

# THE MINERAL INDUSTRIES OF DENMARK, THE FAROE ISLANDS, AND GREENLAND

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## DENMARK

Denmark's industrialized market economy, which depended on exports of food and energy and imports of raw materials, grew by only 1.2% in terms of gross domestic product (GDP) in 2003. Its standard of living was among the highest in the world with a per capita GDP of \$39,152 in purchasing power parity. The country lacked economically exploitable metallic mineral resources but had abundant energy resources in the North Sea. It mined such industrial minerals as chalk, diatomaceous earth, limestone, and sand and gravel. The United States was Denmark's largest non-European trading partner mostly in nonenergy commodities (U.S. Department of State, 2004).

The Danish Energy Authority (DEA) approved plans for the development of a number of oilfields and investments of \$1.3 billion in 2003. Despite a high level of exploration activity, the oil companies in Denmark failed to find new reserves to outweigh the oil and gas production during 2003 (Rigzone.com, 2003<sup>1</sup>). The DEA approved a new venture at the Halfdan Field that would increase the country's gas and condensate reserves by about 40 million barrels.

The state-owned integrated energy company DONG A/S's Nini and Cecilie Oilfields came onstream in September. Both fields had unmanned platforms, and oil was piped to DONG's Siri platform for processing and tanker loading. The new fields were expected to produce a combined 25,000 barrels per day (bbl/d) in 2003 and 30,000 bbl/d in 2004. Interests in Nini were DONG (40%), Denerco Oil (30%), and RWE Dea AG (30%). Cecilie was owned by Denerco (61%), DONG (22%), and RWE Dea (17%) (Petroleum Economist, 2003b).

Under an agreement signed by DONG and the European Commission in April, DONG undertook to provide open and nondiscriminatory access to its gas pipeline by January 1, 2004. DONG also agreed to give up its right of first negotiation to buy any new volumes of gas discovered by the Dansk Undergrunds Consortium (DUC), which included the A.P. Moller-Maersk Group, ChevronTexaco Corp., and the Royal Dutch/Shell Group. DONG agreed to sell 150 million cubic meters per year of gas to Goteborg Energi of Sweden, which operated a combined heat and power facility at Rya (Petroleum Economist, 2003a).

The DUC (50%) and DONG (50%) planned to build a 100-kilometer (km) gas pipeline to the Netherlands' offshore F/3 platform from DUC's Tyra Gasfield at a cost of \$155 million. This would give Denmark's gas producers a new export market. Startup of the pipeline was planned for fall 2004. A.P. Moller-Maersk would operate the pipeline (Petroleum Economist, 2003b).

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<sup>1</sup>References that include a section mark (§) are found in the Internet References Cited section.

The European Investment Bank approved a loan of \$157 million to finance the world's largest wind farm south of Horns Rev off the Danish coast in the North Sea. The project comprised 80 wind turbines, each with a capacity of 2 megawatts (MW), and would increase Denmark's renewable wind-power-generating capacity by 8%. Elsam Kraft was the main producer and supplier of electricity in western Denmark (Alexander's Gas & Oil Connections, 2003§).

## References Cited

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Rigzone.com, 2003 (June 4), Denmark sets new production record for 2002, accessed June 12, 2003, at URL [http://www.rigzone.com/news/article.asp?a\\_id=6886](http://www.rigzone.com/news/article.asp?a_id=6886).

## Major Source of Information

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## FAROE ISLANDS

The Faroese economy performed strongly as a result of increased fishing activities and high export prices. The islands have no significant mineral resources. Initial discoveries of oil could give potential for eventual oil production and a more diversified economy. The Faroese Government initiated the process toward greater independence from Denmark. Danish subsidy amounted to about 6% of the Faroese GDP in 2003.

An oil consortium led by Amerada Hess Corp. of the United States, DONG, ChevronTexaco, and OMW Corp. found natural gas and petroleum reserves in a 170-meter (m) interval in an area that is located 25 km on the British side of the border between the Shetland Islands of the United Kingdom and the Faroe Islands and 30 km north of two major oilfields. Whether this new discovery will be commercially viable mat not be

known for several years. The Faroe Islands' oil administration granted four more drilling permits to Agip S.p.A. of Italy; the company was expected to begin test operations on the islands in the next 3 years (Alexander's Gas & Oil Connections, 2003a§).

ENI Denmark BV planned to plug and abandon the Marimas exploration well on Faroes License 002 in the Atlantic. The well encountered good reservoir-quality sandstones but only traces of hydrocarbons. The owner of the license was Faroe Petroleum Ltd. The first two test drillings by Statoil ASA of Norway and British Petroleum also found no oil. The second licensing round was to open in the summer of 2004 (Oil & Gas Journal, 2003).

The Ministry of Petroleum's second licensing round would include the Faroese continental shelf within 200 nautical miles. It would award the exploration licenses near yearend 2004. Test wells drilled in the first licensing round established that the Faroese continental shelf had a geologic structure that was favorable to entrapment of petroleum (Alexander's Gas & Oil Connections, 2003b§).

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Oil & Gas Journal, 2003, Exploration & development: Oil & Gas Journal, v. 101, no. 32, August 18, p. 42.

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Alexander's Gas & Oil Connections, 2003b (October 17), Faroe prepares for second licensing round, accessed November 13, 2003, at URL <http://www.gasandoil.com/goc/news/nte34215.htm>.

## GREENLAND

Greenland is a self-governing administrative division of Denmark and has had increasing autonomy. About one-half of Greenland's Government revenues came from grants from the Danish Government and were an important supplement to its GDP; tourism also contributed to the GDP. The country engaged in hydrocarbon and mineral exploration activities. Mineral exploration was focused on base metals, diamond, gold, industrial minerals, iron, nickel, and platinum-group metals.

Nalunaq Gold Mine AS approved the key civil engineering contracts to construct required infrastructure for mining and shipping of the ores at the Nalunaq gold project in southern Greenland; the project was 67% owned by Crew Development Corp. of Canada. The largest single contract, which was the delivery of a turnkey camp complex for 70 people, was awarded to RC Enterprise Service ApS of Qaqortoq in southern Greenland. The contract also covered all mobilization, construction, earthworks, water supply, and wastewater treatment, and installation of a 400-MW powerplant. The contract to construct and prepare the anchor systems for the barges and bulk carriers was awarded to Dykkerselskabet Viking A/S of the capital city Nuuk. Viking was to supply and construct the conveyor system and ship loader and mobilize and install the 91-m barge that will be used as a support for the ship loader facility. The remaining contracts to be finalized included the mining and shipping and the processing agreements.

The construction work had started and the camp and harbor facilities were expected to be fully operational in September. Mining operations were scheduled to begin thereafter (Crew Development Corp., 2003a).

Crew signed a memorandum of understanding with Rio Narcea Gold Mines Ltd. of Spain regarding the processing of ore from the Nalunaq gold mine. A new mine plan would allow for full-scale mining at a rate of from 420 to 450 metric tons per day (t/d) to be reached during the first quarter of 2004. The Nalunaq ore would be processed in four batches of from 35,000 to 40,000 metric tons per year. The initial gold production was expected to exceed 4,000 kilograms in the first 12 months of operation. Rio Narcea had one of Europe's most modern ore-processing and gold recovery plants, which had a capacity of 2,000 t/d and used a combination of gravity and carbon-in-leach processing (PrimeZone Media Network, 2003§).

Crew acquired 100% of mineral rights to the Seqi olivine deposit, which is located 90 km north of Nuuk. Seqi is a large and homogeneous olivine deposit with up to 97% olivine. The inferred resources derived from drillings to about 50-m depth were estimated to be 46 million metric tons (Mt). Gravimetric studies indicated a resource in excess of 100 Mt. The company planned additional limited drilling in August and a feasibility study of a production rate of from 1.5 million to 2 million metric tons per year (Crew Development Corp., 2003c).

Crew signed an agreement with Minelco AB (a subsidiary of LKAB of Sweden) to develop a bankable feasibility study of the Seqi olivine project. Minelco had an option to buy 51% of the project by carrying all capital expenditures related to the development of a mining operation as defined by the study. Crew would own 49% of a new company and be the preferred operator. Olivine would be used extensively in iron pellet production (Crew Development Corp., 2003b).

### References Cited

Crew Development Corp., 2003a, Civil engineering contracts awarded for Nalunaq gold mine: Vancouver, British Columbia, Canada, Crew Development Corp. news release, July 2, p. 1.

Crew Development Corp., 2003b, Crew secures industrial partner for Seqi olivine project: Vancouver, British Columbia, Canada, Crew Development Corp. news release, July 9, p. 1.

Crew Development Corp., 2003c, Crew secures mineral rights to Seqi olivine deposit in Greenland: Vancouver, British Columbia, Canada, Crew Development Corp. news release, April 24, p. 1.

### Internet Reference Cited

PrimeZone Media Network, 2003 (September 9), Memorandum of understanding signed for the processing of Nalunaq ore, accessed September 10, 2003, at URL [http://www.primezone.com/pages/news\\_releases.mhtml?d=44822](http://www.primezone.com/pages/news_releases.mhtml?d=44822).

### Major Source of Information

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TABLE 1  
DENMARK: ESTIMATED PRODUCTION OF MINERAL COMMODITIES<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity	1999	2000	2001	2002	2003
Aluminum metal, secondary	14,000	16,000	18,000	18,000	18,000
Cement, hydraulic	1,926,000 <sup>3</sup>	2,009,000 <sup>3</sup>	2,047,000 <sup>r,3</sup>	2,010,000	2,030,000
Chalk	40,000	400,000	1,859,000	1,900,000	1,900,000
Clays:					
Fire clay	20	25	25	25	25
Kaolin	2,500	2,500	2,500	2,500	2,500
Other	6,000	6,500	6,500	6,000	6,000
Moler, extracted	thousand cubic meters	185	234	231	230
232					
Gas:					
Manufactured	million cubic meters	1,500	1,500	1,500	1,500
Natural:					
Gross	do.	9,600	9,700	8,200	8,100
Marketable	do.	7,000	7,100	7,330	7,300
Iron and steel, metal, steel:					
Crude	thousand metric tons	748 <sup>3</sup>	803 <sup>3</sup>	746 <sup>3</sup>	392 <sup>3</sup>
Semimanufactures	do.	600	549 <sup>3</sup>	625 <sup>3</sup>	600
300					
Lime, hydrated and quicklime					
Natural gas plant liquids	thousand 42-gallon barrels	115,000	115,000	115,000	114,000 <sup>r</sup>
Nitrogen, N content of ammonia		45,000	46,000	47,000	46,700 <sup>r,3</sup>
Peat		1,600	1,600	1,600	1,600
Petroleum:					
Crude	thousand 42-gallon barrels	200,000	247,000	287,000	290,000
95,000					
Refinery products:					
Liquefied petroleum gas	do.	84,000	87,860 <sup>3</sup>	88,130 <sup>3</sup>	94,600 <sup>r,3</sup>
Gasoline	do.	1,600	1,700	1,700	1,660 <sup>r,3</sup>
Naphtha	do.	30,000	30,000	30,000	27,800 <sup>r,3</sup>
Jet fuel	do.	1,200	1,300	1,300	-- <sup>r,3</sup>
Kerosene	do.	1,800	2,000	2,000	1,950 <sup>r,3</sup>
Distillate fuel oil	do.	100	100	-- <sup>r,3</sup>	-- <sup>r,3</sup>
Refinery gas	do.	28,000	28,200	28,200 <sup>r</sup>	28,500 <sup>r,3</sup>
Lubricants	do.	16,000	17,000	1,700	1,640 <sup>r,3</sup>
Residual fuel oil	do.	300	300	-- <sup>r,3</sup>	-- <sup>r,3</sup>
Petroleum coke	do.	13,000	13,000	13,000	13,100 <sup>r,3</sup>
Total	do.	60	60	-- <sup>r,3</sup>	-- <sup>r,3</sup>
Phosphates, crude, gross weight		92,100 <sup>r</sup>	93,700 <sup>r</sup>	77,900 <sup>r</sup>	74,650 <sup>r,3</sup>
Salt, all forms		75,300	1,200	1,300	1,300
Sand and gravel:					
Onshore	thousand cubic meters	600,000	605,000	600,000	600,000
Offshore	do.	18,000	28,066 <sup>3</sup>	26,684 <sup>3</sup>	27,000
Total	do.	5,000	715 <sup>3</sup>	700	700
Of which sand, industrial (sales)	do.	23,000	28,781 <sup>3</sup>	27,384 <sup>3</sup>	27,700
500					
Stone:					
Dimension (mostly granite)		26,000	27,000	27,000	25,000
Limestone:					
Agricultural		700,000	700,000	700,000	700,000
Industrial		250,000	250,000	250,000	250,000
Sulfur, byproduct		10,000	10,500	10,500	11,000
12,000					

<sup>r</sup>Revised. -- Zero.

<sup>1</sup>Estimated data are based on sales of domestically produced mineral commodities and are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Table includes data available through June 22, 2004.

<sup>3</sup>Reported figure.