The mining project on Kvanefjeldet was disputed during the election campaign. Particularly the issue of so-called radioactive waste has caused debate. In this article a leading international expert explains the Self-Government’s conclusion that the waste does not constitute an environmental risk, as has otherwise been claimed in many media outlets.

Greenland has a new government. One of the big issues for the new government is the mine on Kvanefjeldet. Many themes regarding the mine have been discussed in public, but not always on a proper basis. We have therefore called one of the world’s leading experts in radioactivity to get his assessment of the risk at the mine on Kvanefjeldet: the internationally renowned physicist Doug Chambers from Arcadis. Arcadis is a world leading company in the field of environmental consulting. In this interview, we would like to get his assessment of the radioactive mine waste from Kvanefjeldet, which has been discussed widely in Greenland.

Is the radioactive mine waste from Kvanefjeldet a risk to the environment in Narsaq and South Greenland?

Normally, the term “radioactive waste” is associated with highly active radioactive waste, primarily from nuclear power plants. The mine on Kvanefjeldet will only produce residual waste in the form of tailings, which are stored in Taseg. This waste should not be described as “radioactive waste” in the traditional sense., as the radioactivity in the tailings is comparable to that found locally in natural background sediments.

But does that mean the mining waste is not radioactive at all?

No, it does not. The radiological content of the mine’s waste reflects the natural geology of South Greenland. In general, the radioactive content of the ore is low to moderate with 300 ppm uranium and 600 ppm thorium. The radioactive content of the mineral tailings is even lower. In fact, the radioactivity in most of the mine’s tailings comparable to that in silt in the local streams. From a radiation perspective the tailings are safe for the environment and people.

About Doug Chambers

Dr. Douglas Chambers received his Hon BSc in Physics from the University of Waterloo in 1968 and a Ph.D. in Physics from McMaster University in 1973. He subsequently took graduate level courses in biostatistics. He has more than 40 years of consulting experience with industry, government and various national and international agencies. He was a founder, executive vice president and director of risk and radioactivity at SENES Consultants (SENES). SENES was acquired by Arcadis, a well-known international engineering consulting firm in March 2013. Dr. Chambers is currently a Vice President at Arcadis Canada and Technical Knowledge and Innovation (TKI) discipline lead for radioactivity services in Arcadis.
In the election campaign, there was also a lot of debate about thorium. Does it pose a risk to the environment?

As said, the ore radioactivity is low to moderate with 300 ppm uranium and 600 ppm thorium. The radioactive content of the mineral tailings is even lower. It therefore poses no risk to the environment.

What about soluble thorium, which many express concerns in the media?

While some of the thorium is dissolved during chemical processing of the flotation concentrate, the chemical residues are neutralized prior to discharge to a robustly engineered facility, and at neutral pH (i.e., not acidic), thorium is, for practical purposes, insoluble and immobile.

And why does it not pose a risk?

Thorium poses no radiological risk to the environment or people. It is important to emphasize that thorium in nature is chemically immobile and not biologically concentrated. This is confirmed by the extremely low thorium content in freshwater and seawater. There is virtually no biological concentration of thorium in nature. Thus, there are also many examples of thorium's lack of mobility from mines around the world, for example in eastern Canada. The thorium content in the monitored outlet in Kvanefjeldet is extremely low and without risk to the environment and humans. When disposed of as planned, under ground and water cover, there is no radiation exposure for local residents.

So thorium is not dangerous at all?

The only potential risk for humans is the direct (gamma) radiation dose from the thorium. However, when the limited amount of thorium is disposed of as planned at Kvanefjeldet in a designed facility and under water cover, there is no risk of direct radiation dose to the local inhabitants.

The Kvanefjeld of the future on the way

Greenland Minerals has in close dialogue with all of Greenland's changing governments since 2007 developed the mining project on Kvanefjeld based on an exploration permit issued in accordance with the Greenlandic Minerals Act. The main purpose of the project is to extract rare earths for use in, among other things, wind turbines and electric cars.

On 17 December 2021, the Naalakkersuisut approved that Greenland Minerals' reports on Environmental Impact Assessment (EIA) and Social Sustainability Assessment (VSB) complied with the requirements for initiating the statutory public consultation process. The National Center for Environment and Energy (DCE) at Aarhus University and the Greenland Institute of Nature (GN) have provided a thorough evaluation of Greenland Minerals' EIA report in their report “DCE / GN: Overall comments on project description and EIA report for Greenland Minerals Ltd - Project Kvanefjeld" of 26 January 2021 ". DCE and GN are advisers to the Self-Government and have carried out the evaluation. The National Center for Environment and Energy and the Greenland Institute of Nature write, among other things, in the report: “that the project will in all probability be able to be completed without more extensive environmental effects than those described in the EIA report".

Greenland Minerals' EIA report is subject to the environmental provisions of the Mineral Resources Act. This means that before a mining project can be implemented, it must live up to international practice regarding protection of the environment and health - including compliance with BAT and BEP. The National Center for Environment and Energy and the Greenland Institute of Nature have ensured that the report has been prepared in accordance with the guidelines for the preparation of an EIA.

“Greenland Minerals has spent 14 years and several hundred million DKK on developing a world-class mining project, which the Self-
Government’s independent experts assess, is within the framework of Greenland’s extremely restrictive Minerals Act. We are pleased to be able to present the comprehensive project in detail to the newly elected politicians, so that they can assess the project’s potential and contribution to Greenlandic society, “says Greenland Minerals CEO John Mair.

**Great commitment**

Over the years, changing Greenlandic governments have invited investors to the country to develop the mining industry. At the request of the government, Greenland Minerals has responsibly and professionally helped to present Greenland’s ambitions to develop a modern mining industry. Greenland Minerals has therefore actively participated in the governments’ presentation trips to international mining conferences around the world. The company has also participated in the Arctic Circle Forum in Nuuk, just as Greenland Minerals has played a key role in joint research initiatives on rare earths together with scientific experts.

“Greenland will be able to become a main supplier in the development of the world’s green transition - and at the same time ensure approx. 900 jobs and tax revenues of 1.5 billion DKK annually during the operation of the mine (at least 37 years). Greenland Minerals delivers a world-class sustainable mine that contributes to a greener world and at the same time ensures Greenland far better welfare for several decades to come. We are very pleased to be able to offer Greenland such a thorough project”, says Greenland Minerals CEO John Mair.

**The mine creates jobs for citizens throughout Greenland**

The mining project at Kvanefjeldet will create more than 900 new jobs. 328 of those jobs will go to local Greenlandic laborers. Greenland Minerals has in fact also undertaken to give any qualified Greenlandic applicant priority over any given foreign applicant. In this way, Greenlandic workers will be at the forefront of the queue for the many jobs.

There will be a lot of employees from all over the country who can work in the mine. For example, they can be at work for two weeks - and have two weeks off. We therefore expect to have employees from all over Greenland.

As part of the development with more jobs and more growth, Greenland Minerals, in collaboration with the Mineral Resources School and the Food School, will train young Greenlanders for all the many jobs in and around the mine.

The goal is for the mine at Kvanefjeld to employ 40 new graduates from the program each year and admit 15 new apprentices. We think it is a unique opportunity for the young people in Narsaq and the rest of Greenland.

**Public consultation ends June 1, 2021**

The election in Greenland naturally got many citizens interested in the many different political themes. However, the political debate has removed focus from the fact that the public consultation on Kvanefjeldet is still ongoing. The consultation process has been set by the authorities to take place in the period from 18 December 2020 to 1 June 2021. The consultation process has therefore not yet been completed.

Greenland Minerals has received a number of questions for the project in the consultation phase. These questions must be answered in a so-called White Paper. After this, we expect the project to follow the guidelines for the further approval process, which are laid down in the Mineral Resources Act.

Greenland Minerals is very happy to enter into a dialogue with all interested citizens about the EIA report that forms the basis for the public consultation. It has taken 14 years and several hundred million kroner to get the world’s best experts to develop the project. Therefore, the dialogue with the citizens - and questions from the citizens - are important for the further project. We
want a serious debate based on facts. Therefore, we also provide fact-based answers to all the questions we are faced with.

There are four more weeks left of the consultation phase, where we look forward to answering questions about the project's EIA report. Now that the election is over, there is hopefully better time for a serious dialogue about how the project can best be realized for the benefit of the whole of Greenland.