KANUKOKA
Kalaallit Nunaanni Kommunit Kattuffiat • De Grønlandske Kommuners Landsforening

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Attention: Råstofstyrelsen

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Hearing respond to the pre-hearing of the Terms of Reference for the SIA and EIA for the Titanium project at Pituffik license 2015/08

Qaasuitsup Municipality, Qeqqata Municipality, Kujalleq Municipality and KANUKOKA acknowledge the possibility to provide hearing respond.

Background

The draft Terms of Reference are prepared by the consultancy companies NIRAS and Orbicon in accordance with guidelines prepared by Naalakkersuisut concerning SIA and EIA assessments.

In addition has Bluejay Mining plc published useful information, including:

- A first resource estimate of the project from 10 April 2017
- An analysis of the company by SP Angel from 10 April 2017. SP Angel is also the companies "Nominated Advisor" and "Broker" at the AIM Stock Exchange in London
- The company's latest "Corporate Presentation" from 2017

Assessment of assumed mineral resource (estimate) of 10 April 2017:

- SRK Consulting (UK) Ltd. which is a recognized and respected consultancy company has prepared the first resource estimate for the project.
- Dr. Mike Armitage (C Geol, C ENG, MIMM, ROPO) is in this connection a qualified person, accepted by JORC, to from time to time to carry out mineral resource estimates.
- It is assumed that the resource on land consist of 23.6 million tonnes with a grade of 8.8% of the mineral ilmenite. This assessment is based on a terrain model which covers an area with a length of 5 km, 0.9 km broad and 3 meter deep, where all material is included
- Within this ore resource is a high grade zone which contains 7.9 million tones with a grade of 14.2% ilmenite, which is expected to be exploited at mine start. This is situated in the Moriusaq bay.

- SRK believes that it is entitled to assume that it is possible to locate between 90 and 130 million tons with a grade between 6.3% and 8.4% ilmenite.

Plans for 2017 and 2018 according to Bluejay Mining's latest presentation:

- The full SKR report is expected published in 2nd quarter 2017
- The exploration continues in 2017 with the purpose to multiply the size of the assumed ore resource and upgrade part of this to an indicated category
- A large ore sample is collected in 2017 for metallurgical study with the purpose of designing the processing plant for producing the ilmenite concentrate in Greenland for export
- In 2017 studies are carried out of wet-processes which are also tested
- In 2017 a study is carried out regarding how the concentrate can be shipped away from site.
- Titanium Industry Global Advisory ("TIGA") was selected as sale advisor in 2017.
- The SIA and EIA studies are completed in 2017
- The feasibility study is completed in 2017
- The company applies for exploitation license in 2017
- The production of ilmenite starts in 2018

Production plan according to Bluejay Mining plc's latest presentation:

- Instead of excavating the sediment on land lakes will be created and the material will be pumped as slurry
- The production will start at the existing tombola at Moriusaq
- The tombola will be enlarged as the material from the beach is utilized
- Coarse particles are caught in a sieve which removed around 30% of the material and increased the ilmenite grade from 14.2% (high grade zone) to over 20% before the gravitation process
- The wanted grain size is sand between 0.63 and 2 mm
- The off shore resource is collected by a dredger in a similar way
- The resource does not contain slimes or radioactive material

Comments to the content of the SIA

What formal education will be required for the estimated 80 +/- 20 workers involved in the potential production of the concentrate? When describing the consequences of the project, it should be made certain that the background information used in the assessment of the project are representative for the period of the year where there is activity on the project, and not an average for the year.

Comment to a specific issue in the SIA report

- The location "Interlak" is wrongly spelled and should be "Iterlak".
- In table 2, page 27 there are two annotations x^1 and x^2. An explanation of "1" is missing.

Comments to the scope of work for preparing the Terms of Reference for the EIA report.

The guidelines for preparing an EIA stipulate an approach that focuses on the project. In this way potential problems are overlooked, for example special geological conditions or circumstances caused by the processing of rock types, minerals and elements.

This can lead to a delay in the EIA process which influences the (mine) companies and societies opportunities to benefit from the mine project without too many delays.

In connection with mine projects it would be beneficial to describe all important rock types, associated important minerals and associated important elements. This will give a balanced description of what the ore consists of, what is processed for sale and what is left for deposition. By far the majority of these (minerals and elements) will be unproblematic, but such an approach would in a fair way to identify problematic components which are then described in more detail in the assessment.

In a similar way should the processing of rock, minerals and elements before they are exported from the country be described. Which reagents are used? Where will the different rock types, minerals and elements end up? How are the various element reacting during the processing? This would provide a fair description and provide an overview of the situation and reduce the need for corrections, new versions and delays.

The (EIA) report should of cause be prepared by an independent third party as part of the under the arm's length principle.

It must be a goal that the authorities approval process is completed in 3 month. If the approval process takes more than 6 month the authorities must explain the reason for the delay.

The following comments to the ToR for the EIA report for the Pituffik project should be seen in the light of the "mass balance model" above.

The baseline studies, which must be carried out for at least 2-3 years, should also describe the conditions we don't see; the natural background pollution from for example the mineralizing of cobalt-nickel-silver which probably takes place in the geological background.

Comments to the specific sections of the EIA

Section	Page	Comment
3. The mine company	5	The description of the (license)owner should exclusively be described as Dundas Titanium A/S a company registered in Greenland. It would be fair to mention that the executing part is Bluejay mining plc., a AIM-listed company operating under British regulations.
Background:		

It appears from the prehearing material that it is the company FinnAust Mining Plc (a legal entity based in the UK) which owns the rights (license) and therefore is responsible for the EIA. From the hearings document it appears that the license owner is Bluejay Mining Ltd. (another legal entity) which is a subsidiary to FinnAust Mining Plc.. It appears by the way that the mother company FinnAust Mining Plc recently changed name to Bluejay Mining plc (it is not clear if this is a third legal entity?). In this case Bluejay Mining plc is mother company to Bluejay Mining Ltd. which is the license owner. In connection with the plans for an exploitation license Bluejay Mining Ltd now applies for permission to handover the rights to the newly formed company Dundas Titanium A/S.

Section	Page	Comment
4. Project location	5	It would be fair to describe that the project is located in the arctic at around 76 degree 40 minutes north and which overall infrastructure is available for the project.
Background: The location in the high-arctic is significant for important elements of the EIA. Bluejay Mining plc is marketing the project as located close to existing infrastructure facilities at Pituffik.		

Section	Page	Comment
5. Black sands	6	An approximately representative content of ilmenite should be mentioned in addition to (the statement that) ”the ilmenite content can reach more than 70%”.
Background: The grade is of importance when assessing the environmental impact of the production. What is the expected content of ilmenite in the resource? Which other heavy minerals than ilmenite and magnetite (which is mentioned) are expected to be included in the production? Which light minerals are found in the resource? **After note**: A resource estimate published on 10 April suggests a resource with an overall in-situ content of ilmenite of 8.8%. None of the other heavy minerals are of value. Concentrates with around 90% ilmenite can probably be produced. The other minerals will be deposited on site.		

Section	Page	Comment
6. Pituffik Titanium Project	7	a) Optimistic shipping season of 4 months using vessels without ice reinforcement? Has there/will there be prepared a risk assessment of shipping with and without ice-reinforcement, respectively? b) There is a need to describe the permafrost in the area. c) How many tons must be processed to produce 400,000

		tons of ilmenite concentrate? How large amounts of leftover minerals will there be? Will the production start in zones with high grade and end in zones with low grade? Is it possible that the ore resource is larger than the 10 – 30 million tons (0.5-1.5 million tons annually in 20 years according to the (ToR for the SIA); and an expected mine life of 30 years in the (ToR for the EIA), so mine life can be extended? d) Which minerals will be part of the concentrate and which minerals are left overs which must be deposited locally? e) To what extend is top soil or waste rock present which have to be removed before production and if this is the case what will happened to these (materials)? f) Is it the intention to use a very large vessel (barge or bulk carrier) as temporary storage from where the freighter skips are loaded? The loading of these temporary storages are expected to take place either by using a (small) barge or by pumping the concentrate as a slurry through a pipeline. How much water is required if the pipeline-model is used, where will it come from and how is it treated and how is it dis-charged after use? g) A description of the power supply of the project is lacking. h) How will garbage from the project be handled (from the camp, fuel etc.?)

Background:

a) For comparison is Royal Arctic Line's season for servicing Qaanaaq and Pituffik just two months, namely 3 July and 5 September (2017) which takes place using ice class ICE 1A vessels.

After note: Bluejay Mining plc has as a target to complete a skipping study in 2017.

b) Part of the resource is on land and will be impacted by permafrost part of the time. The material is excavated and thawn in mixing tanks with saltwater, heated water and maybe steam. The mineral concentrate will be produced using gravity and magnetic separation processes. There are many types of gravity and magnetic processes. When the final process to be used is known it will be relevant to inform about the methods and which reagents that will be used.

After note: Bluejay Mining plc now plans that the production from the shore zone (offshore zone) will be by pumping. Too large material (gravel and stones) corresponding to 30% of the production is removed using sieves. The production will take place on land and the concentrate is stored on land. A shipping model is under preparation.

c) Based on the expected average grade for the production a specific amount of ore must be pumped up (dredged) and excavated. The intended amount required for producing 400,000 tons of concentrate should be mentioned in the EIA. From the SIA study it appears that the strategy is to extract 0.5 to 1.5 million tons annually for 20 years. At the same time it is mentioned that the expected mine life is 30 years.

How does the intended 0.4 million tons production (of concentrate) correspond with the plan to excavate between 0.5 and 1.5 million tons and how much mineral waste (tailings) does this correspond to? Will the production take place in high grade zones first and low grade zone last?

After note: With an ilmenite grade of 8.8% around 4.5 million tons of sand and gravel must be pumped up (excavated/dredged) to produce 400,000 tons of concentrate. Gravel and larger stones which make up 30% of the excavated material are removed immediately and is probably deposited behind the dredger. Ideally, 3.1 million tons of sand enters the production. Here light minerals (with a density below 2.95: typical light minerals such as quarts and feldspar) are removed in a gravity separation process. Assuming the ration of light and dark minerals is the same in the coarse and fine fractions the light minerals make up c. 2.0 million tons out of the 3.1 million tons. Subsequently the magnetic properties of the heavy minerals are used to further separate the remaining 1.1 tons (of material). 400,000 tons of ilmenite concentrate is produced. This implies that there are c. 700,000 tons of other heavy minerals which must be deposited.

d) The production process is gravity separation followed by magnetic separation (weak and strong). Which are the important minerals that are removed during the gravity separation? Which non-magnetic heavy minerals are removed during the weak magnetic separation? In addition to ilmenite and magnetite other sources mention the presence of the minerals titanomagnetit, hæmatit, kromit, sulfider, tourmalin, zirkon, granat, rutil, anatas, titanit, sillimanit, epidot hornblende, aktinolit/tremolit, diopsid, augit, hypersten, olivin, apatit. Ujarassiorit mention the presence of for example löllingit, saffrolit and skutterudit which are arsenider of kobold, nickel and iron in similar geological environments. Experience from other countries show that monazite is part of the concentrate. All potential problem minerals and elements should be described.

Section	Page	Comment
7. Study area	10	The analyses of trace-elements which is part of the baseline studies should include the elements which can be related to the minerals mentioned under d) in the previous comment. This should include but not be limited to Ni, Cu, Co, Cr, Zn, Pb, Cd, Ag, Au, As, Hg, Ti, V, Bi, Th, U, F, P, S.
Background: The baseline studies should determine the natural pollution in an area before the mine project starts. During and after the mine operations it will be possible to measure and document any pollution from the operations.		

Section	Page	Comment
8. Climate	11	a) A description of the wind regime is lacking b) A description of the ice conditions are lacking c) A description of how the (current) infrastructure will meet the need to transport cargo and personnel to the

		mine is lacking.

Background:

a) The area is known for its very strong storms.
b) Not only the ice conditions in the mine area should be addressed but also the shipping route through the Davis Straight and the Baffin Bay where shipping with non-ice class vessels will take place through 4 months.
c) Qaanaaq is serviced only once a week by Air Greenland and (the aircrafts) have limited capacity. Qaanaaq has no port.

Section	Page	Comment
11. Environmental impact issues of concern	27	Reference is made to comment 7d (8.8 in this note). A description of the minerals and the chemistry of the collected baseline study samples can generate other (problematic) issues than oil spill, and should be included in the risk assessment.

Section	Page	Comment
12.1 Chemical background considerations	28	Baseline sampling only takes place in August. It should be considered also to collect samples in June.

Background:

Mining of heavy sand in the area will probably not change the chemical background picture (level) significantly, but since the background level could be disturbed but other (not yet discovered) occurrences could collection of background samples immediately after the spring thaw be valuable.

With kind regards

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