

GREENLAND

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The number of exploration licences in Greenland has declined since 1996 but there was a small improvement in 2000 (see table). There was a particularly sharp decline from 1998 to 1999 which was probably due to the global stagnation in exploration activities related to the crisis in southeast Asia. However, with an increase from 26 granted exploration licences in 1999 to 28 in 2000, exploration activities in Greenland seem to have reached a turning point.

The Government of Greenland continues to encourage mineral exploration and places considerable investments in acquiring basic geological data. During 2000 a new GIS-based compilation of data from south Greenland was released, on CD-Rom, entitled 'The resource potential of south Greenland'. Airborne electromagnetic and magnetic data acquired in the 1994-98 AEM Greenland project have also been released on CD-Rom. In addition, a drill-core library has now been established at the international airport in Kangerlussuaq. This gives geologists an excellent opportunity to inspect relevant drill-cores in connection with fieldwork in Greenland. Other important assets to attract exploration activities in Greenland are an efficient 'one-stop' licensing system and a complete absence of private ownership of land. Licence claims are updated every 14 days on the Bureau of Minerals and Petroleum's web site (www.bmp.gl).

Greenland has a long history of base metal and precious metal exploration. In 2000, mineral exploration has shifted more towards projects involving industrial minerals.

The Canadian company A H Clark & Associates Industrial Minerals Development has applied for two exploration licences

covering two promising garnet sand deposits located on the west coast of Greenland. The Isortuarsuk deposit has an estimated resource of 10 Mt of sand containing at least 20% garnets. Grades of 43-50% have been obtained from the deposit. The garnet sand has been tested for waterjet cutting purposes and has outperformed Barton's best by a minimum of 10% in speed and quality. The Upernivik deposit was discovered in the public mineral hunt programme 'Ujarassiorit'. The deposit contains 80% garnet and test results showed that sand quality meets or exceeds the Barton HPX 80 world standard.

Due to the great importance of tantalum in the electronics industry a lot of attention has been drawn to alkaline and carbonatite complexes in Greenland. The Motzfeldt Centre in south Greenland is a major alkaline igneous complex in the Mesoproterozoic Gardar Province. The Motzfeldt Centre covers an area of 300 km² and has an estimated resource of 50 Mt of pyrochlore-bearing rocks with 0.03-0.1% tantalum oxide and 0.4-1.0% niobium oxide. The mineralisation is also enriched in Zr and REE. In early 2000, Angus & Ross plc was granted an exploration licence which includes the Motzfeldt Centre. Lakefield Research Ltd has conducted metallurgical tests on two composite bulk-samples and the preliminary test results conclude that the economically interesting elements can be recovered by flotation techniques. The plan for this year's field season is to collect larger samples for further metallurgical testing.

The Australian company New Millennium Resources NL is operating in the Phanerozoic Sarfartoq and Qaqaarsuk carbonatite complexes in west Greenland. The Sarfartoq mineralisation consists of high-grade pods of niobium-tantalum bearing pyrochlore associated with granitic ring dykes

surrounding the complex. The mineralisation has an estimated resource of 35,000 t with 7.9% (5% cut-off) niobium. The company conducted a drilling programme in 1998 and has now carried the project further by submitting a 5 t sample of representative ore for metallurgical testing. The Qaqaarsuk mineralisation has an estimated resource of 1.2 Mt with 0.6% niobium and 4 Mt of apatite-bearing carbonatite with 1.9% phosphorus.

Disregarding the exciting new projects revolving around industrial minerals, the gold mineralisation at Nalunaq is by far the most advanced project in Greenland. The licence covering the Nalunaq mineralisation and adjacent gold prospects is held by Nalunaq I/S, which is a joint venture between Vancouver-based Crew Development Corp. (67%) and the Greenlandic company NunaMinerals A/S (33%). The Nalunaq gold deposit is situated 40 km northeast of the town of Nanortalik in southern Greenland.

The gold mineralisation at Nalunaq was localised in 1992 as the first known occurrence of in situ visible gold in Greenland. The gold-bearing quartz vein system is situated in Palaeoproterozoic mafic metavolcanic rocks in the Ketilidian mobile belt of south Greenland. The main vein is 0.5-2.0 m wide and has an estimated average grade of 32 g/t. Grades of up to 5,000 g/t have been obtained from channel samples. The indicated and inferred resource constitutes 425,000 oz. Three adits of 400 m strike length and 15 raises have been completed in a test-

mining programme totalling more than 1,800 m of underground workings. The final feasibility study is expected in the near future.

Since 1986, the Skaergaard intrusion in east Greenland has been known to host a major, low-grade precious metal deposit dominated by palladium and gold. Platinova A/S held an exploration licence for the intrusion from 1986 to 1999 and, in early 2000, a new licence was granted to Vancouver-based Gryphon Metals Corp. A re-evaluation of the palladium potential has now been published by the Geological Survey of Denmark and Greenland. The report is based on exploration data, modelling of the intrusion's structure and mineralisation, and mass-balance calculations. Variations in the stratigraphically controlled, primary high-temperature mineralisation can be studied in great detail throughout the intrusion (>40 km²). Drill-core information indicates a potential for over 100 Mt with an average 2.4 g/t Pd (PGM+Au combined: 2.7 g/t) over 2 m in a host rock with density 3.2- 3.3. The best intersections are 5 g/t Pd over 1 m, and >0.5 g/t over 10 m. The average width of the mineralisation at 1 g/t Pd cut-off is >4 m. Palladium and gold occur as alloys with copper.

Statistics on Mineral Exploration in Greenland					
	1996	1997	1998	1999	2000
No. of prospecting licences	22	24	13	14	15
No. of exploration licences	60	57	41	26	28
No. km ² under exploration licences	60,525	53,594	23,779	11,459	12,617
Exploration commitments*	74.9	105.6	75.1	62.8	63.9
Exploration expenses*	67.5	104.7	109.0	49.0	92.0 ^p

* DK million
^p Provisional