Uulex is a newsletter to the international oil and gas exploration industry with updates of geo-scientific and legislative information about hydrocarbons in Greenland. The name 'Uulex' is an abbreviation of 'uulia' (Greenlandic for oil) and 'ex' for exploration. This is the first issue of the Greenland Oil Exploration Newsletter. The Bureau of Minerals and Petroleum (BMP) hopes that the newsletter will be of interest to the oil and gas exploration companies, the seismic industry and companies related to the offshore industry in Arctic areas. This first issue is focussed on the next hydrocarbon licensing round offshore Greenland, which will be carried out in the Greenland Sea in 2012 and 2013.

The newsletter is web based information news, which will be published two to three times a year by the Bureau of Minerals and Petroleum, Greenland Government at the webpage - www.bmp.gl.
News

Baffin Bay

Seven new exclusive licences for exploration and exploitation of oil and gas in Greenland were signed December 2nd 2010 by Minister for Industry and Mineral Resources Ove Karl Berthelsen and representatives from the new licensees. The signing, which took place at an official ceremony in Nuuk, marked the conclusion of the successful Baffin Bay tendering round.

The seven licences have been awarded to the following groups of companies:

- ConocoPhillips, DONG Energy and NUNAOIL ("Qamut")
- Shell, Statoil, GDF Suez and NUNAOIL ("Anu“ og "Napu")
- Cairn Energy and NUNAOIL ("Pitu", "Napariaq“ og "Ingoraq")
- Maersk Oil and NUNAOIL ("Tooq")

All together the blocks granted cover an area of 70,768 km², which means the total area of oil/gas exclusive licences in Greenland today covers approx. 200,000 km².

With the addition of the new licensees, the list of companies with exclusive licences for oil/gas exploration in Greenland now comprises: Exxon, Chevron, Husky, PA Resources, Cairn Energy, PETRONAS, ConocoPhillips, Shell, Statoil, GDF Suez, Maersk Oil, DONG Energy and NUNAOIL.

BMP at AAPG in Houston 2011

The Greenland Bureau of Minerals and Petroleum will again this year be present at the AAPG 2011 in Houston. The Bureau of Minerals and Petroleum will host a “Greenland Day” where the Northeast Greenland Sea Licensing Round Area will be announced. You can find BMP at booth no. 1949 at the International Pavilion where you are most welcome to come and have a talk with us.

For further information and registration to the ‘Greenland Day’ please contact Lonnie B. Wilms, Bureau of Minerals and Petroleum – lobw@nanoq.gl.

Greenland Sea Licensing Rounds in 2012 and 2013

Time table and milestones

The licensing rounds in Northeast Greenland will consist of a pre-licensing round and an ordinary licensing round.

The KANUMAS project was a regional seismic program that was initiated at the end of 1989. It included preliminary studies for hydrocarbons offshore Northwest and Northeast Greenland.

The pre-licensing is reserved for the members of the KANUMAS licences offshore Northeast Greenland. The members of the KANUMAS Group are: StatoilHydro, BP, ExxonMobil, ChevronTexaco, Shell, Japan Oil, Gas and Metals National Corporation and NUNAOIL A/S.
Thereafter, a call for tenders is made in an ordinary licensing round for selected areas which, after the completion of the pre-licensing round, are not covered by licenses. This ordinary licensing round is open to all interested parties.

**Pre-licensing round for consortiums with participation of KANUMAS Group companies – Phase 1**

The 50,000 km² licensing area for 2012 and 2013 will be announced at the ‘Greenland Day’ April 12th 2011 at AAPG in Houston.

On 1st January 2012, the Greenland Government shall determine and announce the designation of the pre-round area of 30,000 km².

Deadline for submission of non-obligating Pre-Qualification application is on 1st March 2012.

Deadline for licence applications is on 15th December 2012.

The offers received in the pre-round will be evaluated and negotiated by the Greenland Government on the basis of fair and reasonable, generally used criteria.

**Ordinary licensing round open to all interested parties – Phase 2**

After completion of the pre-round an ordinary round will be conducted in selected areas which are not covered by licences awarded in Phase 1.

Any company and group may participate without limitations in the ordinary round.

Deadline for submission of non-obligating Pre-Qualification application is on 1st July 2013.

Deadline for licence applications is on 15th October 2013.

The offers received in the ordinary round will be evaluated and negotiated by the Greenland Government on the basis of fair and reasonable, generally used criteria.

**Outline of Licence terms – Greenland Sea Area**

The Licensing area for 2012 and 2013 covers 50,000 km² offshore Northeast Greenland.

Licences will be granted for an exploration period of a maximum of 16 years with a right to a 30-year extension for areas where exploitation is intended. The exploration period of 16 years can be divided into three sub periods. Work programme is to be agreed upon for each sub period before the Licence is granted.

The licensee may before the end of each sub period choose either to surrender the Licence, or accept the work programme for the next sub period.

*Figure on the next page:*

The Licensing area for 2012 and 2013 covering 50,000 km² offshore Greenland will be announced within the circled area.
Petroleum Geology of the Greenland Sea

Upper Palaeozoic and Mesozoic sedimentary basins developed along the continent-ocean margin in North and East Greenland and are now preserved both onshore and offshore.

Their development was closely related to continental breakup with formation of rift basins. Initiated rifting in East Greenland in latest Devonian and early Carboniferous time and succeeding phases culminated with the opening of the North Atlantic in the late Palaeocene.

Deep basins were developed along the rift zones between East Greenland and Norway, and were filled with sediments derived from mainland Greenland.

Sea-floor spreading was accompanied by extrusion of Palaeogene basalts.

The sediments are exposed in a belt along the coast between Scoresby Sund (70° N) and Danmarkshavn (77° N).

Modified after Henriksen 2008

Offshore geology

The prolific Norwegian petroleum province forming the conjugate margin to the East Greenland shelf has raised expectations to the hydrocarbon potential of the offshore areas. It is considered that analogues of successful play types found in these relatively well explored petroleum provinces can be extrapolated into the East Greenland offshore area. Airborne gravity/magnetic data and a sparse 2D seismic grid form the geological data by which the East Greenland shelf can be subdivided into a series of tectonic elements.
Onshore geology

The onshore geology provides useful analogies for offshore basins on both sides of the Atlantic, including the East Greenland shelf, the Barents shelf and shelf areas West of Norway.

The sedimentary succession includes both reservoir rocks and petroleum source rocks of different geological ages and characteristics.

Reservoir quality rocks are numerous and include a number of syn- and post-rift sandstones and carbonate buildup in the Middle to Upper Jurassic and throughout the Devonian to Palaeocene succession.

Petroleum source rocks are present in at least eight stratigraphic intervals that include Upper Palaeozoic lacustrine source rocks and Upper Permian and Upper Jurassic marine shale source rocks (like the world class Kimmeridgian source rock).

Onshore data and seismic data show that possible traps associated with large rotated fault blocks, anticlines or salt tectonics are mainly sealed by Upper Jurassic and Cretaceous mudstones.

Oil seep in Germania Land

During fieldwork in 1990 oil seeps were found in Germania Land. The seeps were found in mineralised breccias in metamorphic basement, in connection with a NNW-SSE trending fault zone. Long-distance migration along the fault zone has been suggested. On the basis of geochemical analyses, a terrestrially derived source rock deposited in a lacustrine environment of Late Paleozoic age is likely.

Ongoing geological studies

The recent assessment of the petroleum potential of Northeast Greenland made by USGS suggests a large exploration potential on the Northeast Greenland shelf. Accordingly, the region experiences a marked increase in interest from the industry.

The geology of the offshore areas are only known in broad outline since no wells have been drilled. Clearly, this emphasis the importance of analogues studies based on much better geology of the onshore basins in East and Northeast Greenland.

Eastern Greenland contains the only substantial exposures of Cretaceous strata in the northern North Atlantic region.
In 2007/2008, the Geological Survey of Denmark and Greenland (GEUS) launched a major petroleum-sponsored project with the objective of updating and expanding our current understanding of the petroleum geology of East and Northeast Greenland. The project is planned to continue for the next 4-5 years and includes compilation of relevant existing data in the form of a geographical information system (GIS) product, supplemented by new data obtained from shallow core drilling and new field work.

See last page for further details on these projects.

**Conclusions**

The shelf area of Northeast Greenland is geologically similar to oil- and gas-producing basins offshore mid-Norway and in the Barents Sea.

There are many well-documented source rocks onshore, including the world class Upper Jurassic area. USGS completed in 2007 an estimate of undiscovered oil and gas resources in the subsurface in the sea in the East Greenland province, which include the Greenland Sea licensing area. The mean estimate for oil and gas in the province was calculated at more than 31 billion barrels of oil equivalents (Source: USGS Fact Sheet 2007-3077; Online at: [http://energy.usgs.gov/arctic/](http://energy.usgs.gov/arctic/)).

**USGS**

Seismic surveys and other geophysical data indicate that large hydrocarbon deposits can be present in the Northeast Greenland offshore area.
sediments that are the source of most North Sea and mid-Norwegian oil.

Onshore oil-seeps have been found on Germania Land, East Greenland. The most likely source rock seems to be of Late Palaeozoic age.

The sedimentary succession exposed in Northeast and East Greenland provides good models for reservoir sandstones and mudstone seals.

Despite an irregular seismic coverage large fault-block structures and salt diapirs are revealed in the area.

The USGS estimates for hydrocarbon resources offshore Northeast Greenland is encouraging.

An intense research program and acquisition of data offshore Northeast Greenland are in progress for the next coming years.

References


The English Polar Medal Award

At a ceremony at Buckingham Palace March 24, 2011 Senior Geologist John R. Ineson was awarded the English Polar Medal for his unique geological research in Polar Regions especially focussed in Northeast and North Greenland. The medal was presented by Prince Charles, Prince of Wales and approved by the Queen Elizabeth II. John R. Ineson has for many years been employed by the Geological Survey of Denmark and Greenland (GEUS).
PETROLEUM GEOLOGY RELATED ACTIVITIES IN NORTH-EAST GREENLAND

2007–2012

At present six such optional studies are being offered, including two different data packages and studies of six fixed locations. Upkeep, the continuous succession of Ice-Greenland and the geology of Ulle Koksenge.

An updated version of the GIS compilation will be distributed at no cost for the project partners during 2011.

A slip-based field trip for the project partners is planned for the summer of 2011.

The number of project partners is growing steadily and more companies are welcome.

To join, companies must sign a standard collaboration agreement with GEUS and pay a fee of 1 million D.kr.

Participation in further optional studies, data packages, etc. is regulated by additions to the standard agreement.

FURTHER INFORMATION

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