



# 16

## Future developments

Freja • Dagny and Glitne • Volve • Sigyn • Grane  
Vale • Skirne • Byggve • Tune • Kvitebjørn  
34/7 25S (STUJ) • Gjøa • Fram • Mikkel • Kristin • Lavrans  
Trestakk • Tyrihans • Heidrun North • Snøhvit • Ringhorne  
Tambar • Ormen Lange • Skarv

## Freja

<b>Blocks and production licences</b>	Block 2/12 – production licence 113. Awarded 1985.		
<b>Operator</b>	Amerada Hess Norge AS		
<b>Licensees</b>	Den norske stats oljeselskap a.s (SDFI 30%)		50%
	Amerada Hess Norge AS		50%
<b>Resources</b>	Oil: 2 mill scm NGLs: 0.1 mill tonnes Gas: 0.3 bn scm		

Discovered in 1987, Freja lies east of Valhall on the boundary with the Danish continental shelf. Development plans based on an unmanned wellhead platform in about 70 metres of water, tied back to Valhall or Denmark's Harald field, have been considered. They call for a joint development with the Danish Gert field. A development of Freja has been postponed because of unsatisfactory project economics.

## Dagny and Glitne

<b>Blocks and production licences</b>	Block 15/6 – production licence 029. Awarded 1969. Block 15/5 – production licence 048. Awarded 1977.		
<b>Operator</b>	Den norske stats oljeselskap a.s (048) Esso Expl & Prod Norway A/S (029)		
<b>Licensees</b>		<b>PL 029</b>	<b>PL 048</b>
	Den norske stats oljeselskap a.s (SDFI)		68.9% (30.0%)
	Elf Petroleum Norge AS		21.8%
	Norsk Hydro Produksjon a.s		9.3%
	Esso Expl & Prod Norway A/S	100%	
<b>Resources</b>	Dagny + 15/5-2 structures:	Gas: 9.2 bn scm NGLs: 0.5 mill tonnes Condensate: 1.2 mill scm	
	Glitne structure (15/5-5 and 6):	Oil: 4-5 mill scm	

Dagny and the block 15/5-2 structures lie north of Sleipner West. A possible development solution involves a subsea production system tied back to the Sleipner A or T platform on Sleipner East when capacity becomes available on one or other of these installations. Dagny was discovered in 1978.

Glitne, a small oil field, was found with well 15/5-5 during 1995 and appraised by 15/5-6 in 1997. Possible development solutions calls for a leasing concept (production ship or other mobile unit) or a tie-in to a future oil processing facility in the area.

## Volve

<b>Block and production licence</b>	Block 15/9 – production licence 046. Awarded 1976.		
<b>Operator</b>	Den norske stats oljeselskap a.s		
<b>Licensees</b>	Den norske stats oljeselskap a.s (SDFI 34.4%)		52.6%
	Esso Expl & Prod Norway A/S		28.0%
	Elf Petroleum Norge AS		10.0%
	Norsk Hydro Produksjon a.s		9.4%
<b>Resources</b>	Oil: 5.2 mill scm Gas: 0.8 bn scm		

Proven in 1993, Volve (Theta West) lies in the Sleipner area. A possible development solution involves a wellhead platform tied back to a new processing facility under consideration for phasing in several oil fields in the Sleipner area.

## Sigyn

<b>Block and production licence</b>	Block 16/7 – production licence 072. Awarded 1981.		
<b>Operator</b>	Esso Expl & Prod Norway A/S		
<b>Licensees</b>	Den norske stats oljeselskap a.s (SDFI 30%)		50%
	Esso Expl & Prod Norway A/S		40%
	Norsk Hydro Produksjon a.s		10%
<b>Resources</b>	Gas: 5.8 bn scm NGLs: 2 mill tonnes Condensate: 4.7 mill scm		

Sigyn was proven in 1982 and lies in the Sleipner area. Sigyn will probably be developed with a simple solution, based on sending the unprocessed wellstream to a parent platform in the Sleipner area.

## Grane

<b>Block and production licences</b>	Block 25/11 – production licences 001 and part of 169. Awarded in 1965 and 1991 respectively.		
<b>Operator</b>	Norsk Hydro Produksjon a.s		
<b>Licensees</b>		<b>PL 169 (part)</b>	<b>PL 001</b>
(after amending participating interest)	Den norske stats oljeselskap a.s (SDFI 54.5%)	65%	
	Norsk Hydro Produksjon a.s	28%	
	Esso Expl & Prod Norway A/S	7%	100%

<b>Resources</b>	Oil: 112 mill scm
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Discovered in 1991, Grane lies east of Balder in the North Sea. Oil in the field is heavy and complicated to recover. Production testing/early production have been pursued by the licensees to gain experience with the reservoir. Plans call for the field to be developed on the basis of an integrated production, drilling and quarters platform, with oil piped to Sture. Natural gas is due to be used as the drive mechanism for oil production. Since the field contains very little associated gas, injection volumes must be acquired elsewhere. The water depth is 127 metres. A plan for development and operation of Grane was submitted by the licensees for production licences 169 and 001 to the authorities for approval on 23 December 1999.

## Vale

<b>Block and production licence</b>	Block 25/4 – production licence 036. Awarded 1971.	
<b>Operator</b>	Norsk Hydro Produksjon a.s	
<b>Licensees</b> (rounded to two decimal places)	Marathon Petroleum Norge A/S	46.90%
	Norsk Hydro Produksjon a.s	21.92%
	Elf Petroleum Norge AS	18.70%
	Total Norge AS	5.54%
	Saga Petroleum ASA	6.61%
	AS Ugland Rederi	0.32%
<b>Resources</b>	Gas: 3 bn scm Condensate: 3.1 mill scm	

Provisional plans call for Vale to be developed with a subsea solution tied back to Heimdal. The discovery was made in 1991. A plan for development and operation is expected to be submitted to the authorities during 2000.

## Skirne

<b>Block and production licence</b>	Block 25/5 – production licence 102. Awarded 1985.	
<b>Operator</b>	Elf Petroleum Norge AS	
<b>Licensees</b>	Den norske stats oljeselskap AS (SDFI 30%)	50%
	Elf Petroleum Norge AS	20%
	Total Norge AS	20%
	Norsk Hydro Produksjon a.s	10%

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<b>Resources</b>	Gas: 4.3 bn scm    Condensate: 0.9 mill scm
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Plans call for Skirne, proven in 1990, to be developed together with Byggve using a subsea installation tied back to Heimdal. A possible development depends on cost-effective phasing-in as a satellite to Heimdal.

### Byggve

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<b>Block and production licence</b>	Block 25/5 – production licence 102. Awarded 1985.	
<b>Operator</b>	Elf Petroleum Norge AS	
<b>Licensees</b>	Den norske stats oljeselskap AS (SDFI 30%)	50%
	Elf Petroleum Norge AS	20%
	Total Norge AS	20%
	Norsk Hydro Produksjon a.s	10%
<b>Resources</b>	Gas: 2.6 bn scm    Condensate: 0.7 mill scm	

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Plans call for Byggve, proven in 1991, to be developed together with Skirne using a subsea installation tied back to Heimdal. A possible development depends on cost-effective phasing-in as a satellite to Heimdal.

### Kvitebjørn

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<b>Block and production licence</b>	Block 34/11 – production licence 193. Awarded 1993.	
<b>Operator</b>	Den norske stats oljeselskap a.s	
<b>Licensees</b>	Den norske stats oljeselskap a.s (SDFI 40%)	80%
	Norsk Hydro Produksjon a.s	15%
	Elf Petroleum Norge AS	5%
<b>Resources</b>	Gas: 47 bn scm    Condensate: 17.2 mill scm    NGLs: 0.4 mill tonnes	

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Kvitebjørn was proven in 1994 and lies south of Gullfaks. Plans call for the field to be developed with a staffed wellhead platform carrying an integrated drilling package to separate gas and condensate for transport in separate pipelines to receiving facilities for further processing. The operator submitted a plan for development and operation in December 1999, with production due to start in 2004.

## 34/7 25S (STUJ)

<b>Block and production licence</b>	Block 34/7 – production licence 089. Awarded 1984.	
<b>Operator</b>	Saga Petroleum ASA	
<b>Licensees</b>	Den norske stats oljeselskap a.s (SDFI 51%)	58.22%
	Esso Expl & Prod Norway A/S	10.5%
	Idemitsu Petroleum Norge AS	9.6%
	Norsk Hydro Produksjon a.s	8.4%
	Saga Petroleum ASA	4.88%
	Elf Petroleum Norge AS	5.6%
	RWE-DEA Norge AS	2.8%
<b>Resources</b>	Oil: 2.3 mill scm Gas: 0.2 bn scm	

This discovery east of Tordis was made in 1996. Development is expected to comprise a subsea solution tied back to the Tordis facilities.

## Gjøa

<b>Blocks and production licence</b>	Blocks 35/9 and 36/7 – production licence 153. Awarded 1988.	
<b>Operator</b>	Norsk Hydro Produksjon a.s	
<b>Licensees</b>	Den norske stats oljeselskap a.s (SDFI 30%)	50%
	Norsk Hydro Produksjon a.s	20%
	A/S Norske Shell	12%
	Saga Petroleum ASA	10%
	RWE-DEA Norge AS	8%
<b>Resources</b>	Oil: 11.6 mill scm Gas: 16.8 bn scm NGLs: 0.6 mill tonnes	

The Gjøa field was proven in 1989 west of Florø and about 42 km north of Fram. A unitisation of resources in the Greater Sogn area is currently under consideration by the licensees. See the description for Fram below.

## Fram

<b>Block and production licence</b>	Block 35/11 – production licence 090. Awarded 1984.		
<b>Operator</b>	Norsk Hydro Produksjon a.s		
<b>Licensees</b>	Den norske stats oljeselskap a.s (SDFI 30%)		50%
	Norsk Hydro Produksjon a.s		25%
	Mobil Development of Norway AS		25%
<b>Resources</b>	Oil: 32.5 mill scm NGLs: 0.8 mill tonnes Gas: 17.2 bn scm		

Fram was proven in 1987. The licensees have considered developing the field with a semi-submersible production, drilling and quarters platform. Oil production could be exported to Mongstad via Troll Oil Pipeline II. However, unsatisfactory project economics for Fram mean that the partners in production licences 090 and 153, in cooperation with the licensees in production licence 153, have resolved to assess the viability of a unitised development of resources in the Greater Sogn area, which embraces production licence 090 (Fram), production licence 153 (Gjøa) and resources proven in production licence 248. On the basis of the studies carried out, the partners in the three production licences have resolved to mature two development solutions – a phased subsea development and a semi-submersible production, drilling and quarters platform. A final choice will probably be made during the summer of 2000.

## Mikkel

<b>Blocks and production licences</b>	Block 6407/6 – production licence 092. Awarded 1984. Block 6407/5 – production licence 121. Awarded 1986.		
<b>Operator</b>	Den norske stats oljeselskap a.s		
<b>Licensees</b>		<b>PL 092</b>	<b>PL 121</b>
	Den norske stats oljeselskap a.s (SDFI)	50% (30%)	70% (40%)
	Norsk Hydro Produksjon a.s	10%	10%
	Mobil Development of Norway AS	40%	20%
<b>Resources</b>	Gas: 19.5 bn scm NGLs: 4.7 mill tonnes Condensate: 4.6 mill scm Oil: 1.6 mill scm		

Proven in 1987, Mikkel lies in 220 metres of water on Halten Bank East, about 40 km south of Åsgard's Midgard deposit and 40 km north of Draugen. Development planning is under way with a view to commencing gas deliveries in 2002 or 2003. The production concept embraces a three-slot subsea template tied back either to Draugen for processing or to

the subsea installations on Midgard for onward transport to the Åsgard B gas processing platform. Plans call for the rich gas to be piped through the Åsgard Transport trunkline to Kårstø for separation of the NGLs. A development decision will depend in part on a sales solution for the gas. The earliest date for submitting a plan for development and operation is September 2000.

## Kristin

<b>Blocks and production licences</b>	Block 6506/11 – production licence 134. Awarded 1987. Block 6406/2 – production licence 199. Awarded 1993.		
<b>Operator</b>	Den norske stats oljeselskap a.s		
<b>Licensees</b>		<b>PL 134</b>	<b>PL 199</b>
	Den norske stats oljeselskap a.s (SDFI)	53% (25%)	73% (45%)
	Saga Petroleum ASA	7%	12%
	Norsk Agip AS	30%	
	Mobil Development of Norway AS		15%
	Total Norge AS	10%	
<b>Resources</b>	Gas: 39.1 bn scm Condensate: 42.1 mill scm NGLs: 5.9 mill tonnes		

Kristin was discovered in 1997, and lies about 20 km south-west of Åsgard's Smørbukk deposit. The discovery extends across production licences 134 and 199. Work is under way on a possible development of the fields in the area, with Kristin as a possible centre and other nearby discoveries – Ragnfrid, Lavrans and Erlend – phased in towards it. One concept under consideration is a floating production facility on Kristin with subsea tie-ins from other fields. Plans call for rich gas to be piped through Åsgard Transport to a land terminal (Kollsnes/Kårstø) for separation of NGLs, while condensate could be processed on the Åsgard A production ship and loaded into shuttle tankers together with Åsgard condensate. Development timing will depend on a sales solution for the gas. A plan for development and operation could be submitted in 2001 at the earliest.



## Lavrans

<b>Block and production licence</b>	Block 6406/2 – production licence 199. Awarded 1993.	
<b>Operator</b>	Den norske stats oljeselskap a.s	
<b>Licensees</b>	Den norske stats oljeselskap a.s (SDFI 45%)	73%
	Saga Petroleum ASA	12%
	Mobil Development of Norway AS	15%
<b>Resources</b>	Gas: 62.5 bn scm Condensate: 29.1 mill scm NGLs: 9.4 mill tonnes	

Discovered in 1994-95, Lavrans lies about 20 km south of Åsgard's Smørbukk deposit in 270-290 metres of water. The field could be developed together with Kristin and other fields in the area. One concept under consideration is a floating production facility on Kristin with subsea tie-ins from other fields. Plans call for rich gas to be piped through Åsgard Transport to a land terminal (Kollsnes/Kårstø) for separation of NGLs, while condensate could be processed on the Åsgard A production ship and loaded into shuttle tankers together with Åsgard condensate. Development timing will depend on a sales solution for the gas.

## Trestakk

<b>Block and production licence</b>	Block 6406/3 – production licence 091. Awarded 1984.	
<b>Operator</b>	Den norske stats oljeselskap a.s	
<b>Licensees</b>	Den norske stats oljeselskap a.s (SDFI 30%)	55%
	Mobil Development of Norway AS	33%
	Saga Petroleum ASA	12%
<b>Resources</b>	Oil: 8.6 mill scm	

Trestakk is a small oil field 10 km west of Tyrihans, which was discovered in 1986. Further development will be assessed together with other fields in the area.

## Tyrihans

<b>Block and production licence</b>	Block 6407/1 – production licence 073. Awarded 1982.	
<b>Operator</b>	Den norske stats oljeselskap a.s	
<b>Licensees</b>	Den norske stats oljeselskap a.s (SDFI 30%)	50.00%
	Total Norge AS	33.33%
	Norsk Hydro Produksjon a.s	16.67%
<b>Resources</b>	Condensate: 19.4 mill scm NGLs: 4 mill tonnes Gas: 23. bn scm	

This field comprises two structures – Tyrihans North and Tyrihans South – located about 40 km south of Åsgard in roughly 285 metres of water. The Tyrihans South gas field was proven in 1983. Tyrihans North, which also contains oil, followed in 1984. The southern structure extends into block 6406/3 in production licence 091. A direct subsea tie-back to existing infrastructure on Åsgard is being considered. Plans call for rich gas to be piped through the Åsgard Transport system to a land terminal (Kollsnes /Kårstø) for separation of the NGLs. Development timing will depend on spare capacity in existing infrastructure as well as a sales solution for the gas.

## Heidrun North

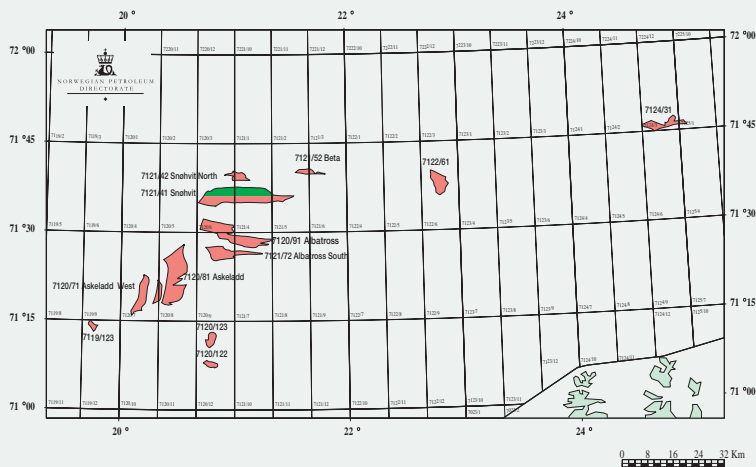
<b>Block and production licence</b>	Block 6507/8 – production licence 124. Awarded 1986.	
<b>Operator</b>	Den norske stats oljeselskap a.s	
<b>Licensees</b>	Den norske stats oljeselskap a.s (SDFI 64.16%)	76.59%
	Norske Conoco AS	18.29%
	Fortum Petroleum AS	5.12%
<b>Resources</b>	Oil: 4 mill scm	

This field lies about eight km north of the Heidrun platform, and was proven in 1990. The idea is to phase it into the Heidrun Unit via a subsea template. Heidrun North will be produced with water injection for pressure support. A plan for development and operation is due to be submitted in the first quarter of 2000. Drilling on Heidrun North is expected to start in August 2000.

## Snøhvit

<b>Blocks and production licences</b>	Block 7120/5 – production licence 110. Awarded 1985. Block 7121/5 – production licence 110. Awarded 1985. Block 7120/6 – production licence 097. Awarded 1984. Block 7121/4 – production licence 099. Awarded 1984.																												
<b>Operators</b>	Norsk Hydro Produksjon a.s is operator for production licence 097. Den norske stats oljeselskap a.s is operator for the other licences.																												
<b>Licensees</b>	<table border="1"> <thead> <tr> <th></th> <th>PL 097</th> <th>PL 099</th> <th>PL 110</th> </tr> </thead> <tbody> <tr> <td>Den norske stats oljeselskap a.s (SDFI)</td> <td>56.25% (30.00%)</td> <td>50.0% (30.0%)</td> <td>50.00% (30.0%)</td> </tr> <tr> <td>Norsk Hydro Produksjon a.s</td> <td>22.50%</td> <td>12.5%</td> <td>16.67%</td> </tr> <tr> <td>Amerada Hess Norge AS</td> <td>11.25%</td> <td></td> <td>8.33%</td> </tr> <tr> <td>RWE-DEA Norge AS</td> <td>10.00%</td> <td></td> <td></td> </tr> <tr> <td>Total Norge AS</td> <td></td> <td>37.5%</td> <td>20.000%</td> </tr> <tr> <td>Fina Production Licenses AS</td> <td></td> <td></td> <td>5.00%</td> </tr> </tbody> </table>		PL 097	PL 099	PL 110	Den norske stats oljeselskap a.s (SDFI)	56.25% (30.00%)	50.0% (30.0%)	50.00% (30.0%)	Norsk Hydro Produksjon a.s	22.50%	12.5%	16.67%	Amerada Hess Norge AS	11.25%		8.33%	RWE-DEA Norge AS	10.00%			Total Norge AS		37.5%	20.000%	Fina Production Licenses AS			5.00%
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Total Norge AS		37.5%	20.000%																										
Fina Production Licenses AS			5.00%																										
<b>Resources</b>	Oil: 20.8 mill scm NGLs: 5.7 mill tonnes Gas: 176.3 bn scm Condensate: 18.5 mill scm																												

Discovered in 1984, Snøhvit is the largest field proven on the Tromsø Patch in the Barents Sea. Its licensees are seeking liquefaction-based marketing solutions for gas reserves in this field as well as nearby Askeladd and Albatross, along with a solution for recoverable oil reserves. The earliest date when a development plan could be submitted to the authorities is December 2000.



Discoveries in the Barents Sea (Source: Norwegian Petroleum Directorate)

## Ringhorne

<b>Blocks and production licences</b>	Block 25/11 – production licence 001. Awarded 1965. Block 25/10 – production licence 028. Awarded 1969. Block 25/8 – production licence 027. Awarded 1969.	
<b>Operator</b>	Esso Expl & Prod Norway A/S	
<b>Licensees</b>	Esso Expl & Prod Norway A/S	100%
<b>Resources</b>	Oil: 30.4 mill scm Gas: 2.0 bn scm	
<b>Production</b>	Oil will be produced together with output from Balder	
<b>Investment</b>	Total investment will probably be NOK 8.2 bn (1999 value)	

Ringhorne comprises the Ringhorne and Forseti discoveries as well as seven smaller deposits in the area around the Balder development. These resources are due to be produced with water injection as pressure support. Plans call for Ringhorne to be developed with an integrated production, drilling and quarters platform tied back to the Balder production ship. This installation will be staffed during the drilling phase and would normally be unstaffed thereafter. In addition to the platform, five subsea wells tied back to the Balder ship are planned. Oil will be shipped by shuttle tanker from Balder. The licensee submitted a plan for development and operation of Ringhorne to the authorities for approval on 8 October 1999.

## Tambar

<b>Blocks and production licences</b>	Block 1/3 – production licence 065. Awarded 1981. Block 2/1 – production licence 019 B. Awarded 1977.	
<b>Operator</b>	BP Amoco Norge AS	
<b>Licensees</b>	BP Amoco Norge AS Den norske stats oljeselskap a.s (SDFI 30%) A/S Norske Shell	55% 30% 15%
<b>Resources</b>	Oil: 5.6 mill scm Gas: 1.5 bn scm NGLs: 0.3 mill tonnes	
<b>Production</b>	Planned plateau production is 27 000 barrels/day oil	
<b>Investment</b>	Total investment will probably be NOK 967 millioner (2000 value)	

Plans call for Tambar to be developed with an unstaffed wellhead platform remotely operated from Ula. Production from the field will be exported to Ula for processing and onward transport. From Ula, the oil will be piped via Ekofisk to Teesside in the UK. A plan for development and operation is due to be submitted to the authorities in 2000.

## Ormen Lange

<b>Blocks and production licences</b>	Block 6304/9 and 6305/7 – production licence 208. Awarded 1996. Blocks 6305/1, 2, 3 and 4 – production licence 209. Awarded 1996. Block 6305/8 – production licence 250. Awarded 1999.			
<b>Operators</b>	Norsk Hydro Produksjon a.s (development phase) A/S Norske Shell (production phase)			
<b>Licensees</b>		<b>PL 208</b>	<b>PL 209</b>	<b>PL 250</b>
	Den norske stats oljeselskap a.s (SDFI)	30.00% (30%)	50.00% (35%)	53.87% (45%)
	Norsk Hydro Produksjon a.s		25.00%	14.78%
	Esso Exploration and Production Norway A/S		10%	5.91%
	BP Amoco Norge A/S	45.00%		9.44%
	A/S Norske Shell	25.00%	15.00%	16.00%
<b>Resources</b>	Gas: 314.7 bn scm			

Proven in 1997, the Ormen Lange gas discovery extends across production licences 208, 209 and 250. It lies about 140 km west of Kristiansund. Two wells have been drilled in the field. Preliminary resource assessments indicate that Ormen Lange is Norway's second largest offshore gas discovery. Production will probably begin in 2006.

## Skarv

<b>Blocks and production licence</b>	Block 6507/5 and 6 – production licence 212. Awarded 1996		
<b>Operator</b>	BP Amoco Norge AS		
<b>Licensees</b>	BP Amoco Norge AS	30%	
	Den norske stats oljeselskap a.s (SDFI 30%)	30%	
	Enterprise Oil Norwegian A/S	25%	
	Mobil Development of Norway AS	15%	
<b>Resources</b>	Oil: 18.3 mill scm Gas: 29.9 bn scm		

Skarv lies about 200 km off the Norwegian coast. The operator's estimates for resources in the field remain very uncertain, and work is continuing on the results of an appraisal well completed in the autumn of 1999. The adjacent acreage has been put on offer in the 16th offshore licensing round.

