Appendix 1

Detailed Technical Response to Allegations Raised in the Communication

Concern 1	Lack of access to adequate information
Concern 2	Failure to consult and seek the free, prior and informed consent of the local indigenous community
Concern 3	insufficient documentation and recognition of environmental risks of toxic and radioactive pollution and wastes
Concern 4	damage to the nearby UNESCO heritage listed site, Kujaata
Concern 5	approval of the uranium mining Project could take place against their free, prior and informed consent
Concern 6	information provided in the Project's EIA is inadequate and unreliable
Concern 7	the timeframe for public consultations has been too short
Concern 8	public meetings have been negatively impacted by restrictions related to the COVID pandemic
Concern 9	international experts cannot travel to Greenland to attend the consultations due to the travel ban
Concern 10	The EIA, lodged by your company, observes that impacts to marine habitat and fauna would not occur at a population level, disturbance impact of terrestrial mammals and birds is assessed as low, and the significance of lost terrestrial habitat due to the Project is assessed to be very low. Even in a catastrophic failure scenario, the EIA excludes population level effect.
Concern 11	the EIA is not reliable
Concern 12	the company led by you downplays the variety of risks associated with the Project
Concern 13	“The radioactive dust produced by uranium mining could be harmful to residents of Narsaq and the agricultural, hunting and fishing activity”
Concern 14	“The Kuannersuit mine could also contaminate and damage the lands used by the local Inuit community, for example sheep farms”

Concern 15	“the management of toxic mining waste including radioactive rubble”
Concern 16	“the lack of documentation in the EIA of the risks posed by thorium”
Concern 17	“the absence of long-term monitoring measures of radioactive thorium waste in Taseq lake”
Concern 18	“Thorium, which is a more potent radioactive element than uranium, could remain on the site after closure of the mine and could potentially pollute local drinking water and jeopardise future agriculture and fishing in the region.”
Concern 19	“concerns that the mining Project could result in Kujaata being placed on UNESCO's World Heritage in danger list and eventually losing its designation”
Concern 20	“influx of predominantly male labourers who will not share local language and culture”
Concern 21	“Their integration into the small local community could be an additional challenge for the residents”
Concern 22	“that such a massive gender imbalance may result in sexual exploitation and abuse of women”
DCR Concern 1	“mining projects are associated with a wide range of potential adverse human health and societal risks”
DCR Concern 2	“mine could potentially contaminate and otherwise disturb areas used by the local indigenous community, for example sheep farms”
DCR Concern 3	“an influx of migrant or temporary workers may be required. Special measures must be taken to ensure oversight of working conditions and to promote their integration into local communities”
DCR Concern 4	“The authorities ' ability to ensure the future close monitoring of waste and tailings dumps”
Special Concern	“potential high levels of contamination by a wide range of substances in the traditional food sources of communities in Greenland”

Concern 1 Lack of access to adequate information

The following key documents have been prepared for the Kvanefjeld Project [the Project], owned by Greenland Minerals A/S [the Company]

1 a feasibility study [FS] into the Kvanefjeld Project [the Project]

2 separate assessments of the environmental [EIA] and social impacts [SIA] of the Project, and

3 a navigational safety investigation study for the Project [NSIS].

The regulatory regime in Greenland mandates that the impact assessments and the navigational safety investigation study be prepared in English, Danish and Greenlandic.

The Government of Greenland [GoG] has published two documents - "Guidelines for preparing an Environmental Impact Assessment report for mineral exploitation in Greenland" and "Social Impact Assessment Guidelines on the process and preparation of the SIA report for mineral projects" [the Guidelines] – to facilitate the preparation of impact assessments by proponents of mining projects.

In accordance with the Guidelines, an environmental impact assessment, which must be "easy to read and understand", must contain:

* a thorough description of the state of the environment before the commencement of project operations
* a detailed description of all phases of the project
* a description of alternatives considered and not selected
* an assessment of the environmental impacts of the project
* an assessment of the cumulative impacts of the project and other projects [operating or planned]
* an assessment of issues related to any archaeological findings
* an environmental management plan describing management, control and mitigation of identified impacts amongst other matters
* an environmental monitoring plan describing how project activities related to environmental impacts will be monitored
* an assessment of environmental issues relating to the eventual closure of the project

A social impact assessment must contain:

* a discussion of the policy, legal and administrative framework within which the SIA has been prepared
* a detailed description of all phases of the project
* discussion of the methodology for data collection and analysis and criteria for selecting the chosen methodologies
* a description of social baseline condition in local communities and across Greenland
* a description of alternatives considered and not selected
* an assessment of the project's possible positive and negative social impacts

* a discussion about possible initiatives managing impacts regarding development opportunities, mitigation and derived effects
* a Benefit and Impact Plan [BIP] identifying programmes which will be implemented in order to maximize development opportunities and mitigate negative impacts
* a mechanism to monitor and evaluate the effects of the BIP

The FS, the EIA and SIA and the NSIS have been reviewed and assessed by Greenlandic regulators and their advisors. The regulators have assessed that the documents meet the requirements of Greenland's Mineral Resources Act [MRA] and relevant Guidelines and have been prepared to a standard that is appropriate for public review. The EIA was supported by 124 references and technical reports. All of the technical reports were prepared by independent expert consultants. Should the Office of the High Commissioner for Human Rights [OHCHR] have an interest in reviewing any of the expert reports referred to in this document, access will be provided on request. Key studies are listed in Annex 1.

The formal period of public review commenced on 18 December 2020 and will continue until June 1, 2021.

The FS, the EIA and SIA and the NSIS, in all languages as mandated, have been available on the website of the GoG [www.naalakkersuisut.gl] since 18 December, 2020. Supplementary material, for example expert reports commissioned to inform the preparation of the EIA and SIA, has also been available on this website since 18 December 2020.

Concern 2 Failure to consult and seek the free, prior and informed consent of the local indigenous community

This issue is primarily addressed in our response to Question 3 in the main body of our response. Additional information in relation to consultation activities is provided here.

In the main townships of south Greenland, including Narsaq, Qaqortoq, and Nanortalik stakeholder engagement has primarily been effected by way of regular community hall meetings. The aim of these meetings has been to provide updates on the Project and potential development scenarios, and importantly to provide an opportunity for local stakeholders to ask questions, voice concerns and identify areas about which they would like to receive further information.

The company has also maintained a presence in Narsaq since 2007. The Company purchased an office facility and a workshop in 2011.

The MRA requires that companies wishing to develop a mining project prepare an environmental impact assessment and a social impact assessment.

One purpose of an environmental impact assessment, amongst others, is to "provide a basis for public participation in the decision-making process" and for the social impact assessment is "to inform and involve relevant and affected individuals and stakeholders early on in the process via ongoing dialogue and specific procedures".

A regulatory framework has been established by the GoG to give effect to meeting these objectives. Key elements of this framework are:

Scoping A company proposing to develop a project must prepare a scoping

	study [SS] for each of its impact assessments. The SS must be approved by the relevant authorities. The company must then produce a non-technical document explaining in layman's terms the most relevant aspects of its proposed project. This document must be prepared in Greenlandic and Danish.
Public Consultation	A 35-day period follows the approval of the SS during which stakeholders have the opportunity to provide feedback on the SS.
Terms of Reference	On the basis of the approved SS and feedback received during this first period of public consultation, a company must prepare terms of reference [ToR] for both of its impact assessments. The ToR set out in detail the material to be addressed in each of the assessments incorporating initiatives and variations that have been developed from public consultation. The ToR contains a proposed Table of Contents [ToC] for each assessment. The ToR must be approved by the relevant authorities.
EIA and SIA	The company must prepare impact assessments that align with the agreed ToR for each assessment and are prepared in accordance with respective Guidelines. The assessments must be approved for release by the relevant authorities as a precondition for the commencement of a second period of public consultation.
Public consultation	A minimum 8-week period of public consultation is mandated for impact assessments. During public consultation stakeholders provide feedback on the impact assessments and this feedback together with responses to the feedback, prepared by both the project proponent and the GoG, is collated and published in a White Paper. The completed White Paper is published on www.naalakkersuisut.gl.

The Company commenced the preparation of its scoping study in 2010. During this scoping phase, a number of stakeholder engagement workshops were conducted to present the Project to stakeholders and to receive feedback on topics to be covered in the impact assessments.

In July 2011, after extensive consultation, Orbicon - Danish specialist environmental consultants prepared the ToR for the Project's EIA. The ToR included details of the extent of public consultation that had taken place prior to drafting the ToR.

The ToR was approved by the GoG.

Subsequent changes to Project design and an amendment to the MRA in 2014 necessitated the preparation of updated ToR in 2014. Orbicon also prepared this update. Public consultation on the update occurred between August and October 2014. Comments received during the consultation process were consolidated in a White Paper.

During the first half of 2015 Orbicon prepared a further update of the ToR based on comments collated in the White Paper. The revised ToR was approved by the GoG in 2015 and an EIA, based on the approved 2014 ToR, was submitted to Greenlandic authorities on December 2, 2015.

On December 18, 2020 the EIA was accepted by the GoG as being suitable for a period of further public consultation.

Between December 2, 2015 [submission of initial version of the EIA] and In December 18, 2020 [the date of acceptance of the EIA for public consultation] there was a process of engagement regarding the contents and presentation of the EIA involving the Company, independent expert consultants, EAMRA [The Environmental Agency for Mineral Resource Activities - the agency of the GoG charged with carriage of the EIA review process], the Danish Centre for the Environment [DCE] and the Greenland Institute for Natural Resources [GINR]. During the review process, the EIA and expert reports were revised and updated, in the case of the expert reports often on multiple occasions.

Public consultation commenced on December 18, 2020 and is currently scheduled to close on June 1, 2021.

In July 2011, after extensive consultation, Grontmij - Danish social impact consultants - prepared the ToR for the Project's SIA. The ToR included details of extent of public consultation that had taken place prior to drafting the ToR.

The ToR was approved by the GoG.

Grontmij prepared an updated ToR for the SIA was prepared in 2014 following regulatory changes and changes to Project design. The revised ToR was approved by the GoG in 2014. The SIA, based on the approved 2014 ToR, was submitted to Greenlandic authorities in July 2018.

On December 18, 2020 the SIA was accepted by the GoG as being suitable for a period of further public consultation.

An initial version of the SIA was submitted by GML to the Ministry of Industry and Energy (MIE) in 2015. Following receipt of feedback on the 2015 version, an updated SIA was submitted in 2018 which incorporated new Project details and presented analysis in a format consistent with international practice.

Public consultation commenced on December 18, 2020 and is currently scheduled to close on June 1, 2021.

The company has supplemented the formal processes of community engagement described above with an active stakeholder engagement program which has been conducted since 2008. The Company maintained detailed engagement registers through this period.

The engagement programme involved a wide range of stake holders and other interested parties. They are identified in the table below.

Regulators and Ministries	Community	Other
Mineral Licence and Safety Authority, Administration (MLSA)	Residents of Narsaq	Danish Centre for Environment and Energy (DCE) Aarhus University
The Environmental Agency for Mineral Resource Activities (EAMRA)	Residents of Sisimiut	Greenland Institute of Natural Resources (GINR)
Danish Foreign Ministry	Residents of Qaqortoq	Air Greenland, Nuuk
Municipality of Kujalleq Mineral Manager	Residents of Aasiaat	Arctic Business Network
Ministry of Mineral Resources (MMR)	Residents of Ilulissat	Businesses in Qaqortoq
The Premier's Office	Residents of Kangaamiut	Greenland Labour Union (SIK)
Ministry of Finance	Residents of Maniitsoq	Employers Association of Greenland (GE)
Ministry of Labour	Residents of Nuuk	Local Hunter and Fisher Association Narsaq
Ministry of Industry	Residents of Qasigiannguit	Fisherman and Hunters Association (knapk)
Ministry of Housing and Infrastructure	Residents of Qeqertarsuaq	Mineral Resources Committee
Ministry of Foreign Affairs and Energy	Municipality of Sermersooq	Transparency Greenland
Ministry of Mineral Resources	Info Group Narsaq	WWF Copenhagen
Ministry of Health		The Greenland Nature Institute
Ministry of Fisheries, Hunting and Agriculture		National Museum
Ministry of Education, Culture and Church		Narsaq Museum
Ministry of Social Affairs, Family and Justice		Working Environment Authority
Ministry of Science and Environment		(The former) National Association of Municipalities
Municipality of Kujalleq Mayor’s department (Qaqortoq)		Greenland’s Business Association
Municipality of Kujalleq Industry and labour market, (Narsaq)		Visit Greenland
Municipality of Kujalleq Culture, leisure and prevention (Narsaq)		Greenland Venture
Municipality of Kujalleq Prevention consultant (Narsaq)		Local Trade Forum
Municipality of Kujalleq Housing and Environment (Qaqortoq)		Locally representatives (APP)
Municipality of Kujalleq Social Services (Qaqortoq)		Sheep Farmers’ Association
Municipality of Kujalleq School and pre-school (Nanortalik)		School of minerals and petroleum (Råstofskolen)
Municipality of Kujalleq Finances (Qaqortoq)		School of Metal and Mechanicsssociated to School of Mining)

Regulators and Ministries	Community	Other
Mayor of Municipality of Kujalleq		Cooking and Food School
		The workers' school
		Narsaq Earth Charter
		Against uranium in Narsaq
		AVATAQ
		ICC – Inuit Circumpolar Conference
		Women's Association (local representative in Narsaq)
		Elders Association/Council (local representative in Narsaq)

Concern 3 insufficient documentation and recognition of environmental risks of toxic and radioactive pollution and wastes

In accordance with the ToR, the EIA contains a comprehensive assessment of the environmental risks of "toxic and radioactive pollution and wastes" produced by the proposed Project. This assessment is drawn from reports prepared by independent internationally recognised experts.

The EIA, together with all of the supporting expert reports, has been subjected to extensive review by the GoG, the DCE and the GINR. All of this material has been available on www.naalakkersuisut.gl since December 18,2020.

Following this review, the EIA was approved by the GoG for public consultation.

The EIA addresses the Project's environmental impacts under a number of headings. Those which address "environmental risks of toxic and radioactive pollution and wastes" include:

* Atmospheric impacts
* Radiological impacts
* Water environment
* Waste management
* Biodiversity

Atmospheric impacts

Atmospheric impacts are discussed in detail in Chapter 8 of the EIA - Atmospheric setting. The discussion in Chapter 8 is supported by the following reports prepared by independent consultants:

* Air Quality Assessment (ERM)
* Greenhouse Gas Assessment (ERM)

Should the OHCHR have an interest in reviewing any of the expert reports referred to in this document, access will be provided on request.

The development of the Project has the potential to generate three types of atmospheric impacts:

* dust,
* gaseous emissions and
* greenhouse gases [GHG]

The air quality impacts of the Project have been modelled using CALPUFF, an industry standard model designated by the United States Environmental Protection Authority.

Modelled ground level concentrations of key pollutants [TSP, $PM_{2.5}$, PM_{10}, SO_X, NO_X, black carbon and PAHs] were compared to ambient air quality assessment criteria to determine the potential impact to the physical environment and human health. In addition, TSP dust fall rates were modelled, and metal loads estimated.

Dust will be created by Project activities and Greenland has air quality criteria applicable to mining operations. The Guidelines recommend consulting other jurisdictions, such as

Canada or Denmark (for consistency with European Union guidelines), for relevant standards where appropriate Greenlandic criteria are not available. A review of assessment criteria was undertaken to identify criteria suitable for determining the potential impact on all values considered important for the Project (i.e. the physical environment, the living environment and land-use, conservation and heritage).

Air quality modelling was conducted for more than fifty sensitive receptors in the area potentially influenced by the Project [Study Area]. Modelling results indicate that at the nearest sensitive receptors all particulate concentrations will be less than 20 % (Project emissions in isolation) and 40 % (cumulative, including background emissions) of their respective assessment limit criteria indicating no significant impact to human health resulting from Project activity. Therefore, the impact of particulate emissions from the Project was assessed to be low.

Gaseous emissions will be produced from Project operating plant and equipment, mobile and fixed, which primarily use diesel fuel. Emissions from the combustion of diesel will include solid particles, NO_X (nitrous oxides), SO_X (oxides of sulphur), black carbon and PAHs.

The results of modelling of cumulative impacts indicate that the predicted ground level concentrations for nitrogen, NO_2, H_2S, SO_2 and SO_4 will not exceed the relevant limit criteria at the receptor locations.

The impact of gaseous emissions from the Project was assessed to be low.

The GHG emissions evaluated for the Project include carbon dioxide, nitrous oxide and methane. The GHG emissions were estimated using methods outlined in the 2006 Intergovernmental Panel on Climate Change (IPCC) guidelines for national greenhouse gas inventories.

A total of 0.24Mtpa of GHG emissions is estimated for the Project. This is equivalent to a 45% increase Greenland's CO_2 emissions and a 1% increase Denmark's CO_2 emissions.

Radiological impacts

Radiological impacts are discussed in detail in Chapter 9 of the EIA - Radiological emissions. The discussion in Chapter 9 is supported by the following reports prepared by independent consultants:

* Radiological assessment (ARCADIS Canada)
* Uranium Product Transportation Assessment (ARCADIS Canada)
* Radiation Monitoring Plan Outline (ARCADIS Canada)
* Radon and Thoron Releases (ARCADIS Canada)
* Radiological Consequence Report Rev 2 (Arcadis)
* Risk Assessment Transportation (SENES)
* Wind Dispersion (Orbicon)]
* Air Quality Addendum for Dam Failure Scenarios (ERM)
* Seismic Stability Assessment of FTSF and CRSF (KCB)
* Dam Failure Report (KCB)
* Closure Cover Options Comparison Assessment (KCB)
* Dry Closure Concept Design (KCB)

Project ore contains elevated concentrations of uranium and thorium and, over time, natural processes such as glaciation and wind and water erosion have dispersed radionuclides [atoms that emit radiation], into the adjacent valley and the township of Narsaq, the nearest community to the Project. As a result, baseline radionuclide concentrations around the Project area are elevated when compared to global average values.

For residents of Narsaq, the natural baseline exposure through food ingestion and inhalation has been calculated to be between 8.5-10.5 mSv/year. Worldwide, the normal range of natural background radiation has been reported to average of 2.4 mSv/year.

Project activities, such as blasting and crushing, will release radioactivity to the air and water. The EIA assessed radiation impacts from Project generated dust, radon and thoron [inert noble gases].

In addition to the release of radionuclides associated with planned Project activities, three risk scenarios were also considered:

* radioactivity from spills,
* radioactivity released in the unlikely event of a failure of the embankment of the Project's tailings storage facility [TSF], and
* aerosol spray from the TSF which has a water covering.

1 Dust

A radiological assessment was conducted for the Project using the INTAKE model to determine the potential for radiological contamination of the local environment as a result of Project activities. Radiological contaminants of concern were identified, and potential radiological releases were estimated. These estimates were combined with data on air and water dispersion to estimate radionuclide concentrations which will develop as a result of Project activities.

Radiological pathways assessments were undertaken. Estimates were calculated for different locations within the Study Area. These concentrations were used, together with "behaviour characteristics" (e.g. what and how much is eaten by animals and people) and natural background radiation, to estimate radiological doses for selected flora, fauna and humans.

The potential for effects on the health of humans and fauna is determined by comparing the total calculated radiological dose for the various receptors (the sum of the natural background dose and the dose arising from Project activities) to the International Commission on Radiological Protection (ICRP) benchmark dose limits. The final step in the assessment was to calculate screening index values (SIVs), where an SIV of less than 1 indicates that the calculated dose is below the reference dose limit and therefore the threshold for the potential for radiological effects on the population at large will not have been reached.

The SIVs calculated for all species were well below 1 indicating that the Project is not expected to result in an adverse effect or significant harm to plants, animals or humans either living in or visiting the area. The analysis specifically included consideration of sheep and their SIVs were also found to be well below 1.

2 Radon and Thoron

Project activities have the potential to produce radon and thoron emissions.

The incremental level of radon arising from Project activities was estimated by combining the estimated radon sources with atmospheric dilution factors to predict radon levels in Narsaq. Estimates were compared to measured background levels. Assuming a "worst-case" emission rate arising as a result of Project activities, the Project will increase background radon concentrations in Narsaq by a maximum of 3 %. As these incremental exposure levels are within the natural variation of background, the consequences of incremental exposure are negligible.

3 Spills

The transport and handling of uranium oxide will take place in accordance with the applicable IAEA Safety Standards and the International Maritime Dangerous Goods Code.

A specific uranium transport assessment has been carried out for the Project.

A review of road transportation accident statistics for Canada and the U.S. confirmed that the probability of an accident and subsequent release of uranium oxide into the environment is extremely low.

4 TSF embankment failure

The proposed TSF will be located in the Taseq basin, located about 7.5 km to the northeast of Narsaq. Tailings disposal involves thickened tailings being deposited sub-aqueously into an earth-fill embankment dam constructed within the basin. The raised embankment design is the most common construction technique used in tailings storage facilities [https://www.tailings.info/disposal/conventional.htm]. The embankment uses a downstream design and is raised at certain time intervals to increase the available volume for the storage of tailings and water.

The TSF embankments have been designed to meet international standards (ICOLD) and are predicted to withstand even worst-case seismic events. The Project is in a region that has been tectonically stable for more than 600 million years.

Southern Greenland has never experienced an earthquake event above Mw4.6 (moment magnitude). Studies have been conducted to determine the "maximum credible earthquake" (MCE) (a 1:10,000 event) for the Kvanefjeld location. Modelling indicates that even under MCE conditions, less than 5cm of movement would be anticipated in the embankments, and their structural integrity would not be compromised.

Notwithstanding the very low likelihood of an embankment failure occurring, three different potential failure scenarios were assessed, each at two points in time; at the end of operations (when the tailings volume will peak) and 6 years after operations have ceased (when the volume of water cover over the tailings will be greatest).

Under all scenarios, the discharge would be expected to follow the current surface water discharge pathway which follows the Narsaq river through to a discharge point at Narsap Ilua.

Scenario 1 **Overtopping**
TSF water cover is released into the river system to the SW

In the event of overtopping during Project operations, a potential short-term effect on phytoplankton was identified with no other species expected to be affected and no impacts to human health.

For overtopping 6 years post mine closure, water will have been treated for a number of years and will meet Greenland water quality guidelines (GWQC) for all elements excluding fluoride and the potential radiological impact is assessed to be very low.

Scenario 2 **Piping failure**
TSF embankment materials are eroded out by flowing water, resulting in the release of both water cover and a proportion of tailings solids

Physical (rather than radiological) factors are likely to have a greater influence on the freshwater environment in the short-term, and some longer-term radiological effects might be experienced by freshwater biota, but these are not expected to be severe.

Within the marine environment, phytoplankton could experience short-term significant radiological effects, but these effects would be expected to decline after the event. In the longer-term, tailings may comprise a new sediment layer in the local bay [Narsap Ilua], however this is not expected to present concerns from a radiological exposure perspective.

Scenario 3 **Catastrophic failure**
Where all water cover and a significant proportion of the tailings would be released

The effects would be similar to those described under piping failure.

The larger footprint of a catastrophic failure would result in a greater area of inundation and sediment deposition on land. Modelling indicates that some marine species (phytoplankton) may experience significant short-term radiological effects, but these effects would be expected to rapidly decline.

The RESRAD ONSITE model was used to determine human health impacts. The conclusion was that direct exposure to tailings deposited on land is not likely to be a health concern. Similarly, dust generated from the desiccation of deposited tailings is not expected to be a concern from a radiological perspective.

The township of Narsaq is outside the flow path of all modelled scenarios, and as such, neither inundation nor tailings deposition would be expected to occur in the town.

Water Environment

Impacts on the water environment are discussed in detail in Chapter 10 of the EIA - Water environment. The discussion in Chapter 10 is supported by the following reports prepared by independent consultants:

* Hydrology and Climate (Orbicon)

* Tailings and Waste Rock Stockpile (Orbicon)
* Hydrocarbon and Chemical Spill Report (Orbicon)
* Natural Environment of the Study Area (Orbicon)
* Preliminary Groundwater Impact Assessment from Tailings Facilities (GHD, Orbicon)
* Water Quality Assessment of Tailings Water and Waste Rock Run off (Orbicon)
* Marine Discharges and Fjord Dynamics - Modelling and Interpretation of Ecotoxicology Studies (DHI)
* Life of Mine Modelling (Water, Fluoride and Uranium - GoldSim) (GHD)
* Wind Dispersion (Orbicon)
* Taseq Basin Groundwater Hydrology (Orbicon)
* Fluoride Levels in Taseq Tailings Dam (Orbicon)
* Woods / AMEC (2017) TSF Environmental Risk Assessment
* Dam Failure Report (KCB)
* Seismic Stability Assessment of FTSF and CRSF (KCB)
* Seepage Technical Memorandum (Orbicon)
* Air Quality Addendum for Dam Failure Scenarios (ERM)
* Geochemical assessment of river water quality changes resulting from dam failure (KCB).

Potential impacts to the water environment in so far as they relate to "toxic and radioactive pollution and wastes" have been assessed under the following headings:

* Operation of the TSF

There will be no water discharge from the TSF to the local river system river until 6 years after the end of mine and processing activities. After this, and only when the water covering the TSF meets Greenland water quality criteria, will release to the local river system be allowed.

* Release of tailings water and solids from TSF embankment failure

As described above, three hypothetical modes of failure, each with a very low likelihood, were assessed to determine the impact on the environment:

Overtopping	The primary impact would be a large and extended water flow, which could temporarily flood the grass field of the alluvial fan zone. If the failure were to occur during operations, short term water quality exceedances could be anticipated but these would be rapidly diluted. If the failure were to occur after 6 years from the end of operations, the quality of the overtopping water would meet GWQCs (with the exception of fluoride) and as such, would not be expected to have an impact on downstream water quality.
Piping failure	Assuming that all surface water and 25 % of tailings stored above a certain point (15 Mm^3) were lost in this type of failure, the slurry flow would be expected to result in the flooding of the grass field of the fan zone for the duration of the failure event.
Catastrophic failure	The most significant immediate effect would be the physical impact of a sudden release of high velocity fluid and solids. Immediately after

failure, the water quality in the river would be likely to be similar to that of the tailings.

Within two years, constituent concentrations would approximate baseline conditions in the Narsaq river for all except fluoride. Fluoride concentrations would meet the winter water quality criteria after two years, and the summer water quality criteria after 10 – 20 years (depending on the timing of the failure event).

River water flowing into marine environment at Narsap Ilua would meet all except the fluoride guideline values.

The township of Narsaq is outside the flow path of all modelled scenarios, and as such, neither inundation nor tailings deposition would be expected to occur in the town.

The impacts to the water environment from the worst case TSF embankment failure (catastrophic failure) would be high, however due to the very low likelihood of this event occurring, the impact has been assessed to be low.

* Drinking water quality impacts - aerosol spray and seepage from the TSF

Narsaq is supplied with water from a discrete catchment area. Given local topography and the prevailing wind direction during high wind events, it has been assessed to be unlikely that aerosols from the TSF will affect the town's drinking water as a result of the deposition of aerosols.

Studies indicate that there is limited surface and underground water connectivity between the natural basin in which the TSF is to be located and the town's drinking water catchment area. The risk of seepage from the TSF is considered low with the presence of a lake in the basin indicating a competent underlying geological structure.

In the unlikely event that the water supply is impacted, either because of seepage, overflows or aerosol deposition, water treatment on site can be applied as an immediate mitigation.

This issue was also specifically addressed in Chapter 15 [Environmental Risk Assessment] of the EIA where it was considered from a risk perspective.

* Discharge of water to the fjord – operations and closure phases

During operations, two water streams will be released to the environment in the fjord to the north of the mine site. One stream comprising water excess to the requirements of the processing plant and the other a barren chloride liquor. Both will be treated before placement in the fjord.

A hydro-dynamic model for the local fjord system was developed by the Danish Hydraulic Institute which evaluated the quality and quantity of all major contaminants in the two discharge streams in terms of temperature, concentration and flow. The extent of spreading of chemical species contained in the treated water was modelled for summer and winter, and the optimal position, in terms of dilution, for submerged discharge was identified to be 40 m below the water surface level.

The plume developing from the water placement is expected to cover an area of 3 km^2, extending 700 m from the coast at depths between 20 to 50 m. Beyond this distance, the water quality is below the predicted no effect concentration level for all contaminants.

Toxicological testing was also carried out to determine if the discharge water would be acutely or chronically toxic to algae, copepods or fish. Testing indicated that algae and fish appeared to be unaffected by the effluent, even at high concentrations however, under certain high concentrations, the effluent may impact copepods.

It was concluded that the placement of water in the fjord is unlikely to significantly affect water quality or the marine environment.

* Waste rock run-off and mine pit water

Waste rock will be mined together with ore and will be placed in a waste rock stockpile [WRS] which will be located adjacent to the mine. Material which will be placed in the WRS is significantly less susceptible to weathering than lujavrite, the host-rock for the Project's orebody. It also contains significantly lower concentrations of uranium, thorium, and fluorine.

Water shedding off the WRS will be captured for use during the Project's operations. After mine closure, this water will be diverted to a natural waterway where it will be diluted with water from the local catchment before flowing into the fjord via a natural watercourse. Within 30 m of the discharge point in the fjord, all elements, with the exception of Fe, will have reached the predicted no effect concentration.

At the completion of mining, the pit will gradually fill with water and contribute an additional stream to local surface hydrology. The mine pit water is expected to be low in salts and provide an additional source of dilution to the WRS run-off.

* Hydrocarbon and chemical spills

Chemicals and hydrocarbons required for the Project will be imported and stored in appropriate facilities prior to use. During transportation and use there is the potential for spills.

The environmental impacts of chemical or fuel spills on land are confined to parts of the Study Area, or more particularly to an envelope extending for a few kilometres around Project activities. As the plant will be fully bunded, if a process spill were to occur, it would be captured by the bund, and recovered to avoid environmental damage and the probability of a transport accident releasing uranium oxide into the environment has been assessed to be extremely unlikely.

Fuel spills from tankers typically result from routine operations in connection with loading, discharging and bunkering and are small and localised. The impact on marine life would be local and could be managed using the available emergency response equipment.

Without mitigating measures, spills affecting the Narsaq river (or other watercourses) during periods of high flows might spread downstream of the spill location and reach the fjord.

There is also the potential for the accidental placement of untreated process water into the fjord because of a technical fault. Should this occur, water placement would immediately be halted, and untreated process water would be directed to the TSF. With appropriate mitigations in place any release would be minor and the impact low.

Waste Management

Waste management is discussed in detail in Chapter 11 of the EIA - Waste management.

Waste produced during the Project will include domestic waste, construction waste, iron and scrap metal, tyres from mobile equipment and various types of hazardous waste (hydrocarbon waste, chemical waste and batteries).

Solid waste produced in the process plant will be stored in the TSF. All combustible solid waste, including putrescible waste, will be shipped to the municipality's waste collection centre in accordance with the 2015 Regulations for disposal of hazardous waste.

Project generated sewage will be treated in a package sewage treatment facility which will apply mechanical, biological and chemical treatment processes to the waste to render it safe for permanent disposal. Treated effluent will be discharged to the fjord, consistent with current practice in Narsaq.

Hazardous waste will be registered, handled and shipped to Denmark for treatment and disposal in compliance with Danish and EU requirements.

The impact of waste production on the environment is assessed to be of low significance.

Biodiversity

Biodiversity is discussed in detail in Chapter 12 of the EIA - Biodiversity. The discussion in Chapter 12 is supported by the following reports prepared by independent consultants:

* Marine Discharge Ecotoxicity Test (DHI)
* Botanical Investigations Kvanefjeld (Simondsen)
* Hydrocarbon and Chemical Spill Report (Orbicon)
* The Natural Environment of the Study Area (Orbicon)
* Dam Failure Report (KCB)
* Radiological Consequence Report (Arcadis).

The Project has been designed to avoid and where not possible to avoid, minimise and mitigate environmental and social impacts.

The Project has the potential to contaminate **terrestrial fauna and flora habitat** through spills and following a failure of the TSF embankment.

The likelihood of a spill occurring is very low, however should one occur, the environmental impacts of hydrocarbon or chemical spills on land were assessed to be confined to the Project Area and would result in low impact to terrestrial habitats.

Impacts to terrestrial flora and fauna were assessed for each of embankment failure scenario:

* Overtopping would result in a short-term exceedance of the GWQCs, however this effect would be expected to diminish rapidly due to dilution. From 6 years post closure, the water quality of the released liquid would meet the GWQCs [excluding fluoride].

  As such, the impact to terrestrial fauna and flora from water quality changes would be expected to be minor and no radiological impact would be expected.

* A piping failure would be expected to flood the grass fields of the fan zone and result

in the deposition of most tailings solids within the lower reaches of the Narsaq river. Effects on terrestrial species would not be expected and radiological dose estimates indicate that the any effect would be short-term in duration as the organisms with the highest risk quotients reproduce quickly.

* A catastrophic failure would result in the inundation of approximately 1.84 km^2, to various depths, along the discharge pathway. It is assumed that the terrestrial biota within this inundation zone would be smothered and species would need to recolonize. Terrestrial fauna present in the affected area are common throughout southern Greenland and their conservation is not dependent on the local population. In a catastrophic failure scenario, impacts to terrestrial flora and fauna would be expected at an individual level, but population level effects would not be anticipated.

The Project has the potential to contaminate **freshwater habitats** through spills, by the use of the lake in the Taseq basin for the storage of tailings and following a failure of the TSF embankment.

An oil spill in fresh water could potentially affect the spawning migration, spawning area and feeding of young char in Narsaq river. The likelihood of a major spill occurring on land or into fresh water sources is not high and spills would not be expected to cause significant impact on the species at a population level.

Given the absence of fish in the existing lake, the use of Taseq basin for storage of tailings is expected to have limited consequence. Invertebrates present in the lake would be likely lost however they are neither unique nor of population importance.

Impacts were assessed for each embankment failure scenario:

* Overtopping would result in temporary flooding of the grass fields of the fan zone. Scouring and gouging impacts are likely to be of a similar scale to those experienced naturally. During operations it is expected that there would be a short-term exceedance of the GWQCs which diminish rapidly due to dilution. From 6 years post closure, the water quality of the released liquid would meet the GWQCs [excluding fluoride].

* A piping failure would be expected to flood the grass fields of the fan zone and result in the deposition of 60-70% of the tailings solids within the lower reaches of the Narsaq river. The flow would be expected to overwhelm the natural river flow and would be likely to result in biota being swept away.

  In the short-term, the physical effects of the release would be the primary cause of impacts to freshwater habitats. Once tailings particles had settled in the lower stretch of the Narsaq river, biota would be exposed to radioactivity due to the presence of uranium and thorium in tailings particles. The maximum estimated short-term risk quotient identified in the radiological analysis was recorded for zooplankton (SIV> 1). As these are quickly reproducing organisms it would be expected that any effect would be short-term in duration.

* The flow from a catastrophic failure would be expected to overwhelm the natural river flow. There would be significant scouring and local fish populations would be swept away. Aquatic life would be further compromised by high levels of sediment

clogging fish gills and preventing freshwater plant photosynthesis in the short-term. The physical impacts would be expected to overwhelm any radiological exposure in the short-term. The radiological exposure described for a piping failure is equally applicable to a catastrophic failure

The Project has the potential to contaminate **marine habitats** through spills and following a failure of the TSF embankment.

The NSIS was prepared to address navigation risks.

The consequences of a large oil spill caused by a shipping accident could be very high. An assessment of the potential impact concluded that, while hydrocarbon spills in Arctic ecosystems can have large impacts which are long lasting when compared with temperate ecosystems, if appropriate mitigation strategies [detailed contingency planning, speed restrictions, compulsory pilotage for vessels and appropriate emergency response capability] are implemented the overall risk of large-scale ecological impacts is low.

The likelihood of such a spill occurring is significantly reduced through the application of maritime regulations and has been termed “improbable” by navigation specialists.

Impacts to marine fauna and habitats were assessed for each of embankment failure scenarios:

* The impact of an overtopping was assessed to be very low.

* In a piping failure 5% of the tailings solids would be expected to reach Narsap Ilua and there would be the potential to generate radiological impacts from both the water lost as part of the failure and the deposition of solids.
  During the duration of water release, there could be adverse short-term radiological effects on biota in Narsap Ilua from exposure to radioactivity from the released water. The dose could be substantial where significant effects may occur. After the release ceases, the levels of radioactivity would be expected to decline to close to baseline levels, with doses decreasing to below the effects level. The radiological effects would be potentially significant but short-term.

  Longer-term effects from exposure to the tailings solids deposited in Narsap Ilua would also be expected. Modelling has been undertaken assuming that the tailings solids would constitute a new sediment layer in Narsap Ilua. The results from this modelling indicate there are not expected to be any long-term radiological impact on biota that would re-establish in the sediment that comprises flotation tailings. However, it is noted that the tailings would smother the existing biota and species would need to re-colonize.

* In a catastrophic failure scenario, it is anticipated some tailings material would flow beyond Narsap Ilua into the fjord. This is a very high energy environment and tailings would then be mixed and dispersed over a larger area. In the short-term, biota in Narsap Ilua would likely experience significant physical and radiological impacts, however radioactivity levels would be expected to quickly decline to close to baseline levels. Longer-term radiological impacts to biota in Narsap Ilua and the fjord would not be expected.

Concern 4 damage to the nearby UNESCO heritage listed site, Kujaata

Environmental modelling indicates no impacts from the Project will be experienced at Kujaata or any of the UNESCO sites.

On October 17, 2016 the International Council on Monuments and Sites requested that Denmark provide additional information in respect of the status of mining Projects in southern Greenland as part of its evaluation of the suitability of Kujaata for World Heritage listing.

The response includes:

"The mine is about 20 km from the nearest part of the nominated area (Component 5) and the preliminary investigation tells us that there will be no impact within that radius. … The Steering Group of the "Kujataa" World Heritage Project will examine the EIA when it is released to ensure that the World Heritage area will not be affected."

The issue of the UNESCO heritage listed site, Kujaata, was discussed in detail in Chapter 13 - Local use and cultural heritage - of the EIA. The discussion in Chapter 13 is supported by the following reports prepared by independent consultants:

* Local Use Study (Orbicon)
* Archaeological surveys (Kapel H)]
* Archaeological surveys (Greenland National Museum and Archives)
* SIA (Shared Resources)].

In 2017, five areas representing sub-Arctic farming landscapes in Greenland, collectively referred to as Kujaata, were admitted to the UNESCO World Heritage List. The areas are located in the fjord system around the Tunulliarfik and Igaliku fjords and comprise:

* Area 1 – Qassiarsuk
* Area 2 – Igaliku
* Area 3 – Sissarluttoq
* Area 4 – Tasikuluulik
* Area 5 – Qaqortukulooq.

The five parts of Kujataa together represent the demographic and administrative core of two farming cultures, a Norse Greenlandic culture from the late-10th to the mid-15th century and an Inuit culture from the 1780s to the present. Area 5 (Qaqortukulooq) is the closest to the Project, at a distance of approximately 18 km SSE from the boundary of the Project Area.

Concern 5 approval of the uranium mining Project could take place against their free, prior and informed consent

This issue is primarily addressed in our response to Question 3 in the main body of our response. Additional information in relation to consultation activities is provided here.

Approval of a mining project in Greenland can only be granted by the GoG and the proponent of a project, as a precondition to securing approval for their project, must comply with requirements laid out by the GoG in the MRA and the Guidelines.

As noted in response to the Concern 2, the company has complied with the MRA and the Guidelines. The EIA and SIA are currently being examined by stakeholders in a mandated period of public consultation.

During this period stakeholders have the opportunity to address issues with the impact assessments to which both the Company and the GoG must publicly respond.

Concern 6 information provided in the Project's EIA is inadequate and unreliable

The scope of the EIA is defined in its ToR which define the range of the impacts to be assessed and components of each to be addressed. The ToR were prepared in accordance with a process established by the GoG during which consultation with the communities likely to be affected by the development of the Project and other stakeholders must be consulted. The ToR was approved in 2015.

The ToR includes a proposed Table of Contents [ToC] for the EIA:

1. Introduction
2. EIA methodology
3. Existing environment
4. Project description
5. Impact assessment and development of preventative and mitigation measures

Impacts to the physical environment

Area impacted and possible landscape disturbed
Impacts associated with each infrastructure development.
Impacts related to tailings, waste rock and other mine wastes disposal
Erosion
Long term stability of rehabilitated ground and tailings deposits
Hydrological changes of rivers, lakes and fjord, and groundwater
Mine dewatering impacts
Qualitative and quantitative - impacts on freshwater and sea water
Dust
Noise and vibrations
Light, heat and radiation
Gas emissions including greenhouse gases and Radon emissions
Fluoride
Radionuclides
Radon
Possible release of chemicals and radionuclides to the environment
Taseq [tailings storage facility] water dispersal
Alkaline drainage

Impacts to the living environment

Impacts from ore, tailings and waste rock, alkaline drainage, and dissolved radionuclide and fluoride concentrations and any other chemicals
Removal or damage of vegetation and effects on possible carbon sinks
Disturbances of wildlife, loss of habitats and biodiversity
Introduction of non-native species of flora and fauna
General impact on ecosystems

Creation of new habitats

Impacts to the land use, conservation and heritage

Hindrance of other land use

Increased demand on existing resources

Open up the area for other land use through changes in infrastructure

Cumulative impacts

6. Alternatives considered for the Project
7. Environmental management system
8. Environmental monitoring
9. Public consultation
10. Conclusion

The company prepared its EIA based on the ToR and the ToC proposed in the ToR has been the basis for the structure of the EIA.

For each area of impact, the EIA:

* Describes the existing environment
* Identifies the potential impacts of the Project
* Assesses the potential impacts
* Identifies mitigations for the impact
* Predicts post mitigation outcomes

An excerpt from the ToC of the EIA [relating to the assessment of impacts] is set out below.

For each of the impacts assessed the company engaged independent consultants, internationally recognised in their areas of expertise, to provide data driven analysis, advice and recommendations for inclusion in the EIA.

The EIA, together with all supporting expert reports, were subjected to extensive review by the GoG and during the review process, feedback was incorporated into the EIA and, where appropriate, into expert reports.

Concern 7 the timeframe for public consultations has been too short

The regulatory framework stipulates a minimum 8-week period for public consultation for an environmental impact assessment that has been accepted as having been prepared to a standard that is suitable for public consultation.

It was recognised by the Company and the GoG that the period of consultation should be extended beyond the minimum to allow additional time for review and to allow for the potential impact of the COVID pandemic.

The public consultation period for the EIA is 23 weeks, 15 weeks more than the minimum.

This is the longest period that has ever been required by the GoG for public consultation in respect of an environmental impact assessment for a mining project EIA. Another mining project recently [2021] completed public consultation for its impact assessments in 10 weeks, an additional two weeks having been allowed for the impact of COVID.

Concern 8 public meetings have been negatively impacted by restrictions related to the COVID pandemic

It is a requirement that, during the period of consultation, public meetings are held in the communities which are potentially particularly affected by the proposed Project. During these public meetings representatives of the GoG, the GoG's advisers and the Company are

available to answer questions from members of the public.

The company proposed to hold meetings in 5 communities.

Meeting location	Proposed	Realised
Narsarsuaq	1	1
Qassiarsuk	1	Weather conditions made this impossible
Igaliku	1	Weather conditions made this impossible
Qaqortoq	1	2
Narsaq	1	2

Adverse weather conditions made the meeting at Igaliku and Qassiarsuk impossible, other meetings proceeded as scheduled.

Because of COVID restrictions representatives of the company based in Australia attended meetings via video link.

Concern 9 international experts cannot travel to Greenland to attend the consultations due to the travel ban

Australian based representatives of the Company and other interested parties based outside of Greenland were unable to attend the meetings that were held in Narsarsuaq, Qassiarsuk, Qaqortoq and Narsaq.

"Virtual" attendance was an option for anyone not able to attend meetings in person. Australian based representatives of the Company attended meetings via video link and the meetings were also streamed live on Facebook, making them accessible for all interested parties.

Attendance at public meetings was however not the only mechanism available to interested parties wishing make comments on, pose questions regarding or make submissions in respect of, the Project's EIA, SIA or NSIS.

During the consultation period the GoG maintains a portal on its website where interested parties can raise questions or concerns and make their positions known. This portal will remain open until the end of public consultation, currently scheduled for June 1, 2021.

At the conclusion of the consultation period a document [the White Paper] is prepared which:

* sets out all the comments, questions etc provided in person at meetings or submitted via the GoG portal,
* the Company's response to all submissions, and
* the GoG's response to all submissions.

International experts can (and do) raise matters via the GoG's portal in the knowledge that both the Company and the GoG are obliged to formally respond.

Concern 10	**The EIA, lodged by your company, observes that impacts to marine habitat and fauna would not occur at a population level, disturbance impact of terrestrial mammals and birds is assessed as low, and the significance of lost terrestrial habitat due to the Project is assessed to be very low. Even in a catastrophic failure scenario, the EIA excludes population level effect.**

Population level environmental impacts on flora and fauna are considered in Chapter 12 of the EIA - Biodiversity. We refute the allegation that the EIA excludes population effects and note that the effect on species were assessed and evaluated to occur only at an individual level, i.e. no population level effects are anticipated. Population level effects were specifically assessed and were found to be unlikely to occur.

The response to Concern 3 above [under Biodiversity] addresses population level effects.

Concern 11	**the EIA is not reliable**

The EIA addresses in detail the potential impacts of the Project.

For each area of identified impact:

* physical environment
* atmospheric setting
* radiological emissions
* water environment
* waste management
* biodiversity
* local use and cultural heritage, and
* cumulative impacts,

the EIA:

* describes the existing environment
* identifies the potential impacts of the Project
* assesses these potential impacts
* identifies mitigations for the impact, and
* predicts post mitigation outcomes for the study area

The range of material to covered by the EIA was agreed by the GoG in 2015.

The EIA also specifically addresses concerns over the management of uncertainty in Chapter 6.

The information included in the EIA has been reviewed in detail by the GoG and its scientific advisers, and, where appropriate, feedback from this review process was incorporated in revisions to the EIA.

Each of the assessments of the potential impacts was data driven and is supported by expert reports commissioned by the Company from internationally recognised subject matter experts.

The EIA was accepted for public consultation by the GoG in November 2020.

Concern 12 the company led by you downplays the variety of risks associated with the Project

The EIA Guidelines stipulate that an assessment **"shall identify, predict, describe, assess and communicate potential environmental impacts of a proposed mining Project in all its phases".**

The EIA comprises a thorough, objective and comprehensive assessment of the environmental risks associated with the Project. Chapters 7 to 14 of the EIA discuss all the predicted potential impacts of the Project, regardless of their likelihood.

The impacts were addressed under the following headings:

* physical environment
* atmospheric setting
* radiological emissions
* water environment
* waste management
* biodiversity
* local use and cultural heritage, and
* cumulative impacts

Chapter 15 of the EIA then specifically addresses the issue of risk assessment - evaluation of the likelihood and consequence of an environmental effect occurring because of the Project. The risk assessment process employed a systematic approach consistent with the AS/NZS 31000:2009 Risk Management – Principles and Guidelines.

Risk identification was informed by the analysis undertaken in the impact assessment sections and reported upon in the supporting expert technical reports. The risks evaluated represent environmental effects which "may or may not" occur, as distinct from the majority of impacts assessed in the EIA for which there is reasonable confidence that they will occur.

The broad criteria for inclusion in the risk assessment are summarised below:

* Risks highlighted as of being of public concern or interest in public consultations
* Real or perceived high consequence, low likelihood events
* Unplanned events (e.g. accidents or spills).

The decision to exclude low consequence, low likelihood events ensured focus on issues of significance, either risk significance or public significance.

The risk assessment used hazards as a starting point, hazards being events which can cause harm, the risk being the probability of a hazard causing a defined level of harm.

The harm generated by a hazard (referred to as the consequence) might occur across a range of environmental receptors. As such, risk consequences were assessed for each of the relevant environmental receptors for the same hazard in some instances. The environmental receptors against which risks were assessed included:

* Ecology

* Air quality
* Surface water
* Groundwater
* Soil and ground conditions
* Landscape and visual impact
* Community health.

Risk ratings were determined based on the risk assessments contained in the specialist's reports which informed the EIA. The specialist reports utilised a variety of risk ratings, and as such, a common basis for the assessment of risk was required against which all risks could be assessed.

The company prepared consequence and likelihood tables against which each risk meeting the inclusion criteria was assessed.

The likelihood table established the following classification:

	Very Unlikely	Unlikely	Possible	Likely	Almost certain
Probability of a single event	<5 %	6-20 %	21-50 %	51-75 %	>75 %

The consequence table comprised a matrix which cross referenced 5 levels of consequence [very small, small, medium, large and very large] with each of the environmental receptors noted above and provided a description of the threshold for each level of consequence for each receptor.

By way of example, for the **Air quality** receptor:

Consequence	**Description**
Very small	Project / process contributions plus existing background concentrations are <5 % of the standards. No visible increase in dust levels
Small	Project / process contributions plus existing background concentration is 5-20 % of the standards. Visible increase in dust levels not predicted to cause a nuisance, lead to complaints or adverse health impacts.
Medium	Project / process contributions plus existing background concentration is 20-50 % of the standards. Dust is a nuisance to people or may cause minor property, or ecological damage.
Large	Project / process contributions plus existing background concentration is >50 % of the standards. Dust is a significant nuisance to people or will cause measurable but not significant health effects, or moderate property or ecological damage.
Very Large	Project / process contributions plus existing background concentration is >70% of the standards. Dust is a very significant nuisance to people or will cause significant health effects, or significant damage to property.

The following risk matrix was used

Risk Classification		Likelihood				
		Very Unlikely	Unlikely	Possible	Likely	Almost certain
Potential Consequence	Very Large	M	M	H	H	H
	Large	L	M	M	H	H
	Medium	L	L	M	M	H
	Small	L	L	L	M	M
	Very Small	L	L	L	L	M

Two types of risk were evaluated: **inherent risk** and **residual risk**.

The inherent risk measures the likelihood and consequence of the risk event using the Project design but in the absence of planned controls. The residual risk measures the likelihood and consequence of the risk event using the Project design and planned controls.

In the analysis in Chapter 15 of the EIA, a total of ten hazards were assessed, resulting in 35 different risk consequences. Of the 35 risks, seven were evaluated to have a residual risk of medium, and 28 were considered low.

Two examples of the analysis of identified hazards is set out below:

Hazard 1	The failure of the tailings storage facility due to a seismic event
Cause	A maximum credible earthquake [MCE] occurs 10km from the facility
Consequence	Deformation of the TSF embankments as a result of the seismic event, resulting in failure of the tailings facilities
Inherent risk	
Likelihood	Very unlikely
Consequence	Large
Risk rating	Low
Reasoning for assessment	MCE event is a 1:10,000 AEP. MCE event is predicted to cause <5cm of deformation of the tailings facilities. Such a level of deformation is not expected to be sufficient to weaken the stability of the embankments. Factor of safety (FoS) for structures remains at 1.1 or higher under MCE circumstances. Embankments will be constructed using BAT, to ICOLD standards. They will be rock-filled and the FTSF embankment will be keyed into competent rock. Expert reports Probabilistic Seismic Hazard Assessment (KCB) Dam Failure Report (KCB)

•	Seismic Stability Assessment of FTSF and CRSF (KCB)
Mitigation controls	No further mitigation measures
Residual risk	
Likelihood	Very unlikely
Consequence	Large
Risk rating	Low

Hazard 2	**Aerosol spray generated from surface of TSF**
Cause	High winds (foehn conditions) generate aerosol spray on the TSF with deposition beyond the confines of the TSF facility
Consequence	Impacts to the Narsaq drinking water catchment and supply
Inherent risk	
Likelihood	Unlikely
Consequence	Small
Risk rating	Low
Reasoning for assessment	An aerosol dispersion model estimated the deposition of fluoride if 1 % and 10 % of aerosol spray from the TSF under foehn conditions landed in the Narsaq drinking water catchment. If 10 % is considered (the maximum case) to land in the 6 km2 area of the Narsaq drinking water catchment, the maximum buffer load of 4,500 kg/y (considering WHO Guidelines for drinking water quality and baseline fluoride levels) would only be exceeded if foehn events lasted for more than 335 hours. Deposition of aerosols in Narsaq drinking water catchment is considered unlikely due to wind direction, topography and mountain ridge separating Taseq valley with the area used for abstraction of raw water to Narsaq water supply. Critical load assessments indicate that potential impacts to Narsaq water quality are considered low. Expert reports Hydrology and Climate (Orbicon) Natural Environment of the Study Area (Orbicon) Wind Dispersion (Orbicon) Fluoride Levels in Taseq Tailings Dam (Orbicon) Life of Mine Modelling (Water, F and U) (GHD)
Mitigation controls	In the event that foehn winds were shown to be generating changes in the water quality for Narsaq, additional water treatment could be implemented at the TSF to improve water quality in the supernatant prior to discharge. Environmental monitoring will be undertaken at [an identified] control point (Narsaq river just after confluence with Taseq

	river), allowing early identification of changes in water quality requiring intervention.
Residual risk	
Likelihood	Unlikely
Consequence	Very small
Risk rating	Low

Concern 13 "The radioactive dust produced by uranium mining could be harmful to residents of Narsaq and the agricultural, hunting and fishing activity"

The design and layout of the Project have been designed to minimise social and environmental impact.

The issues of the environmental impact of Project generated dust [both the impact of the particulates and of the radionuclide contents of the dust particles] were covered in Chapters 8 [Atmospheric setting] and 9 [Radiological emissions] of the EIA.

All of the conclusions presented in the EIA are supported by reports of independent experts commissioned by the company.

The Project has the potential to generate dust primarily through material handling and vehicle movements. Particulates have the potential to affect both the environment and human health.

Emissions were estimated to show the impact of the Project on air quality [including dust]. All identified emissions were included in the estimates and annualized emissions were calculated for the Project.

The assessment considered the potential impacts attributable to the Project in isolation and the cumulative impact of the Project's emissions and existing emission sources in the Study Area. This has been identified as a Project impact and was considered to be of low significance.

In this analysis it was conservatively assumed that no dust controls were in place at the Project to ensure that the maximum potential emission profile was assessed. It is estimated that, were dust control measures accounted for in the modelling, dust emissions would be 63 % lower.

In addition to ground level concentrations of dust, concentrations were calculated for sensitive receptor locations which were identified as being representative of protective values.

The modelling results indicate that the predicted ground level concentrations for dust deposition do not exceed the relevant assessment criteria at the sensitive receptor locations (in isolation and cumulatively). Results from the modelling are inherently conservative as they present outputs generated in the absence of applicable control measures (it is

estimated that, were dust control measures accounted for in the modelling, dust emissions could be reduced by as much as 63 %).

The highest overall dust emissions are expected in the mine area close to the pit. Material handling, haulage and blasting are expected to have the greatest impact on dust emissions.

It is predicted that most of the dust generated will be deposited on the Project area itself and on the mountainous plateau to the south-west of the mine. Forecasts of dust deposition are based on several factors including wind speed and direction.

All particulate concentrations will be less than 20 % (Project emissions in isolation) and 40 % (cumulative, including background emissions) of their assessment criteria and the impact of particulate emissions from the Project was assessed to be low.

The modelling of dust dispersion identified the sources of dust during the Project's operations and estimated the concentrations at different locations within the Study Area. Using dust deposition modelling and data on the content of uranium and thorium in the source material of the dust, concentrations of contaminants of potential concern (COPC) at different locations in the Study Area were estimated.

The predicted levels of COPC in Project dust were then used to predict the change in concentrations of radionuclides in receptors as a result of the deposition of Project related dust. Concentrations of (COPC) [*including the long-lived radionuclides in* ***the uranium decay chain*** *including uranium-238 (U-238) as well as thorium-230 (Th-230), radium-226 (Ra-226), lead-210 (Pb-210) and polonium-210 (Po-210)* ***as well as the thorium-232 (Th-232) series****, which includes radium-228 (Ra-228) and thorium-228 (Th-228)*] were estimated at different locations in the Study Area.

The predicted levels of COPC in the dust were then used to predict the change in concentrations of radionuclides in receptors because of the deposition of Project related dust.

Based on the predicted cumulative concentrations of COPC in soil and plants (i.e. background and Project-related), the predicted concentrations in selected animals that inhabit the various terrestrial habitats of the Study Area were determined. The calculation of the concentration of COPC in each species was determined by considering the species' diet, the time spent in the Study Area and the estimated concentrations of radionuclides in the diet.

Concentrations were modelled for selected terrestrial birds and mammals at a number of locations within the Study Area. The concentrations are all low and are at or below levels of detection.

Based on the concentrations of COPC the radiation dose for these species was then estimated, the dose being the amount of radiation energy absorbed.

The dose was estimated using the calculated concentration of COPC in plants and animals and a dose co-efficient, which accounts for radiation and tissue weighting factors, metabolic and bio-kinetic information. Values for dose coefficients were sourced from the ERICA tool

which were derived from the Framework for Assessment of Environmental Impact (FASSET, https://cordis.europa.eu/project/id/FIGE-CT-2000-00102).

The final step in radiological assessment is the calculation of the screening index value (SIV). This is calculated by dividing the total dose rate (background plus Project) received by a receptor (for example a bird) by the relevant reference dose limits [noted in the previous paragraph.

If the SIV is below 1, the calculated dose is below the reference dose limit and, therefore, the threshold for the potential for significant effects on the population at large will not have been reached.

The SIVs for marine animals and plants [at points in the adjacent fjord], for terrestrial plants and animals and for a selection of birds were well below the threshold level of 1.

The Project is expected to release only small amounts of additional radioactivity in dust to the environment and is not expected to result in an adverse effect, or significant harm, to plants, animals or humans either living in or visiting the area. The potential radiological impacts of the Project on plants and animals in marine, freshwater and terrestrial habitats are assessed as very low. The estimated dose to all these receptors is below benchmark values as seen in the SIVs.

Concern 14 "The Kuannersuit mine could also contaminate and damage the lands used by the local Inuit community, for example sheep farms"

The design and layout of the Project have been designed to minimise social and environmental impact.

The impact of Project on the physical environment was addressed in Chapter 7 [Physical environment] of the EIA. All of the conclusions presented in the EIA are supported by reports of independent experts commissioned by the company. The social impacts of the Project are addressed in the SIA.

Construction and operation of the Project have the potential to have the following impacts on the physical environment:

* Physical alteration of the landscape and reduced visual amenity
* Erosion
* Noise
* Light emissions

The Project will produce localised landscape alterations which will be visible to varying degrees from various vantage points in the vicinity of Narasq. Some of the alterations will be permanent while others will be removed or ameliorated at the end of the Project's life.

The most significant alterations will be development and construction of:

* The mine and stockpiles for material that is mined but not processed
* The processing facility, located in the vicinity of the mine

* The tailings storage facility
* A port
* A road from the port to the mine
* Permanent employee accommodation adjacent to the town of Narsaq.

Most construction works will take place in areas with consolidated rock. There are very limited soils or clays within the Project area and as a result, limited erosion is anticipated as a result of earthworks and construction activities.

The minimum natural background noise level is 30 dB(A) in the Project area. The Project will create additional noise the level of which will vary over the life of the Project.

Noise modelling was undertaken using SoundPlan software and noise level distribution indicates that the areas where the noise levels will exceed the minimum natural background noise level will be limited to the mine/plant areas, the upper parts of the Narsaq valley close to the mine/plant areas, the port and its immediate vicinity and, depending on the terrain, for between 800 and 1,200 m on either side of the road connecting the port and the mine/plant area.

Modelling results also assessed the noise level anticipated at noise sensitive receptors located in the Narsaq valley and town. The Project-related traffic noise levels calculated for the houses closest to the port-mine road are below the Danish limit for daytime noise for summer housing but above the evening and night limit.

The noise level in the residential areas of Narsaq, and at the Village, will meet the Danish noise guidelines for areas with mixed residential and business development, and the day and evening guidelines for open and low-housing developments in the day and evening, but is not expected to meet the night-time limit.

The environmental impact of Project on lands used by residents of Narsaq, the majority of whom self-identify as Inuit, was addressed in Chapter 13 [Local use and cultural heritage] of the EIA. The conclusions presented in the EIA are supported by reports of independent experts commissioned by the company.

As described in detail in the SIA, the Project is located approximately 8 km north of Narsaq and in the vicinity of the Project are a cattle farm and summerhouses in the lower part of the Narsaq valley.

Local use studies, undertaken in 2011 and 2015, identified hunting and fishing as livelihood activities in the Narsaq area, providing an important source of income and subsistence to many families. Most local fishing activity takes the form of small-scale operations in the fjords around Narsaq. A small number of people hold commercial fishing licences and sell their catch. Fishing in the lower parts of Narsaq river is also popular.

Fishing will be prohibited in two “no hunting” security zones, one in the bay in which the Project’s port will be located and the other near the outlet in the fjord to the north of the Project for treated Project water. The zones, the extent of which will be agreed with relevant local authorities, would not be expected to have any impact as there is limited fishing in these locations.

Although less significant as a commercial activity, seal hunting is an important source of income via the private sale and distribution of seal meat. Seal hunting is also important for subsistence for many families in Narsaq. Seals are hunted in the fjords around Narsaq, and no significant restrictions in seal hunting are expected except for the security zones. The impact of the zones has been assessed as low as it is a small reduction in the available seal hunting area.

During winter, some ptarmigan and hare hunting, for primarily recreational purposes, occurs to the north-east of Narsaq.

Gemstone fossicking, primarily for commercial jewellery or personal souvenirs, takes place throughout the Study Area. The semi-precious stone tugtupit is by far the most popular target for fossickers. For security reasons access to the mine and processing plant area will not be permitted and this will limit access to some tugtupit fossicking areas. There are other locations in the area where these semi-precious gemstones are found, and arrangements will be made to allow fossicking in affected areas prior to restrictions being put in place.

Tourism in and around Narsaq is relatively limited. Most tourists usually arrive at Narsaq as part of a south Greenland tour, and the focus of the visit is activities within the town or kayaking in the fjords. However, some tourists come on their own, stay at the small hotel in town and visit the Narsaq valley.

A large proportion of the inhabitants in Narsaq make use of the Study Area for recreational activities. While there will be access restrictions in the immediate vicinity of Project activities, most of the valley and the waters around the Project will remain available to residents of Narsaq for recreational use.

A terrestrial “no hunting” security zone will be established around the Project area to avoid accidents. The extent will be agreed with local authorities in advance of Project activities.

Residents of Narsaq pick crowberries and bilberries in late summer and autumn. Except within the working area of the road between the mine and the port, Project activities will have a limited direct impact on berry picking activities.

Walking, running, hiking and, to a lesser extent, driving are currently popular recreational uses of Narsaq valley among Narsaq residents and tourists. For safety reasons driving and hiking on the road between the port and the mine will not be permitted. The mine, processing plant and associated facilities, including the tailings storage facility, will also be closed for the public.

Kayaking is a popular activity, particularly amongst tourists. With Port utilisation not expected to exceed 20 %, impacts to kayaking safety are not expected to be significant, however an alternative “put-in” point may need to be located for aesthetic reasons.

There are two farms in the Study Area, a cattle farm in the Narsaq valley and a sheep farm at Ipiutaq. The Ipiutaq farm also operates as a guest house and a gourmet kitchen. Ipiutaq is relatively isolated from the Project. The impacts of Project related activities on Ipiutaq farm have been assessed to be low and are summarised below.

Dust deposition can have an impact on vegetation via the coating of leaves with dust which in turn might have an impact on mammals and birds that feed on the affected vegetation. Based on observations of and research on caribou which was conducted in northern Canada it is suggested that a dust deposition threshold on the order of 0.16 g/m2/month might be

relevant for Arctic hare, sheep and birds such as the ptarmigan which feed on vegetation.

Modelling has shown that the area with dust deposition this threshold extends less than a few hundred meters from the mine. For all sensitive receptor locations dust deposition is below 0.11 g/m2/month. The potential dust deposition impact on vegetation and mammals (including sheep) and birds is assessed as low.

In respect of the impact of radionuclides, SIVs [see response to Concern 3] calculated for all species were well below 1 indicating that the Project is not expected to result in an adverse effect or significant harm to plants, animals or humans either living in or visiting the area. The supporting expert analysis specifically included consideration of sheep and their SIVs were also found to be 0.017 at Ipiutaq farm.

The Project and the owner of the Narsaq valley cattle farm have conducted informal discussions in the past. Once the Project obtains an exploitation permit, steps regarding a negotiation between the Company and the owner of the farm regarding a possible acquisition of the farm can take place. It must be emphasized that at present no agreement has been made.

The EIA addresses the Project's environmental impacts, insofar as they relate to potential contamination, in Chapters 8 to 12. All of the conclusions presented in the EIA are supported by reports of independent experts commissioned by the company.

A detailed discussion of the relevant material in these chapters has been provided in response to Concern 3 and will not be repeated here.

Concern 15 "the management of toxic mining waste including radioactive rubble"

The EIA addresses the Project's environmental impacts, insofar as they relate to "toxic mining waste" and "radioactive rubble". A detailed discussion of the material relevant to a discussion of "toxic waste" is presented in Chapters 8 to 12 of the EIA. The conclusions presented in the EIA are supported by reports of independent experts commissioned by the company.

A detailed discussion of the material relating to "toxic waste" in these chapters has been provided in response to Concern 3 and will not be repeated here.

In respect of the reference to "radioactive rubble", the mining operation will involve conventional open pit mining via blasting followed by truck/shovel haulage. Ore will be transported to a processing plant to produce saleable products, mineral concentrates [rare earth and zinc], uranium oxide and fluorspar.

Overburden or waste rock, material from the mining operation which it is not economic to process, will be placed in a waste rock stockpile [WRS]. On average approximately three Mtpa of waste rock will be placed on the WRS which is to be located to the northwest of the mine.

Static and kinetic acid rock drainage and metal leaching prediction tests have shown little metal leaching potential in the waste rock. However, WRS run-off will be collected and used to supplement fresh-water requirements for ore processing. A channel will be excavated

around the toe of the WRS to collect the runoff and this water will be pumped to the concentrator.

Exposed surfaces of uranium bearing material (ore and waste rock) have the potential to release radon and thoron.

Most of the additional radon exposure will come from radon released from the open pit mining operations. The incremental level of radon arising from mining activities was estimated by combining the estimated sources with atmospheric dilution factors to predict levels which were then compared to background levels. The Project will increase background radon concentrations in Narsaq [the community 8 km to the SSE of the mine] by a maximum of 3 %. As these incremental radon levels are within the natural variation of background radon, the consequences of incremental radon exposure are negligible.

Concern 16 "the lack of documentation in the EIA of the risks posed by thorium"

The Company's EIA addresses the Project's radiological impacts in Chapter 9 [Radiological emissions]. The assessment of contaminants of potential concern (COPC), which is reported in Chapter 9 of the EIA, includes all of the long-lived radionuclides in the uranium decay chain **including uranium-238 (U-238) and thorium-230 (Th-230).**

Radiation is present everywhere in our environment. One source of radiation is naturally occurring radionuclides [atoms that emit ionizing radiation], which are present in all soils and rocks thereby creating a natural background radiation level in every location on the planet. Uranium and thorium are two of a number of naturally occurring radioactive elements that are widely distributed on earth.

Kvanefjeld ore contains elevated concentrations of uranium and thorium, approximately 300ppm and 800ppm respectively.

It is not meaningful to separate individual radionuclides for the purpose of identifying the impact of each individual radionuclide. Any reference in the EIA to the radiological impacts of the Project is a reference to the radiological impacts of the entire suite of radionuclides in the Project's ore, including thorium. Where an impact is addressed it is the cumulative impact of all radionuclides, including thorium.

See the response to Concern 18 for further detail regarding thorium as part of the entire suite of radionuclides in the Project's ore.

In Chapter 9 of the EIA there are also a number of particular references to the inclusion of thorium in the assessment of the radiological impacts and extensive reporting of the inclusion of thorium in the calculations to determine exposure levels for flora and fauna.

Concentrations of COPC in lichens, mammals and birds include calculations for thorium.

Concern 17 "the absence of long-term monitoring measures of radioactive thorium waste in Taseq lake"

The EIA addresses the management and monitoring of the Project's environmental impacts in Appendices A and C respectively.

Appendix A presents an outline of an Environmental Management Plan [EMP] for the Project and Appendix C presents a Conceptual Environmental Monitoring Program [CEMP] for the Project.

Long term monitoring of the level of radionuclides in the Project's tailings facility is included in the company's CEMP which however, as with the EMP, will not be confined to the "radioactive thorium waste in Taseq lake ".

The EMP will detail how the company intends to manage all environmental issues identified in the EIA. It will include commitments and management measures that that will be implemented to ensure that environmental risks are managed to an acceptable level. It will include information related to:

*	Project activity	The activity identified as having the potential to have an impact on or pose a risk to environment
*	Environmental impact	A description of the impact of the activity (such as pollution or disturbance of natural environment)
*	Action	The mitigating measure or actions identified to prevent or minimize the adverse environmental impact, and
*	Responsibility	The party or parties responsible for ensuring the mitigation is put in place.

The CEMP will monitor, in accordance with Greenlandic guidelines, the predicted residual environmental effects of the Project and the effectiveness of implemented mitigation measures. It will include monitoring of:

1. Air quality and dust

Air quality and dust monitoring will continue at established stations in the town of Narsaq and in the Narsaq valley. The results will be compared to baseline values as well as applicable guidelines. The parameters to be monitored will be agreed with the Greenlandic authorities but are expected to include:

* Dust deposition
* Concentration levels of particulate matter
* Radionuclide content of dust
* Radon, thoron and relevant decay products
* Gamma detection
* Nitrogen oxides
* Greenhouse gases

The sampling periods, the trace elements, major ions and radioisotopes to be analysed and reporting requirements are to be agreed with the Greenlandic authorities. The monitoring results will be submitted to regulatory authorities for review.

2. Sea and freshwater

Water quality

Monitoring of water quality and sediment will continue during the life of the Project. The sampling frequency, reporting requirements, parameters to be monitored will be defined in co-operation with the Greenlandic authorities.

It is expected that the water and sediment sampling will include radiological as well as non-radiological parameters. The radionuclide content of tailings pond water will be monitored to confirm modelled predictions.

Marine and freshwater biota

The marine and freshwater biota component of the EMP will provide detailed information regarding metal and radioisotope concentrations in selected key plant and animal species.

Hydrology

Surface water flow monitoring to:

- Monitor seasonal and annual flow patterns
- Support water management measures
- Refine the water balance, and
- Inform water quality modelling.

Water levels will be recorded continuously with a pressure transducer at automated stations, with calibration discharge measurements conducted at a range of flows during scheduled site visits.

3. Soil and terrestrial biota

To establish background concentrations of metals and radioisotopes in terrestrial habitats, samples of soil, lichens, grass and leaves of bushes have been collected since 2007 from stations at Kvanefjeld, Narsaq Valley and in a reference area.

Monitoring will continue and will include soil, snow lichen, grass and leaves of dwarf shrubs including Northern Willow.

4. The tailings facility

To provide on-going characterization of water quality in the tailings facility to confirm the predicted concentrations of metals in the tailings facility. Monitoring will also cover facility embankments including seepage.

Radiological and non-radiological parameters will be monitored.

5. Meteorology

Collection of meteorological data will continue as continuing meteorological data collection is required to verify design assumptions for water management systems and dust dispersal modelling.

The results will be used in air quality monitoring.

6. Narsaq drinking water

Drinking water quality in Narsaq is already monitored by the Greenland authorities. It will be recommended that this be extended to include relevant radiological parameters, total organic carbon, phosphorus and a number of bacteria.

Concern 18	**"Thorium, which is a more potent radioactive element than uranium, could remain on the site after closure of the mine and could potentially pollute local drinking water and jeopardise future agriculture and fishing in the region."**

The impact of the Project on the water environment and on local use and heritage were addressed in the company's EIA, Chapters 10 [Water environment] and 13 [Local use and cultural heritage] respectively. All of the conclusions presented in the EIA are supported by reports of independent experts commissioned by the company.

The Company takes issue with the assertion that thorium "is a more potent radioactive element than uranium".

Elements that emit ionizing radiation are called radionuclides. As a radionuclide emits radiation it "decays" and, as it decays, transforms into a different atom - a decay product. If the decay product is stable, radiation emission ceases. If the decay product is unstable, it will continue to emit radiation and will transform into a new decay product. This process will continue until the daughter is stable.

Most radionuclides only decay once before becoming stable. Those that decay in more than one step are called series radionuclides. The series of decay products created to reach this balance is called the decay chain.

Each series radionuclide has its own unique decay chain. The chain has a "head" element and decay products, always radioactive, each of which has a specific decay rate.

The radioactivity produced by a series radionuclide element is the sum of the radioactivity released by the "head" of the decay chain and all of the decay products. Uranium-238 and Thorium-232 are head of chain elements. Uranium-238 has 13 daughters after which it decays into a stable form of lead. Thorium-232 has 9 before it also decays into a stable form of lead.

The specific radioactivity of each radioactive element [head and decay products] in a decay chain is known. The sum of the specific radioactivity of the U-238 decay chain is 173,600 Bq/g and for Thorium-232 is 41,000 Bq/g. On this basis uranium [including its decay chain] is 4+ times as radioactive as thorium.

Project ore contains approximately 300 ppm uranium and 800 ppm thorium. Over time natural processes, such as glaciation and wind and water erosion, have dispersed uranium and thorium into the surrounding environment, including the Narsaq valley.

Thorium contained in the ore is not recovered into saleable products in the processing plant and is deposited in the Project's TSF. Waste rock, mined together with ore, contains significantly lower concentrations of uranium and thorium in a host rock that is significantly less susceptible to weathering than lujavrite, the host-rock for the Project's orebody. Waste

rock will be stored in the WSR.

At the end of the Project, tailings will remain in the TSF and waste rock in the WSR.

During the operation of the Project, aerosols originating from the TSF are a potential source for the dispersion of radioactive elements. However, given prevailing wind directions (easterly and north easterly), local topography separating the source of aerosols from the area used for abstraction of raw water to Narsaq water supply, (the ridge south of the valley is more than 200 m above the source), modelling indicates that deposition of aerosols from the TSF into the catchment for Narsaq's drinking water will be limited. Modelling of extreme wind events demonstrates that the quantity of uranium potentially deposited in the Narsaq drinking water catchment will remain well below World Health Organization (WHO) drinking water quality guidelines.

The EIA examines, for three scenarios, the impact of potential release of material stored in tailings facilities. In the response to Concern 3 above ["insufficient documentation and recognition of environmental risks of toxic and radioactive pollution and wastes "] these potential impacts have been discussed.

In the response to Concern 14 above ["The Kuannersuit mine could also contaminate and damage the lands used by the local Inuit community, for example sheep farms"] the Project's potential impact on future agriculture and fishing in the region have been discussed.

Concern 19	**"concerns that the mining Project could result in Kujaata being placed on UNESCO's World Heritage in danger list and eventually losing its designation"**

See response to Concern 4

As noted in response to Concern 1 above [Lack of access to adequate information] the Company has prepared a social impact assessment (SIA) for Project. It is a stand-alone document addressing the social impacts of the Project, but it should be read in combination with the Project's EIA for a complete analysis of the impacts of the Project.

The SIA describes how the Project has been designed and identifies and analyses the Project's salient impacts on society [positive and negative] and sets out how the Project will be implemented to minimise its adverse impacts and maximise its benefits. The SIA is the basis for negotiating an Impact and Benefit Agreement between the company, the GoG and the local municipality. The IBA specifically provides information on the:

* Use of Greenland labour
* Use of Greenlandic enterprises; and
* Extent to which processing of minerals will take place in Greenland.

The SIA has been prepared in accordance with "Social Impact - Assessment (SIA) Guidelines on the process and preparation of the SIA report for mineral Projects" published by the GoG.

According to the guidelines the SIA must contain, amongst other things:

* a description of social baseline condition in local communities and across Greenland
* an assessment of the Project's possible positive and negative social impacts
* a discussion about possible initiatives managing impacts regarding development opportunities, mitigation and derived effects
* a Benefit and Impact Plan [BIP] identifying programmes which will be implemented in order to maximize development opportunities and mitigate negative impacts
* a mechanism to monitor and evaluate the effects of the BIP

The SIA was reviewed and assessed by Greenlandic regulators and accepted for public review.

Concern 20	**"influx of predominantly male labourers who will not share local language and culture"**

Concern 21	**"Their integration into the small local community could be an additional challenge for the residents"**

Concern 22	**"that such a massive gender imbalance may result in sexual exploitation and abuse of women"**

The design and layout of the Project have been designed to minimise social and environmental impact.

Each of concerns 20, 21 and 22 primarily relate to the influx of a predominantly male workforce into the local community. A single response has been prepared to address these three concerns.

The impact of an influx of predominantly male labourers was addressed in the Company's

SIA in Chapter 7 - Impact Assessment, sections 7.3 - Employment and Labour Conditions, 7.7 - Community Health, Safety and Security and 7.8 - Social Structures and Community Life.

Development of the Project will require the recruitment of significant numbers of, predominantly male, foreign employees and Greenlandic employees who are not residents of Narsaq.

Project employees will be accommodated on the Project site and in the Narsaq environs during the life of the Project. These employees will interact to varying degrees with residents in Narsaq and other local communities.

The numbers of employees will vary with Project phases. approximately 1,170 during construction and approximately 720 during operations.

Of the construction workforce, approximately 200 are expected to be Greenlandic citizens who will commute to the Project. The foreign construction workforce will be accommodated in a temporary construction worker's camp, which will be constructed in proximity to the mine and processing plant.

During operations, the workforce will average approximately 720 of which approximately 330 are initially expected to be Greenlanders. Non-local employees will be housed in a purpose-built accommodation facility which will be constructed on the north-west edge of the Narsaq.

The introduction of a significant workforce into a relatively small community has the potential to generate a range of impacts, including:

* Social tension generated by a large non-local workforce
* Social tension generated by a "segregated" community on the outskirts of Narsaq
* A shortage of accommodation in Narsaq and communities in the Project's vicinity
* Cramped or low-quality living conditions for employees; and
* Changes to housing availability and rental prices in Narsaq.

The following measures are proposed to minimise the negative impacts and enhance the benefits associated with the proposed approach to accommodating the Project workforce:

* All workers will be required to agree to a code of conduct regulating their behaviour and interaction with the local community
* Maximising the use of Greenlandic labour in jobs affiliated with the accommodation facilities
* Setting accommodation standards that comply with international good practice
* Refurbishment of local housing stock in the Narsaq.

The introduction of an international workforce to a relatively remote regional centre has the potential to generate communicable disease impacts. Relevant diseases can include:

* Sexually transmitted diseases
* Tuberculosis and respiratory diseases which can be transmitted in close living conditions, and

* Communicable diseases previously uncommon to the region.

These impacts are largely common to most major infrastructure and resource extraction Projects. Drawing on this experience, the following measures will be implemented to reduce these impacts:

* Construction workers will be largely segregated from the town of Narsaq, minimising opportunities for interaction
* Operations workers will live within a security-controlled environment where non-workers will not be allowed to stay overnight
* All workers will be required to agree to a code of conduct regulating their behaviour and interaction with the local community
* The company will provide and will require its contractors to:
  - Conduct awareness raising exercises with their workforce on sexually transmitted diseases
  - Provide condoms for workers
  - Provide STD (including HIV) diagnosis and testing at the work-place clinic, and provide access to counselling, and referral services as necessary, and
  - Monitor workforce health outcomes and engage with health service providers to share data and develop campaigns to change behaviours, as necessary.
* The company will work with the Narsaq health service to develop public awareness campaigns on STD transmission and safe sex initiatives
* All employees (regardless of nationality) will be subject to pre-employment medical screens and regular health checks once employed
* The living conditions provided at the temporary construction camp and the Village will be designed to reduce the risk of TB transmission within the workforce, and
* The company will develop epidemic and pandemic management plans in accordance with GoG requirements.

The development of the Project is likely to act as an attraction for people to move to Narsaq and the Project area (project induced in-migration).

Un-managed in-migration can lead to a range of impacts, including:

* Overloading of existing services, e.g. health, education, public infrastructure
* Social tension between original residents and “new arrivals”; and
* Development of illegal or informal activities (e.g. prostitution, bars and gambling).

The likelihood of in-migration occurring at any significant scale is considered low for Kvanefjeld and the development approach proposed for the Project will naturally attenuate the tendency for in-migration for the following reasons:

* Use of a predominantly foreign workforce and fly-in fly-out workers will reduce the incentive for families and friends to accompany workers to Narsaq
* The Project’s ore is not suitable for small-scale or artisanal mining and as such, is unlikely to attract artisanal miners
* Modular construction used during construction will reduce Project related demand for small construction enterprises in Kommune Kujalleq particularly; and

* A segregated temporary construction workers camp and permanent security-controlled worker's accommodation will restrict opportunities for "camp follower" enterprises to develop (e.g. prostitution; bars and restaurants etc.).

Further to Project specific attenuation factors, Greenland presents its own factors, namely:
* Geographic isolation and controls over immigration, and
* The harsh weather conditions in winter.

While significant in-migration is not anticipated, the following measures will be put in place to manage in-migration impacts if they occur:
* Effective communication of the nature of employment opportunities and skills requirements, and
* Engagement with the local community and municipality to understand pressure placed on existing services and to develop a plan to reduce the pressure.

Concerns 2017 country report - Denmark

As noted in the communication of 19 April 2021, in the report of the official country visit to Denmark and Greenland of The Special Rapporteur on Toxics and Human Rights in 2017 [DCR] concerns were raised about the company's Project.

There is specific reference to 4 concerns, namely

DCR 1 "mining Projects are associated with a wide range of potential adverse human health and societal risks",

DCR 2 "could potentially contaminate and otherwise disturb areas used by the local indigenous community",

DCR 3 "an influx of migrant or temporary workers may be required. Special measures must be taken to ensure oversight of working conditions and to promote their integration into local communities", and

DCR 4 "The authorities ' ability to ensure the future close monitoring of waste and tailings dumps might be another source of concern"

Since the report of the country visit was issued, in accordance with processes and procedures enshrined in Greenland's legislative framework, the company has prepared social and environmental impact assessments for the Project. The assessments have been prepared in accordance with published guidelines.

The assessments, and all supporting material including the reports of independent experts, have been reviewed by the GoG and its advisers. Following this process of assessment, the GoG has approved the assessments for a period of public review.

The impact assessments address three of the concerns that you have identified as having been raised in the 2017 country report.

We have responded to 22 concerns that we have identified as having been raised by the OHCHR arising out of material that has been presented to it [see concerns 1 -22 above]. The information that we have gathered to answer the 22 concerns contains material which responds to each of the issues raised country report concerns so we will not repeat it but will rather direct you to the place in this document where the relevant material is located.

Material presented elsewhere in this document responds to the

DCR 1 **"mining Projects are associated with a wide range of potential adverse human health and societal risks"**

Please refer to the material presented in response to Concerns 3, 6, 11, 12 and 15

DCR 2 **"could potentially contaminate and otherwise disturb areas used by the local indigenous community",**

Please refer to the material presented in response to Concern 12 and 13

DCR 3 **"an influx of migrant or temporary workers may be required. Special measures must be taken to ensure oversight of working conditions and to promote their integration into local communities",**

Please refer to the material presented in response to Concern 20, 21 and 22

DCR 4 **"The authorities ' ability to ensure the future close monitoring of waste and tailings dumps might be another source of concern"**

This is not a concern to which the company can respond.

Special concern

"regarding the potential high levels of contamination by a wide range of substances in the traditional food sources of communities in Greenland"

Your letter also refers to an additional special concern - **"Special concerns exist regarding the potential high levels of contamination by a wide range of substances in the traditional food sources of communities in Greenland".**

Please refer to the material presented in response to Concerns 3, 6, 11, 12, 13 and 15 above. The discussion in these chapters is supported by, amongst others, the following reports prepared by independent consultants:

* Air Quality Assessment (ERM)
* Radiological assessment (ARCADIS Canada)
* Radiological Consequence Report Rev 2 (Arcadis)
* Hydrology and Climate (Orbicon)
* Natural Environment of the Study Area (Orbicon)
* Botanical Investigations Kvanefjeld (Simondsen)
* Radiological Consequence Report (Arcadis)
* Local Use Study (Orbicon)
* SIA (Shared Resources)

In 2017, 37 farms were reported to be operating in Kommune Kujalleq, of which two were reindeer farms and one was a cattle farm, with the remainder operating as sheep farms.

There are two farms in the Study Area, a cattle farm in the Narsaq valley and a sheep farm at Ipiutaq. The closest (the cattle farm) is in the Ilua Valley, about 4 km from the proposed mine site, and this farm transitioned from sheep to cattle a few years ago and in 2017 had between 150-160 head of cattle.

The Project and the owner of the Ilua Valley cattle farm have conducted informal

discussions in the past. Once the Project obtains an exploitation permit, steps regarding a negotiation between the Company and the owner of the Ilua Valley cattle farm regarding a possible acquisition of the farm can take place. It must be emphasized that at present no agreement has been made.

The next closest farm is located approximately 12 km to the east of the Project. This farm runs sheep, cultivates vegetables, and offers bed and breakfast facilities at a guesthouse. Analysis indicates that Project related activities are expected to have a limited impact on farming activities at Ipiutaq.

Reindeer farming activity undertaken at Tuttutooq (> 25 km from the mine site).

Berries and other plants are collected across the Study Area for personal consumption and sale in Narsaq shops. The berries which are gathered include crowberries (revling) and bilberries (mosebøllebaer). The best berry picking areas are considered to be in close proximity to Narsaq town.

Dust deposition can have an impact on vegetation via the coating of leaves with dust. Modelling has shown that the potential dust deposition impact on vegetation and mammals (including sheep) and birds is assessed as low. Detailed analysis has concluded that radionuclides in dust are not expected to result in an adverse effect or significant harm to plants, animals or humans either living in or visiting the area. The analysis included consideration of sheep at Ipiutaq farm.

Local use studies, undertaken in 2011 and 2015, identified hunting and fishing as livelihood activities in the Narsaq area, providing an important source of income and subsistence to many families.

Fishing will be prohibited in two “no hunting” marine security zones, but this is expected to have no impact as iceberg density in the location of the security zones makes fishing difficult. Char fishing in the Narsaq river can continue.

Seal hunting is an important source of income and for subsistence for many families in Narsaq. The impact of the marine security zones has been assessed as low as these areas represent a small reduction in the seal hunting area available to the Narsaq community.

During winter, some ptarmigan and hare hunting, for primarily recreational purposes, occurs to the north-east of Narsaq.

Annex 1

Studies performed by independent consultants include, amongst others, the following:

Physical environment

* Noise Assessment (Orbicon)]
* Hydrology and Climate Report (Orbicon)
* Probabilistic Seismic Hazard Assessment (KCB)

Atmospheric setting

* Air Quality Assessment (ERM)
* Greenhouse Gas Assessment (ERM)

Radiological emissions

* Radiological assessment (ARCADIS Canada)
* Uranium Product Transportation Assessment (ARCADIS Canada)
* Radiation Monitoring Plan Outline (ARCADIS Canada)
* Radon and Thoron Releases (ARCADIS Canada)
* Radiological Consequence Report Rev 2 (Arcadis)
* Risk Assessment Transportation (SENES)
* Wind Dispersion (Orbicon)
* Air Quality Addendum for Dam Failure Scenarios (ERM)
* Seismic Stability Assessment of FTSF and CRSF (KCB)
* Dam Failure Report (KCB)
* Closure Cover Options Comparison Assessment (KCB)
* Dry Closure Concept Design (KCB)

Water environment

* Hydrology and Climate (Orbicon)
* Tailings and Waste Rock Stockpile (Orbicon)
* Hydrocarbon and Chemical Spill Report (Orbicon)
* Natural Environment of the Study Area (Orbicon
* Preliminary Groundwater Impact Assessment from Tailings Facilities (GHD, Orbicon)
* Water Quality Assessment of Tailings Water and Waste Rock Run off (Orbicon)
* Marine Discharges and Fjord Dynamics - Modelling and Interpretation of Ecotoxicology Studies (DHI)
* Life of Mine Modelling (Water, Fluoride and Uranium - GoldSim) (GHD)
* Wind Dispersion (Orbicon)
* Taseq Basin Groundwater Hydrology (Orbicon)
* Fluoride Levels in Taseq Tailings Dam (Orbicon)
* Woods / AMEC (2017) TSF Environmental Risk Assessment
* Dam Failure Report (KCB)
* Seismic Stability Assessment of FTSF and CRSF (KCB)
* Seepage Technical Memorandum (Orbicon)
* Air Quality Addendum for Dam Failure Scenarios (ERM)

* Geochemical assessment of river water quality changes resulting from dam failure (KCB)

Waste management

* Geochemical/Environmental test work (SGS Lakefield Oretest)
* AMEC (2011) Project Tailings Management Options
* SRK (2015) Kvanefjeld Project Mining Study

Biodiversity

* Marine Discharge Ecotoxicity Test (DHI)
* Botanical Investigations Kvanefjeld (Simondsen)
* Hydrocarbon and Chemical Spill Report (Orbicon)
* The Natural Environment of the Study Area (Orbicon)
* Dam Failure Report (KCB)
* Radiological Consequence Report (Arcadis)

Local Use and heritage

* Local Use Study (Orbicon)
* Archaeological surveys (Kapel H)
* Archaeological surveys (Greenland National Museum and Archives)
* SIA (Shared Resources).