

He points out that many project opportunities on the NCS demand such a big commitment by the companies in both organisational and technological terms that they are not taken.

That applies particularly to small fields and improved recovery in a late phase of a field’s producing life – tail production – and to exploration in frontier areas.

“In other words, everything that’s tough. The British have grasped this long ago, and introduced tax deductions for various demanding fields. We must do the same here if we want to get the resources out.”

Emissions

The other side of the coin is what the world can tolerate in terms of emissions. Norway’s public debate on this issue has become far more polarised for or against oil.

Ramm is more than happy to address the climate issue. “The key issue is how much of the fossil resources are usable. If we get a big transition from coal to gas, there’ll be even more room for petroleum.”

He points in this context to reports from the International Energy Agency (IEA), which show that the world will need 95 per cent of today’s level of oil and gas output in 2035.

That requirement will have fallen to 76 per cent by 2050, with global demand for petroleum declining gradually. These forecasts build on expectations about political decisions, which are often far from rational and permit too much use of coal.

Another and much discussed contribution to the debate is an article in *Nature* on how oil and gas production breaks down by region and country.

The authors maintain that, providing all output is cost-effective, no room would exist for petroleum supplies from the Arctic.

Ramm dismisses this claim because it rests on average costs for all parts of the high north, while Norway can operate much more cheaply in its part of the region.

The interesting aspect of the article is its demonstration that a cost-effective adaptation to the 2°C target will give less space for coal and more for petroleum.

It actually shows that success in cutting the use of coal would allow oil consumption to remain at roughly the present level until 2050, while gas usage could rise by 50 per cent.

Norway cannot maintain 95 per cent of today’s output in 2030, even with full activity, Ramm says, and therefore believes that business as usual is fully compatible with the climate goals.

“Oil and gas must be provided regardless,” he points out. “In that case, it’s better that it gets produced in Norway with our operating parameters.”

He feels that the policy of taking symbolic action – which is supported by a minority in Norwegian politics – has too dominant a place.

In his view, the climate debate should pay more attention to influencing demand for coal. This can be done by exploiting emission trading and tax systems, or by promoting alternative energy.

“How much oil and gas is to be produced should be determined by demand, which is decided in turn by climate policy,” Ramm argues.

“Attacking the supply side would undermine the whole delivery of energy. That’s not particularly effective, and the world could become dangerous if energy supplies fail. This also has a moral aspect.”

laboratories was weakened.

Statoil could no longer maintain the same exclusive and open relationship with specific suppliers, because it had to give more emphasis to safeguarding competition.

Ramm stresses that Statoil is naturally an excellent company which has contributed and still contributes much to technology development. But things could have been done differently.

After attending the conference, where the prime minister, the political opposition and the industry have spoken, the pundit shares his thoughts on the current status of Norway’s oil sector.

The national mood is dominated by a sense of crisis, with discussions in many channels about what must succeed the nation’s petroleum business.

“It’s important that we manage to distinguish between the imme-

Doubts return over oil jobs

Numbers applying for engineering courses in Norway this autumn are unchanged from 2014, but far fewer want to take petroleum-related subjects. Industry associations fear a repeat of the errors made after the last price slump in the late 1990s.

| Alf Inge Molde and Tommy Ellingsen (photos)

The corridors in the University of Stavanger (UiS) buzz even more than usual when 2 500 upper secondary pupils across the local region visit to find what it has to offer them.

A bit of showmanship comes in handy on such occasions – and icecream, naturally.

“It only takes a few seconds,” explains Arindam Guha, who heads the student branch of the Norwegian Society of Engineers and Technologists (Nito) at the UiS.

He vigorously stirs the mix of cream, sugar and vanilla, while Beder Al Furati carefully pours on more liquid nitrogen. And the dish is ready in a flash.

Alanah Rochell, Redwan Hassan Maalin and Johnny Phi Tran have already decided that they want to be engineers.

While Rochell, who is already studying mathematical methods at the UiS, is primarily interested in civil engineering, the others – classmates at Sola upper secondary school – are considering computing and electrical engineering as well.

But not petroleum. “I’ve thought about it, but it’s in a downturn,” says Rochell, whose mother works at ConocoPhillips. The advice from home is that a commitment to oil and gas would be risky today.

Tran’s father works at Stavanger fabricator Rosenberg WorleyParsons, which is also experiencing cutbacks.

“I was very tempted by the oil industry in lower secondary school,” he says. “But I see on the news that it’s in slow decline, so a commit-

Dramatic decline

The Norwegian Society of Graduate Technical and Scientific Professionals (Tekna) has looked at primary applications for petroleum subjects at the Norwegian University of Science and Technology (NTNU). Their number has declined from 286 last year to only 77 – a drop of 73 per cent.

After many years of growth and record figures in 2013 and 2014, the University of Stavanger (UiS) has seen a virtual halving in applications for its BSc studies and five-year MSc courses in petroleum and offshore subjects.

ment there would be dubious.”

After nine months of one newspaper story after another on falling oil prices, cost cuts, layoffs, redundancies and declining investment, the message seems to have got through to tomorrow’s engineers – prospects for the petroleum sector are uncertain.

Survey

That is reflected in a survey conducted by pollster TNS Gallup for the Norwegian Oil and Gas Association. When asked whether they would recommend an oil-related education to somebody they cared about, 64 per cent of respondents said no, 30 per cent said yes and the rest were undecided.

Seven out of 10 people polled also expressed concern about the Norwegian economy and welfare state in the wake of the oil price slump.

“Demolishing something is incredibly quick to do,” observes Lise L Randeberg, president of the



Wait and see. Students Redwan Hassan Maalin (left), Johnny Phi Tran and Alanah Rochell see that a number of companies which were earlier eager to offer summer jobs are currently doing no more than show that they exist.

Norwegian Society of Graduate Technical and Scientific Professionals (Tekna).

She has met a number of people who describe the mood in the industry as “sombre”, and is worried about the short-termism which prevails in many companies – reflected in the number of calls being received by union officials and lawyers.

But she nevertheless notes that the actual number of engineers out of work remains low. The Labour and Welfare Service (NAV) reported 4 948 unemployed engineers and ICT personnel in February, a 50 per cent rise over 12 months – but still only 1.9 per cent of this occupational group.

Randeberg is particularly concerned about the consequences this will have for recruitment to university-level technical studies in Norway.

Demand for such disciplines will remain high, she points out, and it takes five years to educate an engineer to MSc level. Much can happen in such a space of time.

“The companies must keep their nerve rather than pursuing aggressive downsizing,” she adds. Doing

the latter makes it difficult to secure the necessary expertise later.

It also destroys the community itself – the people with ideas in their heads. Randeberg warns companies that making the youngest and oldest employees redundant reduces their diversity.

Norway’s power industry lost a whole generation in that way, and so did the IT business after the dot.com crisis. It could now be the oil sector’s turn, she fears.

In her view, the industry is repeating the mistake it made in the late 1990s when many jobs were shed and few people applied for petroleum-related studies because recruitment ceased.

“And the companies weren’t happy afterwards,” she emphasises.

Changed

Guha clearly saw that times had changed during the Industry Day at the UiS in January. Many companies which had previously actively offered summer jobs now only wanted to

show that they existed.

“One oil company said it might be interested in somebody in their fourth year with high average marks,” said Guha. “Nobody else had a hope.”

He is in his second year of petroleum geology studies. So is Al Furati, who reports that a number of fellow students have shifted to mechanical or civil engineering.

But he has decided to continue. “The oil price is fluctuating, but it’s always done that.” He checks the latest prices at least once a week.

Classmate Joakim Nesheim, who is already a qualified driller and has three years of experience from Ekofisk, hopes that a BSc and a good network will help when he starts job hunting again.

The Norwegian Oil and Gas Association has long spearheaded a drive to boost science studies and recruitment by the industry, and could report progress in recent years.

Figures from the education ministry show a 40 per cent rise in the main take-up of students for science



But not petroleum. Alanah Rochell (left), Johnny Phi Tran and Redwan Hassan Maalin believe a commitment to electrical, mechanical or civil engineering will be more secure than petroleum-related studies.

and technology courses over the past four years. And offers of places for technological subjects in 2014 were up by 563 from the year before.

Decline

Thina Hagen, communications manager for working life at Norwegian Oil and Gas, is keenly awaiting the figures on applications for the next academic year. She expects to see a decline for petroleum-related subjects.

A relationship has previously existed between oil prices and applicant numbers at the Norwegian University of Science and Technology (NTNU) in Trondheim, with a time lag of one-two years.

These courses are difficult to get onto in any event, Hagen points out. The queue will simply become shorter.

"The level of activity we've seen in recent years – with big recruitment challenges, a huge pay spiral and the need to recruit foreign labour – has been unsustainable," she emphasises.

Nevertheless, Hagen hopes applications for science and engineering studies remain high overall. That would benefit the oil business, Norwegian industry in general and the public sector.

According to the *Industry Builders 2015* report from the International Research Institute of Stavanger

(Iris), petroleum-related activities employed 186 000 people in Norway last year.

Petroleum engineers account for only a fraction of this group, with demand equally high for civil and mechanical engineers as well as IT experts and a number of other specialists.

Senior adviser Bjørn Vidar Lerøen at Norwegian Oil and Gas shares Randeberg's concerns that the industry is downsizing too much and sending signals that it offers no future.

He is in close touch with the companies, and hears both operators and suppliers saying they are aware of the problem and working on it. But redundancies continue, particularly among young employees.

"They talk about a long-term view, but operate on the basis of 'quarterly capitalism'," complains Lerøen. "That tempts them to cut more than they should. But the industry mustn't frighten young people away."

Topped

Statoil has topped the list of favoured employers among engineering students for a number of years, and has devoted substantial resources to securing future personnel and expertise.

At the same time, the Norwegian oil company wants to cut its costs –

and reduce its workforce by 1 600-1 900 people.

Tone Rognstad, Statoil's recruitment manager, appreciates that these two messages are not so easy to reconcile, but maintains that both are necessary.

"We're making every effort to recruit young people, despite being in a restructuring phase," she explains. "We must think long-term, and it takes years to develop the expertise we need. That's entrenched at all levels here."

Many of the company's offshore workers are aged 50 and above. New fields, like Johan Sverdrup, will be operated for decades to come. So it has a big need for new engineers and skilled workers.

Rognstad knows from experience that it is difficult to secure engineers in the 30-35 age range, and emphasises the importance of recruiting young people even in difficult times.

Statoil currently takes on 130 apprentices annually, compared with 170 three years ago. In addition come 300 students given summer jobs, which Rognstad describes as the most important recruitment channel. About 80 new graduates are hired on a permanent basis annually.

Asked whether apprentices and summer workers are to be regarded as normal recruitment, she explains that they are viewed as temporary staff.

"Both categories are key elements in Norway's education system,

which also makes it important for us to support them. We have a social responsibility, and thereby back the commitment to science studies and take on far more apprentices than we need ourselves."

Transferred

Aker Solutions is one of the Norwegian companies which has seen a dip in demand, particularly in the maintenance, modification and operations (MMO) market. So personnel were offered the chance last year to transfer to human resources company Frontica Advantage.

Lasting seven months, this solution was accepted by 500 employees – with 45 securing a new job, mostly outside the company. In addition, 40 consultants were shed and 40 workers made redundant.

The MMO business has not

improved and new measures could be taken during 2015. But press head Anne Cecilie Lund-Andersen says demand for the company's products and services remains robust. That applies particularly to the deepwater and subsea segments. The order backlog is NOK 48.3 billion.

Lund-Andersen maintains that Aker Solutions is keen to hire new graduates, and that this becomes even more important when the level of activity falls. The company is still hiring apprentices, and had advertised a limited number of summer jobs.

"It's not necessarily the case that recruitment to the industry becomes more challenging when market activity is down," she maintains.

Given the complexity of Aker Solutions' operations and the technology it works with, she believes that young engineers will still find it attractive to seek work there.



Cutting and recruiting. Recruitment manager Tone Rognstad says that Statoil is giving priority to young recruits while cutting 1 600-1 900 jobs. Eighty new graduates will be hired this year.



Facsimile from *Norwegian Continental Shelf* 1-2014.

A move closer to chess in schools

| Astri Sivertsen

Many good arguments exist for starting to teach chess in schools, as noted in the article on "Game plan for education" in the previous issue of *Norwegian Continental Shelf*.

A new move to promote this idea was staged by chess masters Garry Kasparov and Magnus Carlsen at the Norwegian Storting (parliament) on 23 March.

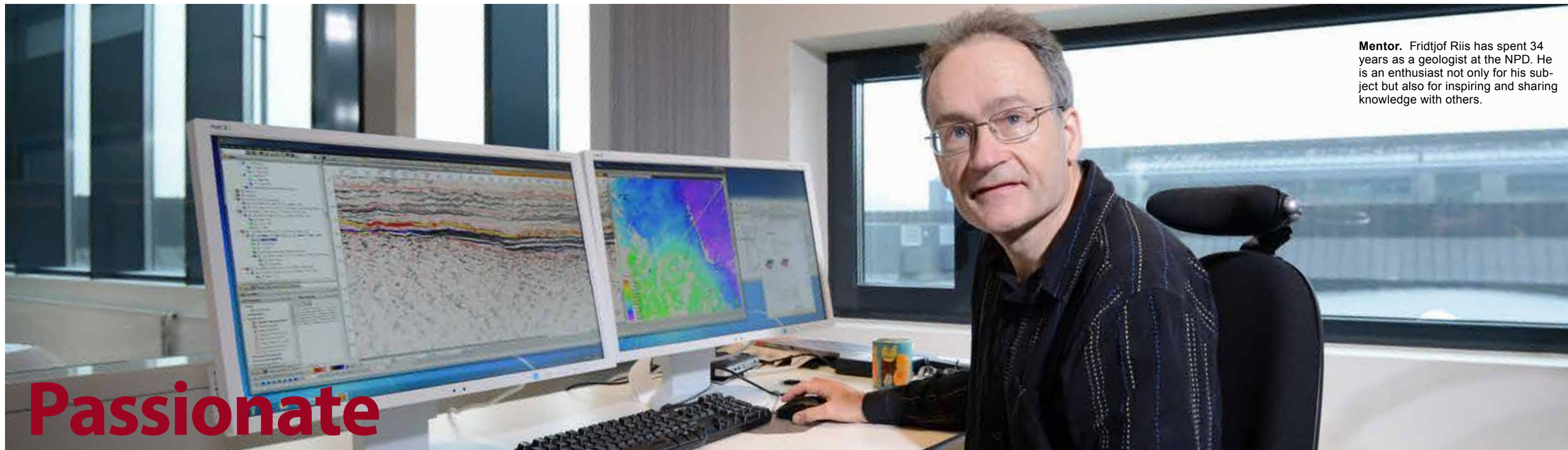
While the first-named gave a speech on how the game develops concentration and decisiveness in children, Carlsen played a simultaneous exhibition against Storting representatives – who were helped by talented young players.

This two-hour session was a cross-political initiative organised by five parties spanning from far right to far left in cooperation with the Norwegian Chess Federation.

The goal is a trial project which can demonstrate the effect of chess teaching on children's results in school, explains federation chair Jøran Aulin-Jansson.

"This meeting was a big step forward. It'll be used as a reference for future work, where the initial aim is to get the government to finance a research project in 50-100 schools."

In the longer term, the chess enthusiasts hope to be able to offer an hour of chess teaching per week for pupils in years three or four (eight-nine years old).



Mentor. Fridtjof Riis has spent 34 years as a geologist at the NPD. He is an enthusiast not only for his subject but also for inspiring and sharing knowledge with others.

Passionate communicator

He has discovered meteorite craters and won prizes for his contributions to geoscience. But Fridtjof Riis is primarily concerned with sharing – both knowledge and acclaim.

| Bente Bergøy and Emile Ashley (photo)

Now in his 60s, Riis has been a geologist at the NPD for virtually his entire professional career. He knew some of those already working there, and was persuaded – or inspired – to apply for a job in petroleum administration.

Many geologists have served with the NPD before going on to work in the industry. But Riis belongs to an exclusive group which has stayed.

“Opportunities are very good here for studying subjects which interest you in depth, and flexibility is great,” he explains. “The team is small and you deal with the whole NCS.”

“That gives you a huge overview. At the same time, the NPD performs an important role in society.”

Since joining the directorate in 1981, Riis has also spanned a very wide range of activities, including exploration and reservoir technology for most of Norway’s offshore oil and gas fields.

In addition come 36 published scientific articles in journals and books, including nine as lead author.

Riis has a strong social and international commitment, and is active in union and solidarity work. He is also involved in the Oil for Development programme at the Norwegian Agency for Development Cooperation (Norad).

“Developing countries learn from us, but we learn from them as well,” he affirms. “The differences between Norway and other oil producers around the world aren’t as great as you might think. Geology unites us.”

Interests

Riis has a wide range of interests, including mathematics, physics, astronomy, plants and animal life. He originally intended to become a botanist, but took a geology course, got a summer job at the Norwegian Geological Survey (NGU) – and was hooked.

Asked whether he only looks at rocks when out for a walk, he says that other things also attract his attention. But his hikes undoubtedly

have different objectives than those of most people.

He is interested in geology both on land and offshore, and his work on regional models for uplift and erosion is described as groundbreaking.

These contributions include a new understanding of how Norway was subject to large-scale uplift in the Cenozoic – the most recent of Earth’s geological eras, which began 66 million years ago. That in turn has provided a better grasp of continental shelf geology and petroleum plays.

Riis says that his most interesting recent project has been the *CO₂ Atlas*, an overview of suitable locations for secure long-term underground storage of carbon dioxide on the NCS.

“This publication turned out very differently than we’d expected when starting the job on behalf of the Ministry of Petroleum and Energy,” he explains.

“We were to document what we knew about the sub-surface, with geologists and reservoir engineers

working together to look at discoveries, fields and reservoir formations.

“Regional geology was also updated, and the result became a geological textbook which describes the continental shelf in a new way.”

The atlas attracted great attention in the world at large. Although other countries have produced similar publications, none are so detailed.

“We could create this work because we had access to large quantities of offshore data,” Riis explains. “In that respect, we occupy a unique position in Norway.”

He is currently studying how water, oil and gas behave in the sub-surface over long periods of geological time, and serves in the NPD’s team for Johan Sverdrup in the North Sea.

“Sverdrup is a big field, which will generate income – and technology – over a long time,” he observes. “It’s important that decisions taken now, in the first phase, lay the basis for a good production strategy throughout its producing life.”

Support

Riis often provides support for younger and less experienced geologists, says Janka Rom, disci-

pline coordinator for geosciences at the NPD.

“We know it’s safe to let them work with Fridtjof. He’s been, and still is, a mentor for many – both at work and as MSc students at various universities. He’s a good educator.”

His preference for inspiring, sharing knowledge with and realising the potential of others, rather than promoting himself, was also one of the reasons why he won the Brøgger prize in 2014.

The highest honour conferred by the Geological Society of Norway, this was presented to Riis for “contributing at a high scholarly level to Norwegian geology and geoscience in general through a lifelong commitment”.

While that award was a professional accolade from fellow geologists, the Hjelmeland prize was given to him in 2011 by Hjelmeland local authority for identifying the Ritland crater.

This is one of two meteorite crashes discovered on the Norwegian mainland, and the local community has valued the positive way Riis presented his find.

Together with scientists from the department of geoscience at the University of Oslo (UiO), he succeeded in documenting that a chunk of rock had hit Vormedalsheia north-east of Stavanger.

Travelling at high speed, it struck so forcefully that a 350-metre-deep crater measuring 2.7 kilometres in diameter was gouged out in this highland region.

“Geologists have long been interested in the area around Ritland,” explains Riis, who has himself spent much time there. “Well preserved fossils found in 1950s theoretically shouldn’t have existed there.”

His theory that the distinctive rock formations and landscape features found locally were caused by a meteorite impact was finally confirmed in 2008.

Although Riis comes across as a fairly modest man, he finds it gratifying that his work has attracted attention.

“These are two very different awards, and it’s a matter of pride to have received them both. I feel that creates an obligation to keep going.”

A natural question is what he thinks will happen with future recruitment to the geosciences now that the petroleum sector is experiencing difficult times.

He emphasises that the discipline covers much more than oil and gas. “Geologists are always going to be needed. Geology is the mother of all natural sciences, you know.”

Facts for the future – or scaremongering?

Petter Osmundsen



This is an edited and abridged version of a paper by Petter Osmundsen, professor of petroleum economics at the University of Stavanger. The full English version is available on the NPD website at www.npd.no/en/Publications/.

Norwegian prime minister Erna Solberg and her minister of finance, Siv Jensen, have presented figures which purport to show a dramatic decline in demand from the country's petroleum industry.

These forecasts derive from a 2013 report commissioned by the Ministry of Finance from Statistics Norway (SSB) on the future downscaling of the petroleum sector.

When a closer look is taken at the basis for the forecasts, however, they turn out to be far less dramatic than when presented in compressed graphs. SSB actually predicts an annual decline of 0.4 per cent as a proportion of mainland GDP.

A number of objections can also be levelled at the analysis. SSB takes no account of a possible price recovery, underestimates the available resources and ignores possible expansion in that part of the supplies industry which delivers to foreign markets.

The report is not a best estimate of the future of the Norwegian oil industry, but a downscaling scenario.

Negative

Some members of the government seem to build their

negative predictions of the petroleum industry on information reproduced by the Productivity Commission of 2015, which was based in turn on an SSB report by Cappelen et al – hereafter referred to as SSB (2013).

This contains a figure which appears to show a sharp decline in domestic demand from the petroleum industry after 2015.

The ministers concerned seem to believe that SSB was able in 2013 to predict the sharp cyclical downturn now being experienced by the petroleum industry after the growth in costs and the price slump, and that this decline is permanent.

However, reading the actual SSB report – entitled *The impact of the petroleum sector on the Norwegian economy and pay formation. Future downscaling and sensitivity to oil price shocks* – creates a different impression.

The conclusion is as follows: "The petroleum industry and the activities which follow in its wake are now substantial, even if production has declined from the peak year almost a decade ago.

"Demand from the industry is likely to continue growing for some years, while production could remain stable for just under a decade to come.

"We expect a moderate

declining trend in demand from the petroleum sector to begin about five years from now. In our view, production will first begin to fall in the 2020s and this reduction is likely to continue towards 2040."

Estimate

The figure reproduced by the Productivity Commission is based on a price estimate of USD 94 per barrel in 2013 value, which remains flat up to 2040.

That is a trend projection of a base scenario, and the report does not address short-term economic fluctuations of the kind being experienced today.

Nor does it paint a dramatic picture. Output will stay stable until 2020 before falling gradually. As noted above, demand for the Norwegian economy, and specifically for the supplies industry delivering to the NCS, is expected to decline by 0.4 per cent per annum as a proportion of mainland GDP.

That is very different from the more dramatic picture painted in the Norwegian media, and the predicted decline is the same as the one from 1993 to 2002.

I believe SSB systematically underestimates undiscovered



Figure 1. Petroleum sector demand. Percentage of mainland Norway GDP. Source: Official Norwegian Reports, NOU 2015:1, *Productivity – Underpinning Growth and Welfare*, taken from Official Norwegian Reports, NOU 2013:13, *Wage Formation and Challenges Facing the Norwegian Economy*.

resources. An indication of this is provided when it comments that SSB (2013) is an update of another Cappelen et al report from 2010:

"Public balances now clearly appear more solid than three years ago, and larger oil reserves than earlier assumed have been proven. Demand from the petroleum industry is accordingly expected to remain higher for longer into the future than we assumed in the 2010 study."

This type of underestimate is normal.

Figure 2 shows that production forecasts for the NCS have consistently been too conservative. Among other considerations, they fail to take account of the political response to a decline.

Active policies in the form of relicensing of relinquished acreage, admitting new players to the NCS and the tax refund scheme for exploration costs have given a substantial boost to operations.

My interpretation of the SSB report is that it deals only with deliveries to activities on the NCS and excludes exports, and this has been confirmed by its authors.

That explains why the Norwegian resource base becomes so significant for the estimates. These exports are very

high and growing.

According to Rystad Energy, international turnover for Norwegian suppliers totalled NOK 206 billion in 2013. This represents a substantial segment of the supplies industry, and oil companies in Norway also have considerable activities related to projects in other countries.

The report's reference trajectory would therefore become more positive if it allowed for the possibility that reduced activity at home could be partly offset by expanding operations abroad.

Resources

SSB notes that Rystad Energy (2013) has produced forecasts extending further ahead in time, which estimate that big resources exist in the recently opened areas of the Barents Sea.

However, SSB chooses to ignore this since "the methodology underlying these estimates is not presented in the report, so that the uncertainty appears very great".

I must add here that SSB itself says nothing at all about the methodology underlying its own production projections, which include the prediction of a

substantial contraction in exploration activity at an oil price of USD 94 per barrel, and that it makes no mention of the uncertainty related to its own forecasts.

I interpret the report such that it completely ignores additional resources from newly opened areas of the Barents Sea: "Our reference scenario assumes that petroleum production declines gradually between 2030 and 2040. A price estimate of USD 90 per barrel, measured in 2013 prices, will help to ensure modest profitability for fields in Arctic areas, and can in itself contribute to reducing the industry's desire to expand towards the far north."

Reserves and production are quite simply not attributed by SSB to areas which the oil companies have been eager to have opened. Does it know something other people do not?

As far as I am aware, SSB does not possess sub-surface expertise, and the petroleum industry has been gradually moving northwards.

SSB positions itself within a tradition of sceptics who predict that activities further to the north will not be profitable, and who time and again have been proven wrong.

Reorientation

The government wants a reorientation from the oil sector to mainland industries. That appears to rest on overall macroeconomic considerations, rather than on industrial analysis.

More than half of Norway's petroleum resources remain to be recovered, and the country has been in the top 10 list of the world's biggest discoveries for several years in a row.

An extensive infrastructure has been built up in transport and processing of oil and gas, which must be exploited while it remains intact. Substantial resources remain in mature fields, and recovering these is time-critical.

Fields on the NCS continue to provide an extraordinary pre-tax return and can yield big revenues for the government. A continued commitment should accordingly be devoted to this industry, and efforts made to avoid a deep downturn which causes the loss of jobs and expertise before the next recovery.

In choosing to exploit a contrived crisis in the oil industry, the government is presumably seeking to emphasise the need for reforms in mainland Norway. That requirement stands on its own two feet – talking down the oil industry is unnecessary.

The problem with presenting graphs which show Norwegian oil activity to be in free fall lies in the adverse signal this sends about the industry's future.

It has a harmful effect on educational choices by young people, oil companies considering investment,

and suppliers thinking of making a commitment in Norway.

The downscaling of the petroleum sector appears to be deterministic in the government's analysis, and to provide arguments for encouraging mainland productivity.

It is important to remember that making provision for increased value creation on the NCS will also be possible – activity is a function of existing and anticipated operating parameters. A quote from SSB (2013) could be pertinent here:

"Petroleum activities are important for the Norwegian economy. The gross product in the petroleum sector, defined in the national accounts as the production and pipeline transport industries, accounted in 2012 for almost 25 per cent of GDP.

"However, the bulk of this, 67 per cent, is value added to the input factors, which in principle comprise that part of the gross product which exceeds normal factor earnings.

"This is what is known as the petroleum rent. The government's revenues from petroleum operations have corresponded to about 90-95 per cent of the petroleum rent in recent years."

A very sharp contrast can also be seen with actual policies for the oil industry. That is problematic at a time when producer countries are competing to attract scarce funds from oil companies which are cutting costs and rationing investment spending.

The British have now announced a big easing in their fiscal burden, with the marginal tax rate for new fields being reduced to 50 per cent. Favourable deductions for invest-

ment mean that the effective rate is actually lower than this.

Britain already allows direct expensing of investments, a more beneficial solution for the companies than Norway's depreciation system.

That is now being supplemented by an uplift of no less than 62.5 per cent, which replaces several earlier targeted exemptions. Since the latter had an upper limit, the introduction of uplift will mean a substantial tax relief in most cases.

The overall impression provided by the Norwegian oil industry, on the other hand, is a deterioration in operating parameters.

- Taxation was tightened in 2013 by a reduction in tax-related depreciation, in part with reference to a high level of activity. When the latter falls, the tax changes should be reversed. But there is no sign of that happening.
- When the tax increase was implemented, the previous government talked a lot about studying tax reliefs for land-based facilities in northern Norway. This remains an open issue.
- The current coalition's political declaration states that measures for mature fields will be studied. This appears to have been shelved.

Measures to improve operating parameters for mainland industry are sound. At the same time, it is important to take care of the oil sector. The approach should be industry-neutral – and fact-based.

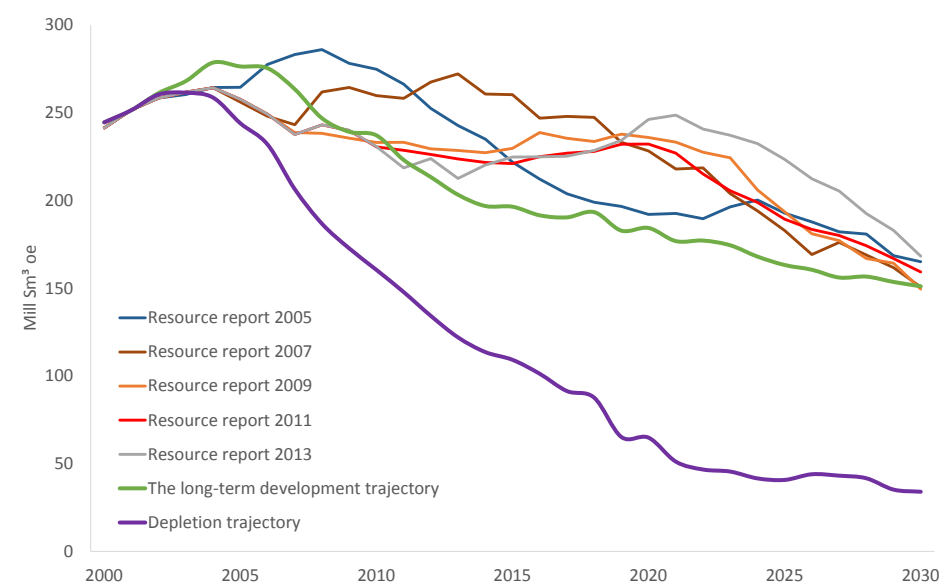


Figure 2. Production forecasts for the NCS. Current forecast compared with the long-term development trajectory and the depletion trajectory from a 2002 White Paper. Data source: NPD

Raining ash

Christian Magnus (text and photo)

Lava and volcanic ash erupted 55 million years ago from fractures which would later become the North Atlantic. Greenland lay adjacent to the NCS at that time.

Drilling in the old volcanoes beneath the Norwegian Sea and all the other wells off Norway have provided much information about this period of geological history.

Ash from the eruptions was carried near and far on the winds. Sub-surface arms from the volcanoes penetrated between the thick layers of sediment deposited in the Vøring and Møre basins.

Heat from the magmatic chambers, the volcanoes and their long vents meant that large quantities of gas previously contained in clay and sandstones

were blasted out of the ground.

The methane in this blowoff, combined with much carbon dioxide, caused a dramatic rise in temperature for a brief period – just a couple of million years. Fortunately for Norway, the huge quantities of lava and igneous rocks in the Norwegian Sea dating from this time are a rare phenomenon.

A similar period of large-scale volcanic activity occurred in Siberia at the end of the Permian, when 90 per cent of animal and plant species died out.

Things were luckily not quite that bad 55 million years ago, at the transition from the Palaeocene to the Eocene. Remote ancestors of hippos browsed in the sub-tropical land-

scape of what is now the North Sea but was then partially dry land. This was just a brief tropical episode in Norway's geological history.

Today, the volcanic ash lies beneath a layer of sediments deposited after the vulcanism had ceased, and has largely been converted to viscous clays known as the Balder and Tare formations in the North and Norwegian Seas respectively.

The small picture depicts microscopic shelly fossils of marine algae. The other shows sediments dating from 55 million years ago, with light layers of algal shells and darker stripes of volcanic ash. Both hail from Fur on Denmark's Lim Fjord.

A young Jan Steinløkk from the NPD in front of sediments at Fur on the Lim Fjord, laid down 55 million years ago with light layers of shelly fossils and darker stripes of volcanic ash.



Electron microscope image of shelly fossils from Fur.

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Facts sited

A fixture on many desks in and around the Norwegian oil industry is no more. The annual *Facts* publication has been replaced in a new and improved format by the www.norskpetsroleum.no website.

Facts 2014 was the last in the printed series published by the Ministry of Petroleum and Energy (MPE) and the NPD to describe and provide factual information on the Norwegian petroleum sector.

The MPE and the NPD launched *Oil Facts* in 2013 as an app for mobiles, with data from the purely factual section of the printed book. This is still available in versions for various phones.

On the new website, the content has been reorganised to tie descriptions and facts more closely together. Articles and facts are illustrated with photos, graphics and maps. All information is accessible from any digital platform, and the content can be downloaded, printed out and shared by mail or on social media.

Provided in both Norwegian and English versions, www.norskpetsroleum.no contains information on such aspects as:

- the significance of the petroleum sector for the Norwegian economy
- a description of current activities on the NCS
- organisation of the petroleum sector
- regulatory parameters throughout the industry life cycle, from opening new exploration acreage to field cessation
- facts about fields, discoveries, companies, exploration activities, production and the resource base on the NCS
- emissions/discharges, measures to reduce them and oil spill response
- the supplies industry and the commitment to research and technology
- explanations of terminology and an energy calculator.

Links to more detailed information are provided for each topic. As with *Oil Facts*, part of the factual information will be synchronised on a daily basis with the NPD's fact bases.

The new site is intended for a broad audience, and accordingly represents a supplement to the NPD's own fact pages and maps. These are aimed to a greater extent at professional users.



Oil Facts

The iPhone app from the NPD and the Ministry of Petroleum and Energy is available in an updated version. This can be accessed in the App Store by searching for *Oil Facts*. The app is also available for Android and Windows phones.