Avataq (Greenland), The Ecological Council, Renewable Energy, and NOAH Friends of the Earth (Denmark), Bellona (Norway), The Network No to Uranium Mining (Sweden)

Rare earth elements can be extracted in Greenland without uranium

Nuuk, Aarhus, Copenhagen, Lerum and Oslo, 11 March 2013

It is understandable that there is a substantial interest in Greenland to mine rare earth elements (REEs) in order to secure much-needed revenue. One of the world's largest REEs-deposits is found in the bedrock at Kringlerne. Here, mining is possible without commercial exploitation of uranium.

Lately, there has been a heated debate, whether the strict uranium zero-tolerance policy that has been in force in the Danish Realm[1] since 1988 should be abolished. Uranium mining is one of the main themes of the upcoming Greenlandic parliament elections, 12th of March. The reason is that the REEs-deposit in Kvanefjeldet at Narsaq is mixed with uranium and thorium. This has been known for almost half a century, but where uranium and thorium for a long time were considered the main deposits, they are now routinely mentioned as insignificant, but inevitable by-products of REEs-extraction. It appears that mining of REEs is not profitable unless uranium is also extracted.

This contravenes the fact that Kvanefjeldet according to the former director of the explorations, which the former Geological Survey of Greenland (GGU) has carried out of the bedrock, contains large deposits of uranium and the world's single largest thorium deposit – possibly as much as two million tons. Thus, Kvanefjeldet could be the third largest uranium mine in the world and provide almost eight percent of the uranium world production. This would make Greenland the sixth largest uranium producer in the world – bigger than e.g. Russia and than the U.S. and China put together.

'We fear that the real incentive for the Kvanefjeld project is uranium mining. Even if Greenland is not a member of the European Union, many people in the EU could perceive uranium import from Greenland as a sort of self-supply' says Christian Ege, director of the Danish Ecological Council.

97 percent of EU's uranium supply is currently imported, which is an argument in support of an energy system based on renewable energies to maintain energy-security. Furthermore, it has been evident for many years that mining at Kvanefjeldet could cause serious environmental damage.

'In addition to the chemical pollution it is a problem that the quantity of radioactive substances in the residue products from the mining will be higher at Kvanefjeldet than in other mines because of the high content of thorium, which is radioactive and has its own decay products', says Mikkel Myrup, chairman of Avataq.

'Rare earth metals do not have to be mined at Kvanefjeldet', says Gunnar Boye Olesen from RenewableEnergy. 'There are several other REEs-deposits in Greenland, not least at Kringlerne, where the bedrock contains more than four billions tons of ore. There are no compelling economic reasons to abolish the zero-tolerance policy for uranium mining in Greenland'.

For further information, please contact:

[1] The Realm consists of Southern Denmark and the two autonomous regions Greenland and the Faroe Islands

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Appendix

Clarifications

The uranium deposit is estimated by the GGU explorations director to be 600,000 tons for the whole Ilimaussaq-complex, of which Kvanefjeldet is a part [1]. In 2012, the licensee mining company Greenland Minerals and Energy Ltd. (GME) set the uranium deposit at 232,000 tons of uranium-oxide (= 512 Mlbs U_3O_8) [2] – i.e. the processed uranium product that is crushed and chemically treated on the spot and then shipped from the uranium mill to the refinery.

If the annual uranium production is as big as projected in the 2010 GME financial report (p. 9) - namely 3,895 tons [3] – Kvanefjeldet will be the third largest uranium mine and the second largest open uranium mine in the world. Only the uranium mines McArthur River in Canada and Ranger in Australia will be bigger. According to the most recent GME estimates it will have a life-span of at least sixty years. As the sixth largest uranium deposit in the world, it could provide almost eight percent of the uranium world production. This would make Greenland the sixth largest uranium producer in the world – bigger than e.g. Russia and than the U.S. and China put together

The bedrock at Kvanefjeldet also contains the world's single largest thorium deposit – possibly as much as two million tons. By many people, thorium is considered an alternative to uranium as fuel for fourth generation nuclear power reactors. But like uranium, it is hampered by proliferation issues because of its suitability for nuclear weapons production. The thorium-deposit at Kvanefjeld is ten times larger than e.g. the total Norwegian deposits and larger even than the 2006 global thorium reserve.

Kvanefjeldet and the Ilimaussaq-complex are not the only uranium deposits in Greenland: According to GEUS, deposits are situated at Illorsuit, Puissattaq, Ivittuut and Motzfeldt Lake in Southern Greenland, Sarfartoq, Nassuttooq, Qaqqaarsuk and Attu in Western Greenland and

Randbøldal and Milne Land in Eastern Greenland [4]. In addition, there might be deposits that have not yet been discovered.

Greenland was part of the EU from 1979 to 1985 and if Greenland chooses to be a member-state again, it would mean a significant step towards fuel self-sufficiency for the European nuclear industry, should the uranium zero-tolerance policy be abolished in the Danish-Greenlandic commonwealth of the realm. Uranium consumption in the EU is approximately 18,000 tons per annum [5]. If the EU becomes self-sufficient in uranium and thorium due to the Greenland reserves, it could slow down EU transition to an energy supply based on renewable energies.

The average content of uranium in Kvanefjeldet is 314 ppm (gram of uranium per ton of ore). This is low-grade ore, considering that mined uranium normally is between thousand and ten thousand grams per ton. Consequently, mining at Kvanefjeldet will generate a lot of waste – the so-called tailings. An annual production of four thousand tons of uranium will result in at least 16 million tons of solid waste and an unknown quantity of liquid waste per annum. Furthermore, because of the composition of the ore, a specialised extraction method has to be applied. The method, developed at Risø Research Centre, implies making the ore react with sulphur dioxide at a temperature of 700^{o} C. To support an annual production of four thousand tons of uranium, approximately 800,000 tons sulphuric acid is needed, which has to be produced on the spot. Hence, in addition to escape of radioactive material, there is a risk of sulphuric pollution from the SO_2-factory, from the uranium extraction and from the liquid waste [6].

During the uranium mining from the open pit, the radioactive gas radon is released, which - if inhaled - could cause cancer. Radioactive clouds and dust could be a problem for the mine workers and the inhabitants of the nearby town, Narsaq. Furthermore, radioactive substances could be washed out from the tailings and absorbed in land vegetation and marine organisms. Because the radioactive compounds are concentrated in the food chains, they could harm humans and animals by inflicting disease, genetic damage and mutations. In the long term, the environmental impacts from uranium mining could be a comprehensive radioactive contamination, which – because of the health risks – would make it necessary to ban fishing, hunting, agriculture and animal husbandry in Southern Greenland.

Apart from Kvanefjeldet, REEs can be mined southwest of Kangerlussuaq, in Godthåbsfjorden, at Kringlerne between Narsaq and Qaqortoq and near Narsarsuaq. The REEs-deposit at Kringlerne is described by the licensee, the Australian mining company Tanbreez Mining Greenland, as the probably largest deposit in the word. At the projected extraction rate, mining at Kringlerne could last 10,000 years. In addition, there are advanced exploration and mining projects focusing on iron, lead, zinc, molybdenum, rubies, diamonds and platinum as well as on a lot of other minerals.

Notes:

[1] Henning Sørensen: Grønlands uran og thorium, Tidsskriftet Grønland 4/5 2008: http://www.kamikposten.dk/lokal/last/container/da/hvadermeningen/pdf/groenlands_uran_og_thorium.pdf

[2] Greenland Minerals and Energy Ltd.: Kvanefjeld Prefeasibility Study Confirms a Long-Life, Cost Competitive Rare Earth Element - Uranium Project, Company Announcement, Friday 4th

May, 2012: http://www.ggg.gl/docs/ASX-announcements/Kvanefjeld-Prefeasibility-Study-4-May-2012.pdf

[3] Greenland Minerals and Energy Limited And Controlled Entities: 31 December 2010 Financial Report: http://www.openbriefing.com.au/AsxDownload.aspx?pdfUrl=Report%2FComNews%2F20110329%2F01166088.pdf

[4] Per Kalvig, Karsten Secher og Gert Asmund: Information og fakta om udvinding af uran i Grønland, Udgivet af De Nationale Geologiske Undersøgelser for Danmark og Grønland – GEUS, juli 2012: http://www.geus.dk/geus-general/announcements/URAN_DK_oplag2_web_100dpi.pdf

[5] Euratom Supply Agency (ESA): ESA Annual Report 2011, Luxembourg, 10/5/2012: http://ec.europa.eu/euratom/docs/Annual_Report_2011_Presentation%20.pdf

[6] Henning Sørensen og John Rose-Hansen: Narssaq-projektet, et miljøgeokemisk-økologisk forskningsprojekt, Tidsskriftet VARV, nr. 1, 1978