



2005 Minerals Yearbook

DENMARK, THE FAROE ISLANDS, AND GREENLAND

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

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DENMARK

Denmark has an industrialized market economy that grew by 3.4% in 2005 in terms of the gross domestic product (GDP). The country's per capita GDP based on purchasing power parity was among the highest in the world at \$34,737 (International Monetary Fund, 2006[§]¹). The country's economic growth depended on imported raw materials and foreign trade. Denmark exported energy, food products, instruments, and machinery. The extraction of oil and gas from the North Sea was very active. The country has no metallic mineral resources but does have large reserves of industrial minerals.

The Government launched its sixth oil and gas licensing round in May; this round was to focus on the western part of the Danish North Sea. Tenders were due by November 1. Seventeen applications from 20 companies were submitted by the due date. The Government was to take a 20% share of each license. A new Government business unit would hold the Government's share. The area had an estimated potential resource of 1.289 billion barrels of oil and 152 billion cubic meters of gas. A new oil find with good production rates, such as ConocoPhillips Company's Herje-2 exploration well, could significantly increase the resource. Drilling at Herje-2 hit oil in pre-Jurassic levels at a depth of 5,399 meters (m) below sea level. Oil discovery at depth with good production levels indicated that porosity was greater than previously proven (Alexander's Gas & Oil Connections, 2005[§]).

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FAROE ISLANDS

The Faroese economy depended on fishing and salmon farming and was aided by a substantial annual subsidy from Denmark. Potential discoveries of oil in the Faroese area gave hope for eventual oil production and diversification of its economy. Foreign oil companies were engaged in geophysical exploration and well drilling offshore. The Faroe Islands have no significant mineral resources.

Under the second Faroese licensing round, the Ministry of Trade and Industry awarded seven exploration licenses to eight oil companies in January. The license terms varied from 3 to 8 years and were divided into shorter sub-phases of 1 to 5 years with intermediate decision points. A firm work program was agreed for the first phase. The work programs covered seismic and other surveys as well as processing and interpretation. Two of the licenses contained stipulations on exploration wells for the subsequent phases of the license (Rigzone.com, 2005b[§]).

In January, the Faroese authorities awarded Denmark's state energy company DONG A/S interests in two new licenses on the Faroese continental shelf that were awarded to two consortia operated by ChevronTexaco Corporation of the United States and Statoil ASA of Norway, respectively. The area between the Faroe Islands and the Shetland Islands was one of DONG's three geographical focus areas for exploration. DONG made a significant discovery—Rosebank/Lochnagar—which is located in the United Kingdom's sector immediately across the boundary (Rigzone.com, 2005a[§]).

P/F Atlantic Petroleum signed an agreement with License 006 Group and the Faroese Petroleum Administration of the Ministry of Trade and Industry that a new commitment to drill on license 006 would be undertaken in lieu of fulfilling existing well commitments of license 001 and license 003 on the Faroe continental shelf. The company agreed to participate provided it was required to assume only a very small share of the cost and risk in license 006. License 006 Group was to drill the well in the summer of 2006 and consisted of Statoil (27.15%, as operator), DONG (21.91%), Anadarko Petroleum Corporation (13%), Enterprise Oil plc (12.47%), Amerada Hess Corporation (11.09%), BG Group (10.31%), Faroe Petroleum plc (4.04%), and Atlantic Petroleum (0.025%) (Huginonline.com, 2005[§]).

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¹References that include a section mark (§) are found in the Internet References Cited sections.

GREENLAND

Greenland covers about 2,166,000 square kilometers (km²) and had a population of only 57,000 in 2005. The country is a self-governing overseas administrative division of Denmark. About one-half of the Government revenues came from grants from the Danish Government. The public sector also contributed to Greenland's economy. Hydrocarbon and mineral exploration activities were the focuses of foreign investment. Exploration was most active for base metals, diamond, gold, nickel, and platinum-group metals.

Galahad Gold plc reported the results of resource estimates for its Skaergaard gold/palladium/platinum project in eastern Greenland. Galahad completed eight diamond drill holes for a total of 5,494 m of drilling between July and September 2004. The gold and palladium zones were determined using a grade and thickness cutoff of 2.5 grams per metric ton (g/t) palladium-equivalent over a 2-m vertical width. The spacing between the gold and palladium zones varied in a systematic manner across the deposit. Inferred resources in the combined zone were estimated to be 1,520 million metric tons (Mt) at grades of 0.21 g/t gold, 0.61 g/t palladium, and 0.04% platinum. The Skaergaard intrusion contained several layers that were enriched with gold, palladium, and platinum. In addition, a recoverable magnetite content of 7.5% and an ilmenite content of 6% titanium dioxide were reported in the combined zone. A scoping study for the project would be completed in March 2006. Galahad Gold decided to stop funding the project and to relinquish the license to the Greenland authorities in 2005, however, owing to soaring capital and energy costs (Galahad Gold plc, 2005§).

International Molybdenum plc (InterMoly), which was a subsidiary of Galahad Gold, announced new mineral resource estimates for the Malmbjerg molybdenum project in eastern Greenland. The deposit contained measured and indicated resources of 217 Mt at a grade of 0.20% MoS₂ and an inferred resource of 12 Mt at a grade of 0.15% MoS₂ using a cutoff grade of 0.12% MoS₂. The capital cost of the project was estimated to be approximately \$605 million for a 15,000-metric-ton-per-day operation that would produce 14,600 metric tons per year of molybdenum concentrate at a grade of 50% molybdenum. The lifespan of the mine would be 15 to 20 years. InterMoly owned 100% of the Malmbjerg project. A feasibility study was scheduled for completion in March 2006. Another project owned by InterMoly, the Flammefjeld prospect, had the potential to host significant molybdenum resources and was to be the subject of a drilling program in 2005 (International Molybdenum plc, 2005§).

In 2005, Inco Ltd. of Canada completed a drill program on Diamond Fields International Ltd.'s Ammassalik nickel project in eastern Greenland to evaluate nickel showings and geophysical targets. The claim block consisted of two adjacent properties that had a combined area of 63,737 hectares (ha); it was found earlier to have associated copper, nickel, and platinum-group metal mineralization. Results were not encouraging and led Inco to a decision to withdraw before vesting and thereby to retain no interest in the project. Diamond Fields was assessing its data and the Inco report to

determine if further exploration was warranted. Subsequently, Diamond Fields concluded an agreement with Inco regarding the Ammassalik block. The agreement granted Inco the option to earn a 65% interest in the block by spending up to \$3 million by the end of 2008 (Diamond Fields International Ltd., 2005, 2006).

According to a prefeasibility report, Angus & Ross plc indicated the viability of reopening its Black Angel Mine in western Greenland based on recovering a minimum of 985,000 metric tons (t) of ore grading at least 22% of combined zinc and lead with additional silver. The first ore could be shipped during construction, possibly in 2006. The mine was closed in 1990 and last inspected in 1997. Angus & Ross planned an extensive drilling program in the area beginning in June 2006. The chances were high of increasing the proven and recoverable reserves by further exploration and development of many satellite ore bodies discovered by Teck Cominco Ltd. and Boliden AB. Angus & Ross discovered an outcrop of satellite zinc ore that became visible owing to the disappearance of part of a glacier. In July 2005, the company acquired a 16% stake in the mine (Angus & Ross plc, 2005§).

In March 2005, Metalex Ventures Ltd. discovered strong counts of exceptional diamond indicator minerals (garnets) in two samples on the southern shore of Garnet Lake in Greenland. The garnets were considered to be derived from a nearby diamondiferous kimberlite pipe source. In June, ground geophysical work that identified 14 magnetic targets was completed, a program of heavy mineral sampling was carried out, and 16 holes were drilled across the lake to collect basal till samples. The drill holes continued into bedrock and some intersected thin kimberlite-like sills. Cantex Mine Development Corp. had an option to acquire a 25% interest in three Greenland licenses, including the area mentioned above (Cantex Mine Development Corp., 2005§).

Hudson Resources Inc. began its 2005 Greenland diamond exploration program with a ground geophysical survey of 120 line kilometers of magnetic data and 30 line kilometers of electromagnetic data. Drilling was expected to begin in mid-March. The areas were Garnet Lake, where a diamondiferous kimberlite was discovered, and Spider Lake, where diamondiferous kimberlite dikes radiated from a deep-seated circular anomaly. Significant diamond recoveries were from four locations in the Garnet Lake area and a new area that is located 12 kilometers (km) northeast of Garnet Lake (Hudson Resources Inc., 2005a, b).

New Millennium Resources Ltd. and Hudson Resources reported that kimberlite was intersected at 18 of the 19 holes (1,450 m) drilled in their drilling program on the Garnet Lake kimberlite in West Greenland. The presence of significant in situ kimberlite was associated with a prior diamond discovery. The joint venture planned to drill an additional 500 m of core in the 2005 field program. New Millennium had a 20% free-carry interest in the joint venture (New Millennium Resources Ltd., 2005§).

Ivigtut, which is located on the western side of Greenland's southern tip, is a mineral-rich area where the Ilimaussaq complex intruded in the Kanerdluarssuk Fjord. The most common gemstones were greenlandite, nuummite, and tugtupite.

In addition, chalcedony, lazurite, and sodalite also were found. True North Gems Inc. of Canada acquired the 5,500-ha Fiskenaasset ruby property, which is located 160 km south of Nuuk in the Qeqertarsuatsiaat district. The property had been in intermittent exploration and small-scale production. A total of 50 t of high-grade ruby ore has been recovered there since 1953 (Colored Stone, 2005).

In 2005, the Government granted a new exploration and exploitation license for hydrocarbons to EnCana Corp. of Canada and Nunaoil A/S of Greenland from the 2004 licensing round. The license area covered 2,897 km² and is located 250 km west of Nuuk offshore West Greenland. EnCana was to hold 87.5% of the license and act as operator and Nunaoil would hold 12.5%. EnCana was the operator of the Atammik license offshore West Greenland, which was awarded in the 2002 licensing round (Rigzone.com, 2005§).

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TABLE 1
DENMARK: ESTIMATED PRODUCTION OF MINERAL COMMODITIES^{1,2}

(Metric tons unless otherwise specified)

Commodity	2001	2002	2003	2004	2005
Aluminum metal, secondary	18,000	18,000	18,000	20,000	20,000
Cement, hydraulic	2,047,000 ³	2,010,000	2,020,000	2,050,000 ^r	2,070,000
Chalk	1,859,000 ³	1,900,000	1,900,000	1,950,000	1,950,000
Clays:					
Fire clay	25	25	25	25	25
Kaolin	2,500	2,500	2,500	2,500	2,500
Other	6,500	6,000	6,000	6,000	5,500
Moler, extracted	thousand cubic meters	231	230	232	233
Gas:					
Manufactured	million cubic meters	1,500	1,500	1,500	1,500
Natural:					
Gross	do.	8,200	8,100	8,300	9,000 ^r
Marketable	do.	7,330	7,300	7,300	8,200 ^r
Iron and steel, metal, steel:					
Crude	thousand metric tons	746 ³	392 ³	-- ³	-- ³
Semimanufactures	do.	625 ³	600	300	300
Lime, hydrated and quicklime		115,000	114,000	115,000	116,000
Natural gas plant liquids	thousand 42-gallon barrels	47,000	46,700 ³	46,000	47,000
Nitrogen, N content of ammonia		1,600	1,600	1,600	1,600
Peat		287,000	290,000	295,000	296,000
Petroleum:					
Crude	thousand 42-gallon barrels	123,800 ³	132,900 ³	133,000 ³	135,000
Refinery products:					
Liquefied petroleum gas	do.	1,224 ³	1,195 ³	1,232 ³	1,240
Gasoline	do.	16,496 ³	15,205 ³	15,264 ³	15,300
Naphtha	do.	13,000	-- ³	--	--
Jet fuel	do.	3,981 ³	3,878 ³	4,479 ³	4,500
Distillate fuel oil	do.	23,606 ³	23,886 ³	25,300 ³	25,500
Refinery gas	do.	2,221 ³	2,141 ³	2,331 ³	2,300
Residual fuel oil	do.	11,488 ³	11,540 ³	11,136 ³	11,000
Total	do.	72,000	57,845 ³	59,700 ³	59,800
Phosphates, crude, gross weight		1,300	1,300	1,400	1,400
Salt, all forms		600,000	600,000	605,000	610,000
Sand and gravel:					
Onshore	thousand cubic meters	26,684 ³	27,000	27,000	28,000
Offshore	do.	700	700	600	600
Total	do.	27,384 ³	27,700	27,600	28,600
Of which sand, industrial (sales)	do.	488 ³	490	500	500
Stone:					
Dimension (mostly granite)		27,000	25,000	26,000	26,000
Limestone:					
Agricultural		700,000	700,000	700,000	700,000
Industrial		250,000	250,000	250,000	250,000
Sulfur, byproduct		10,500	11,000	12,000	12,000

^rRevised. -- Zero.

¹Estimated data are rounded to no more than three significant digits; may not add to totals shown.

²Table includes data available through July 5, 2006.

³Reported figure.