

# GREENLAND

## MINEX News

GREENLAND MINERAL EXPLORATION NEWSLETTER

Greenland MINEX News No. 12

July 1997

### Exciting gold prospect in South-East Greenland

#### *Goldcorp wins exploration rights*

In the wake of the sensational aborted activity in the Busang gold prospect in Indonesia, any announcements of new gold values of economic interest might be expected, at least for some time to come, to raise an extra eyebrow. Thus in Copenhagen this spring, as the initial assays from Greenland's Kangerluluk gold prospect came in, mention of the Busang – Bre-X experience only served to commend governmental policy of checking and double-checking before going public.

The Palaeoproterozoic Ketilidian mobile belt forming the southern tip of Greenland is a new gold province: gold was first detected by panning stream sediments in 1986 in the valley Kirkespirdalen (map). Early Survey geological mapping, regional geochemical surveys based on surficial sediments and the placer gold, stimulated commercial activity that led to the 1992 discovery of the first in situ visible gold; in quartz veins in mafic supracrustal rocks at Kirkespirdalen on the Nanortalik peninsula. The Kirkespirdalen prospect is under licence to Nunaoil A/S and is at the test-drilling phase (see last issue of MINEX, January 1997). The Kangerluluk gold mineralization is situated some 100 km to the north-east on the south side of the fjord Kangerluluk about 25 km from the outer coast. Discovered during summer 1996, the

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mineralised samples were analysed by neutron activation after which the samples returning more than 100 ppb were checked by fire assay analysis in Canada. A selection of the high-grade samples was rechecked by fire assay and results duplicated.

At the end of April, a GEUS press release announced that twelve out of 74 samples from the Kangerluluk prospect returned more than 1 ppm gold with a maximum value of

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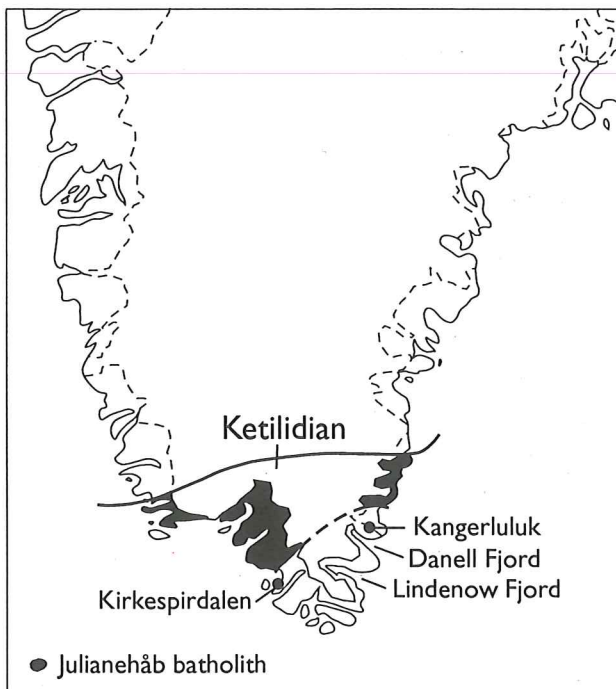
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118 ppm. Out of the immediate applications for licenses, the Canadian company Goldcorp Inc. has acquired the exploration rights at Kangerluluk. This company, presently with active gold mines in Ontario and South Dakota, will get its first taste of Greenland this summer when their exploration programme begins. The gold mineralization at Kangerluluk is found within a supracrustal sequence composed of mafic lava flows with pyroclastic intervals, shallow-water siliciclastic strata as well as a peperitic suite. This sequence is closely associated in space and time with a hypabyssal mafic sill-dyke complex. The gold is mainly found within a steeply-dipping quartz-bearing shear zone system; it is epigenetic and associated with silicification and epidotisation.

The discovery of this latest gold prospect at Kangerluluk is a result of a regional geological-geophysical-geochemical programme carried out during Project SUPRASYD, a government-financed operation aimed at an economic assessment of southern Greenland. A leading approach has been based on the modern consensus that determination of geological setting is a key step in the mineral resource evaluation of supracrustal belts. Thus the multi-season effort (1992-1996) has led to

a reappraisal of the Ketilidian mobile belt in terms of modern 'terrane models' allowing mineralisation types and overall mineral potential to be linked to and appraised in terms of sedimentary/volcanic environments and tectonic regimes.

The host volcano-sedimentary rocks to the Kangerluluk gold mineralisation form a subaerial to shallow-water suite comparable to rock suites of modern and ancient inferred-arc systems. The gold prospect is situated at the north-eastern end of a zone of known gold mineralisations that crosses southern Greenland bordering the southern part of the Julianeåb batholith. This batholith is a polyphase calc-alkaline complex of granites, tonalites and diorities with metagabbros and appinite dykes that is interpreted to be a root zone of a volcanic arc. An overall convergent arc setting has been suggested for the Ketilidian with the batholith as the provenance of the siliciclastic rocks, associated with basaltic and andesitic magmatism. The zone of mineralisation, coinciding with arc rock associations, clearly forms a promising gold target.

Goldcorp will not be alone in South-East Greenland this summer. Another Canadian company, Softrock Petroleum Ltd. of Calgary, will be carrying out geological work on its Lindenow property, south of Kangerluluk (map). Apart from gold, Ni-Cu-Co are the primary targets. Softrock's exploration at Lindenow Fjord is centred on a layered metagabbro complex, from which GEUS earlier announced promising mineralisation values, viz. 0.5% by weight nickel and 0.8% by weight copper.

#### Further reading

The Kangerluluk gold prospect. Shear zone hosted gold mineralization in the Kangerluluk area, South-East Greenland by Henrik Stendal, 1997. *Danmarks og Grønlands Geologiske Undersøgelse Rapport 1997/53*, 25 pp. Available from GEUS. Price: DKK 80.00.

Mafic igneous rocks and mineralisation in the Palaeoproterozoic Ketilidian orogen: project SUPRASYD 1996 by Henrik Stendal et al., 1997. *Geology of Greenland Survey Bulletin 176*, 66-74. Available from GEUS.



## Geological & exploration briefs

### 1997: a record year for diamond exploration in West Greenland

*spring operations on lake-ice is the chosen model*

In the last issue of MINEX (January 1997), we reported on the latest developments in diamond exploration in Greenland, including "the discovery of a microdiamond-bearing kimberlite block at a geophysically pre-defined site". The location of this find is the Maniitsoq area (65°N) in the northern part of the Archaean block of West Greenland (Map). The entire Archaean region of the west coast between 61° and 67° N. has never before received such attention in terms of exploration licenses and the 1997 field operations include the drilling of kimberlite targets. The drilling is based on the assumption that in glaciated terrains kimberlite pipes can be hidden under lakes due to their recessive nature.

#### Drilling

This spring, two Canadian companies, Aber Resources Ltd. and Softrock Petroleum Ltd. commenced drilling programmes of potential kimberlite pipes, as well as for base metals. Aber is operating in the Maniitsoq region on a block optioned to that company by Platinova A/S; Softrock's interests are farther north in the Kangerlussuaq/Sarfartoq region (67°N) in the boundary zone between the Archaean and Proterozoic terranes. The choice of targets is based on geological and geophysical surveys, including surficial sediment sampling for diamond indicator minerals; a spring-time operation allows vertical drilling to be carried out on the lake-ice. In the beginning of April drilling was through more than 1.5 m of clear blue ice but during the second week of May rapidly deteriorating ice conditions ended the Softrock drilling programme over lake-ice.

Water depths were down to 30 m.

Several holes have been drilled by the two companies and both companies expect to continue their drilling programmes after further sampling and analysis during the summer. Aber Resources and Softrock Petroleum are but two of the more than a dozen companies actively exploring for diamonds this summer in what amounts to more than 60 000 km<sup>2</sup> of West and South-West Greenland.

In the next MINEX we hope to report more on this new and exciting diamond exploration in Greenland, and on what promises to be a long and busy field season.



## The resurrection of the Black Angel?

*Platinova well advanced with plans to reopen the mine*

The closure of the Black Angel lead-zinc-silver mine at Maarmorilik, left Greenland without an active mine. That was in 1990. It may well be that Black Angel will reach the record books again if Platinova's plans to reopen the mine come to fruition. Between 1973 and 1986, the celebrated mine on Greenland's west coast was operated by Greenex A/S, partly owned by Cominco Ltd; for the last five years of production Greenex was owned by Boliden Mineral AB. The mine produced some 11.3 million tons ore grading 12.3% Zn, 4% Pb and 29 g/t Ag.

Platinova A/S is in the process of assessing the feasibility of reopening the mine based on extraction of the remaining pillars.

The Greenland based company has been granted an exploration licence on special terms for Maarmorilik and a visit to the abandoned mine was made in April this year.



## Review of Greenland Activities 1996

The annual *Report of Activities* reviewing Greenland projects and results of geological field work, was the best-seller of the former Geological Survey of Greenland. It was published for 30 years (1966-1996). The popular volume is replaced by *Review of Greenland Activities* published by the new national geological survey (GEUS) and issued as a special volume of the scientific series *Geology of Greenland Survey Bulletin*. It appears in the new GEUS design and has a larger format than its predecessor.

The *Review of Greenland Activities* for the year 1996 will be available in August. It

contains 18 articles dealing with a wide range of topics including mineral resource investigations, petroleum geology, airborne geophysical surveys, geological mapping, and glacier and climatic research. It also contains a review of the range of English-language publications that are available from GEUS in 1997, as well as a list of publications released by the Survey in 1996.

The *Review of Greenland Activities* will be sent automatically to our subscribing customers and our library connections. Others can place orders now for this August volume with GEUS.



## Airborne geophysics

### *AEM Greenland and AEROMAG 1997*

Airborne geophysical surveys have played an important role in the recent commercial activity in Greenland. The two government-financed projects – AEM Greenland and AEROMAG – running concurrently, have covered large areas of the southern part of the west coast and the south-east coast of Greenland (map). The budget for each of these two surveys per year is in the order of one million U.S. dollars. AEM Greenland is financed by the Government of Greenland with, in 1995, participation of industry (Cominco), while the AEROMAG 1995 and 1996 surveys were jointly financed by the Governments of Greenland and Denmark, with a contribution for the 1992 survey from industry (Nunaoil). AEROMAG 1997 is financed by the Government of Greenland.

#### **AEM Greenland 1997**

This summer's operation – the penultimate year of the 5-year AEM Greenland programme – is the first in East Greenland. The electromagnetic (GEOTEM) and magnetic fixed-wing survey amounting to approximately 14 000 line kilometres, is being flown by the Canadian company Geotrex Ltd. with a start in mid-July. The area chosen is eastern Scoresby Land, a region known for its stratabound base metal mineralizations in Upper Palaeozoic - Mesozoic sediments and in Tertiary basic intrusives rocks.

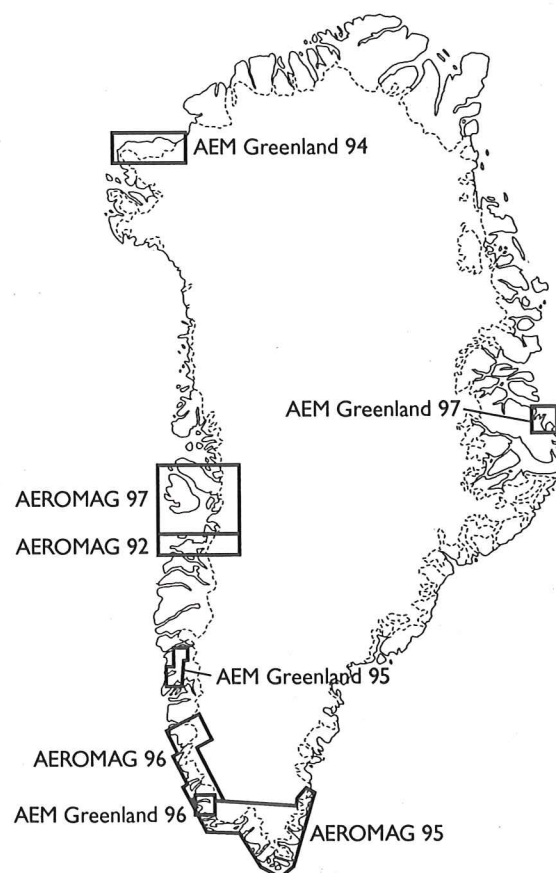
#### **AEROMAG 1997**

Following the 1996 survey in South-West and southern West Greenland, the AEROMAG activity moved north to the Disko Bugt region. The aim is about 70 000 line kms of high sensitivity magnetic data from a fixed-wing

survey flown by Sander Geophysics Ltd. of Canada. Flying started in May. The survey is aimed at elucidating both mineral and hydrocarbon targets: mineralisation targets are gold and copper in the Precambrian crystalline shield; the petroleum interests are both onshore and offshore within the Mesozoic-Tertiary West Greenland Basin.

#### **Data availability**

Release of data from both surveys is planned for 1st March 1998 at which time both digital data and maps will be available for viewing and/or purchase.



## Regulatory & licensing information

### Exclusive licences per June 15, 1997

#### Map on page 7

#### Index Map 1:

14/95: Platinova A/S	402 km <sup>2</sup>
21/95: Major General Resources Ltd.	1,723 km <sup>2</sup>
22/95: Major General Resources Ltd.	745 km <sup>2</sup>
23/95: Softrock Petroleums Ltd.	349 km <sup>2</sup>
24/95: Softrock Petroleums Ltd.	1,102 km <sup>2</sup>
26/95: Platinova A/S	291 km <sup>2</sup>
23/96: Quadrant Res. Pty. Ltd.	151 km <sup>2</sup>
24/96: Texas Energy Corporation N.L	271 km <sup>2</sup>
04/97: Nunaoil A/S	365 km <sup>2</sup>
10/97: Tertiary Gold Limited	441 km <sup>2</sup>
11/97: Highwood Resources Ltd.	34 km <sup>2</sup>
16/97: Mineral Development International A/S	53 km <sup>2</sup>

#### Index Map 2:

18/94: Valhalla Mining Ltd.	168 km <sup>2</sup>
16/95: Platinova A/S	510 km <sup>2</sup>
25/95: Satellite Holdings Ltd.	193 km <sup>2</sup>
08/96: Quadrant Res. Pty. Ltd.	426 km <sup>2</sup>
09/96: Quadrant Res. Pty. Ltd.	153 km <sup>2</sup>
14/96: Nunaoil A/S	760 km <sup>2</sup>
22/96: Quadrant Res. Pty. Ltd.	244 km <sup>2</sup>
28/96: Platinova A/S	13,178 km <sup>2</sup>
30/96: Fjordland Minerals Ltd.	103 km <sup>2</sup>

#### Index Map 3:

01/93: Nunaoil A/S	178 km <sup>2</sup>
08/94: Nunaoil A/S	316 km <sup>2</sup>
09/94: Nunaoil A/S	181 km <sup>2</sup>
14/94: RTZ Mining and Exploration Ltd.	71 km <sup>2</sup>
02/95: Nunaoil A/S	326 km <sup>2</sup>
04/95: Cominco Res. Int. Ltd.	4,332 km <sup>2</sup>
10/95: Ujarak Minerals Aps.	5 km <sup>2</sup>
15/95: Platinova A/S	3,390 km <sup>2</sup>
02/96: Ujarak Minerals Aps	77 km <sup>2</sup>
10/96: Quadrant Res. Pty. Ltd	202 km <sup>2</sup>
11/96: Quadrant Res. Pty. Ltd.	521 km <sup>2</sup>
20/96: Quadrant Res. Pty. Ltd.	399 km <sup>2</sup>
21/96: Quadrant Res. Pty. Ltd.	170 km <sup>2</sup>
29/96: Platinova A/S	11,900 km <sup>2</sup>
36/96: Quadrant Res. Pty. Ltd.	169 km <sup>2</sup>
13/97: Nunaoil A/S	83 km <sup>2</sup>

#### Index Map 4:

12/96: Quadrant Res. Pty. Ltd.	381 km <sup>2</sup>
13/96: Quadrant Res. Pty. Ltd.	289 km <sup>2</sup>
16/96: Inco Ltd.	1,711 km <sup>2</sup>
19/96: Quadrant Res. Pty. Ltd.	219 km <sup>2</sup>
25/96: Texas Energy Corporation N.L	104 km <sup>2</sup>
31/96: Fjordland Minerals Ltd.	196 km <sup>2</sup>
32/96: Fjordland Minerals Ltd.	204 km <sup>2</sup>
37/96: Quadrant Res. Pty. Ltd.	170 km <sup>2</sup>
38/96: Quadrant Res. Pty. Ltd.	241 km <sup>2</sup>
01/97: Softrock Petroleums Ltd.	294 km <sup>2</sup>
17/97: Quadrant Res. Pty. Ltd.	2,675 km <sup>2</sup>
18/97: Quadrant Res. Pty. Ltd.	2,048 km <sup>2</sup>
19/97: Quadrant Res. Pty. Ltd.	2,335 km <sup>2</sup>
20/97: Quadrant Res. Pty. Ltd.	3,525 km <sup>2</sup>

#### Index Map 5:

03/95: Nunaoil A/S	635 km <sup>2</sup>
18/96: Quadrant Res. Pty. Ltd.	465 km <sup>2</sup>
33/96: Fjordland Minerals Ltd.	236 km <sup>2</sup>
34/96: Fjordland Minerals Ltd.	141 km <sup>2</sup>
35/96: Fjordland Minerals Ltd.	194 km <sup>2</sup>
39/96: Quadrant Res. Pty. Ltd.	259 km <sup>2</sup>
21/97: Quadrant Res. Pty. Ltd.	2,075 km <sup>2</sup>
26/97: Quadrant Res. Pty. Ltd.	385 km <sup>2</sup>

#### Index Map 6:

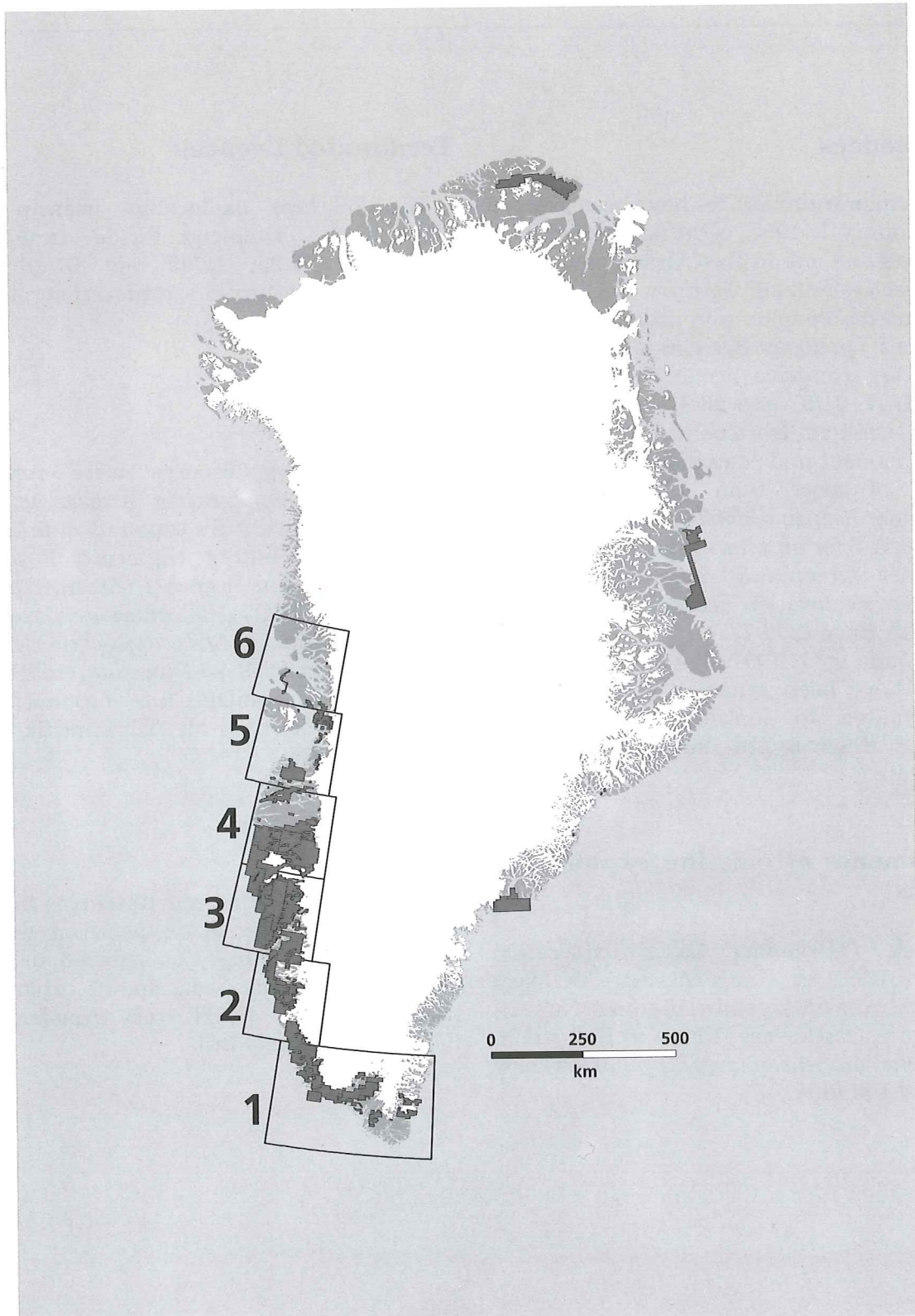
15/97: Falconbridge Greenland A/S & Platinova A/S	338 km <sup>2</sup>
28/97: Platinova A/S	14 km <sup>2</sup>

#### North and East Greenland:

05/95: Platinova A/S	6 km <sup>2</sup>
03/96: Tertiary Gold Ltd.	1,288 km <sup>2</sup>
06/96: Platinova A/S	5,010 km <sup>2</sup>
15/96: Nunaoil A/S	2,100 km <sup>2</sup>
14/97: Platinova A/S	88 km <sup>2</sup>
27/97: Inco Ltd.	2,075 km <sup>2</sup>



**Exclusive licences in Greenland as of June 15, 1997**



## Licence information

### New licences

Nine exploration licences have been granted since January 1, 1997, eight licences in West Greenland and one in East Greenland.

In West Greenland, Tertiary Gold Limited was granted an exploration licence (10/97) at Midternæs. Quadrant Resources Pty. Ltd. was granted six exclusive licences (17/97, 18/97, 19/97, 20/97, 21/97 and 26/97) covering areas at Itilleq, Umiiviit, Isortoqelven, Sukkertoppen Ice Cap, Aasiaat and Ataa Sound respectively, a total of more than 13,000 km<sup>2</sup>. An exploration licence (28/97) was granted to Platinova A/S for an area east of Maarmorilik.

In East Greenland, Inco Limited was granted an exploration licence for an area on Hold With Hope (27/97).

Since January 1, 1997, five new prospecting licences have been granted. Three of those were granted to Platinova A/S, one to Fjordland Minerals Ltd., and the last one to Inco Limited.

### Amendments of existing exploration licences

Softrock Petroleum Ltd.'s exploration licence (01/97) at Kangerlussuaq in West Greenland was enlarged by 154 km<sup>2</sup>. Nunaoil A/S's exploration licence (15/96), at Kulusuk in East Greenland was enlarged by 630 km<sup>2</sup> now totaling 2,100 km<sup>2</sup>.

### Terminated licences

The following exploration licences were terminated: Diamond Fields' exploration licences (17/95, 18/95 and 01/96); and Quadrant Resources' exploration licence (10/93).

### Renewals

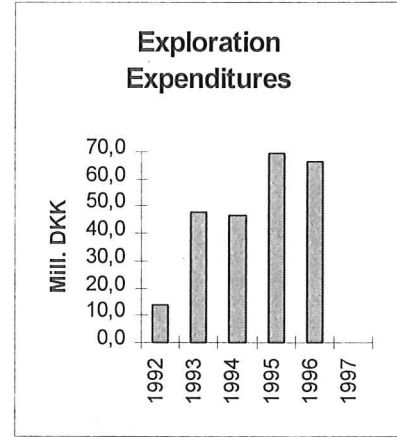
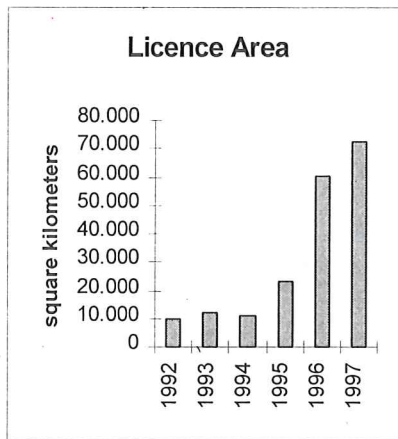
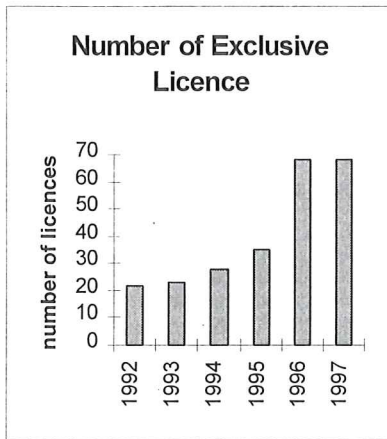
The following licences were renewed: Nunaoil A/S's exploration licence at Storø (13/97); Platinova A/S's exploration licence at Skærgaarden (14/97); Highwood Resources Ltd.'s exploration licence at Kangerluarsuk near Narsaq (11/97); Falconbridge Greenland A/S and Platinova A/S's exploration licence covering areas on Disko-Nuussuaq (15/97); and Mineral Development International A/S's exploration licence at Tunulliarfik near Narsaq (16/97).

### Transfers

The following Quadrant Resources licences have been transferred: 2 exploration licences (21/95 and 22/95) were transferred to Major General Resources Ltd., and 6 exploration licences (30/96 - 35/96) were transferred to Fjordland Minerals Ltd.



## Mineral exploration activities



As reported in the previous newsletter, the interest in mineral exploration in Greenland has increased steadily throughout the period 1992 - 1997. Again, the 1997 numbers displayed on the above figures confirm the upward trend in mineral exploration, although at a reduced rate. Presently, approximately

72,500 km<sup>2</sup> is covered by exclusive licences distributed on more or less the same number of licences as last year. As mentioned in the last issue of Minex, this trend is primarily due to the interest in the diamond potential in West Greenland.

## Mineral Resources Annual Report

*now published in English*

The 1996 Annual Report from the Joint Committee on Mineral Resources in Greenland is published by the Mineral Resources Administration for Greenland in the Danish, Greenland and English language.

This comprehensive 74 pages report is the 17th in the row and it covers a number of aspects related to mineral resources in Greenland. Separate chapters on hydrocarbons and minerals describe licences in force, ongoing projects and surveys as well as aspects of development and information activities respectively.

The appendices of the report include small scale index maps showing all exclusive licences in force. As a part of the presentation, different licence holders are displayed in colours on large scale maps.

The report may be ordered free of charge by fax (+45 33133017) or e-mail (mra@mra.dk) to MRA. At the same time, please indicate if you would like to be added to the mailing list for future annual reports.

