NIRB Application for Screening #125838

Real Ice - November Field Test with CHARS in Cambridge Bay, Canada

Application Type:	New
Project Type:	Scientific Research
Application Date:	7/6/2023 7:42:28 AM
Period of operation:	from 0001-01-01 to 0001-01-01
Proposed Authorization:	from 0001-01-01 to 0001-01-01
Project Proponent:	Cian Sherwin Real Ice Development Company Limited M-sparc Gaerwen Isle of Anglesey LL60 6AG United Kingdom Phone Number:: 07719148331, Fax Number::

DETAILS

Non-technical project proposal description

English: The project is testing scientific and engineering work around the preservation and restoration of sea ice in the Arctic Ocean. The importance of the Arctic sea ice for global climate as well as for local populations is well documented scientifically. We want to demonstrate that sea ice can be thickened up using simple devices incorporating a submersible water pump, and only using zero-emission energy. This is our second field test, after we completed, in February 2023, a test in Nome, Alaska, using a battery powered pump. In this phase we introduce hydrogen, as energy storage and a fuel cell, to transform the hydrogen to electricity and power and electric water pump. With the use of hydrogen, we can extend the operating time of the water pump. The submersible pump will be lowered through an ice hole (drilled with an ice auger) into sea water, and will pump a large amount of water on top of existing sea ice. This sea water will quickly freeze to thicken up the existing ice layer, potentially flooding any existing snow, and increasing the conductivity between the cold air and the sea ice itself, which will support additional ice accretion over the following period. During the test we will track a number of metrics, including the extent of water displacement, the quality and conductivity of the sea-ice created, and sea-ice, snow and air temperatures. We will be requiring (exclusive, as much as possible) access to a sea-ice area of around 5 acres. 2.5 acres will be used for our experiments, and 2.5 will be used as control area for comparison purposes. Ideally we would want to continue to monitor this area for the following winter months, to see the impact of our operations. As an example, by flooding 20cm of snow with sea water at the beginning of winter, we would expect an extra 70cm of sea ice thickness to form, compared to areas where we haven't operated.

French: Le projet a pour but d'effectuer des tests scientifiques et d'ingénierie évaluant la préservation et la restauration de la banquise en Arctique. En effet, l'importance la banquise en zone Arctique et l'enjeu majeur écologique que cela représente pour les populations locales mais aussi à l'échelle mondiale est supportée par de nombreuses études scientifiques.Nous souhaitons démontrer que l'épaisseur de la banquise peut être améliorée grâce à un procédé que nous avons développé. Nous supposons, que l'immersion de neige existante dans de l'eau de mer résulterait par accroître la conductivité entre l'air froid et la banquise elle-même. Par la suite, nous sommes confiants que ce phénomène aiderait à développer une couche de glace supplémentaire. Durant notre test, nous rechercherons divers nombres de métriques, notamment afin d'étudier dans quelle mesure l'eau se déplace mais également la qualité et la conductivité de la nouvelle couche de banquise formée. Les températures de l'air, de la neige et de la banquise seront aussi enregistrées. Dans la poursuite de cet objectif, nous demandons l'accès aussi exclusif que possible à une zone de 5 acres (soit 20.235m²), de banquise afin d'entreprendre nos expériences tout en réservant 2.5 acres (environ 10.000 m²), comme zone de contrôle et d'analyse comparative des résultats obtenus. Idéalement, nous recherchons à maintenir la surveillance de cette zone durant l'hiver prochain afin d'observer l'impact de nos opérations. Par exemple, en immergeant 20cm de neige avec de l'eau de mer au début de l'hiver, nous espérons pouvoir atteindre la formation d'une épaisseur additionnelle de 70cm de banquise par comparaison avec les zones non inclues dans nos recherches.

Inuktitut:

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Inuinnaqtun: Havaaghakkut hapkua qauyihainiaqtut ayuqnaqtunik hanatuyullu havaaghainik talvani hapummihimanahuaqtunit pitquhianullu utiqtittinahuaqlugu taryum hikua Ukiuqtaqtumi Taryuqmi. Aghuurnaqnia Ukiuqtaqtum Taryua nunaqyuami hilamut taimaalu nunallaarmiunut inugiangniinut titiraqhimayut ayuqnaqtunik qauyihaiyinit.Ilittuqhitiyumayugut taimaa taryum hikua hilighilaaqtuq atuqhutik ayuqnaittunik ingilrutinik iliuraiyumik kivitaqtumik imaqmik pakpautinik, taimaalu anialattihimaittumik amirnaqtunik. Hapkua tukliriyaqqut maniqqami qauyihautikput, iniqhimaliqmat, Iidjirurvia 2023-mi, qauyihaihimayut Nome-mi, Alaska-mi, paatulituqtumik pakpautiqaqhutik. Talvuuna havaaghaigut ilittuqhitihimayut hydrogen-mik, taimaa huanngautinik tutquumaviktut uqhiqhiviktullu, nuutittiyaamik hydrogen-mik alruyaqtuqtunut qulliqtuutinullu alruyaqtuqtumullu imaqmik pakpautimut. Atuqhutik hydrogen-mik, kingighivaalliinnarialik aulapkaiviat imaqmik pakpautainik. Kivitaqtuq pakpautik kivipkaqtitauniaqtuq aglukkut (ikuutaqhimayuq ikuutakkut) talvani taryumi, imaqquqtuyumik pakpakkut imiqtarahuat qaanganut taryum hikua.Una taryum hikua qilamik qiqinniaqtuq hilighilugu hikuuyuq, imaukkautilugu aputik aputiqaqqat, hangutitaiplugu niklaumayuq anuri taryuplu hikua, taimaa hakugighautauniaqtuq hikumik kinguani. Qauyihaitillugit paqittihimanahuaqtaqqut kititjutiit, taimaalu imaukkarnia, qanuriningnianik hakugingnianiklu taryumi hikuliuqhimayuq, taryuplu hikua, aputik hilaplu niklaumania.Atuqtitauyumayugut (anginiqhakkut, ayuqnaitpat) taryum hikuanik aktigiyumik 5 acres-mik. 2.5 acres atuqtauniaqtuq qauyihaivighaq, 2.5 acres-lu atuqtauniaqtuq munaqhiviktut aallatqiingniinik qauyihaivighaat. Ayuqnaitpat munarihimmaarumayaqqut hamna atuqtughanit ukiumi tatqiqhiutinit, mihingnautait havaaqqut takuyumaplugu. Ilittuqhitikaffuktut, imaukkautiplugu 20 cm aputik taryumik imaqmik ukiulihaaqtumi, taimaa naahuriniaqtugut 70 cm-mik hilingnianik hikunnguriamik, aallanngayunik nayugaqnit havakvigihimaitaptingnik.

Personnel

Personnel on site: 5

Days on site: 10

Total Person days: 50

Operations Phase: from 2023-11-14 to 2023-11-24

Activities

Location	Activity Type	Land Status	Site history	Site archaeological or paleontological value	Proximity to the nearest communities and any protected areas
Real Ice - CHARS Testing Area on Sea Ice (Exact area within polygon TBC by CHARS)	Scientific/International Polar Year Research	Marine	We will be seeking guidance from CHARS to operate at a site that does not present any disruption to residents or wildlife whilst also mitigating any damage to the environment. Guidance from local authorities will be needed to avoid known pathways/trails on the sea ice as well as hunting grounds for local residents.	We will operate in an area that not contain any archaeological/paleontological value.	Real Ice will be conducting research on the sea ice off the coast of Cambridge Bay within 10km of the CHARS facility.

Community Involvement & Regional Benefits

Community	Name	Organization	Date Contacted
Cambridge Bay	Robert Cooke & Rachel Mandel	Canadian High Arctic Research Station	2023-03-23

Authorizations

Indicate the areas in which the project is located:

Kitikmeot

Authorizations

Regulatory Authority	Authorization Description	Current Status	Date Issued / Applied	Expiry Date
Hunters and Trappers Associations/Organizations	Will need authorization and guidance to ensure minimal impacts to local wildlife and environment that could harm food availability for the local community.	Not Yet Applied		
Nunavut Research Institute	We have been advised to submit a research proposal with the NRI in order to conduct research in Nunavut.	Not Yet Applied		
Kitikmeot Inuit Association	We will need to meaningfully engage with local indigenous populations in Cambridge Bay before, during and after the research has taken place.	Not Yet Applied		

Project transportation types

Transportation Type	Proposed Use	Length of Use
Water	Snow-machine rented/used from the CHARS facility to travel on to the sea ice. Required licences & training to be acquired by team member(s) before conducting research.	
Land	Pick-up truck/ATV's. Suitable transport will be needed for 3 people and equipment when travelling on roads/land.	

Project accomodation types

Other,

Material Use

Equipment to be used (including drills, pumps, aircraft, vehicles, etc)

Equipment Type	Quantity	Size - Dimensions	Proposed Use
Water Pump	1	10inx19in	Pumping seawater on to the surface of sea ice
Fuel Cell Power Station	1	26inx20inx16in	Power supply for pump

Detail Fuel and Hazardous Material Use

Detail fuel material use:	Fuel Type	Number of containers	Container Capacity	Total Amount	Units	Proposed Use
Other	fuel	14	29	406	Liters	Hydrogen gas

Water Consumption

Daily amount (m3)	Proposed water retrieval methods	Proposed water retrieval location
0		

Waste

Waste Management

Project Activity	Type of Waste	Projected Amount Generated	Method of Disposal	Additional treatment procedures
Information is not available				

Environmental Impacts:

Scale of Test - We designed this test to be on a scale small enough that does not present any impacts across any of the physical, biological and socio-economic elements. Noise Pollution affecting Wildlife - Our prototype is designed to run almost silently with the noise of water flooding the sea ice dominating. Hunting grounds disruption - Having a presence or conducting activities in known hunting grounds could disrupt food availability for the local community. Guidance from the local HTO will aid in the selection of a site with minimal impacts. Sea Ice Trails/Pathways - Blocking routes across the sea ice could disrupt local communities. By including the community and Kitikmeot Inuit Association in this process, we can choose a site that presents no impact on transportation across the sea ice.

Additional Information

SECTION A1: Project Info

SECTION A2: Allweather Road

SECTION A3: Winter Road

SECTION B1: Project Info

SECTION B2: Exploration Activity

SECTION B3: Geosciences

SECTION B4: Drilling

SECTION B5: Stripping

SECTION B6: Underground Activity

SECTION B7: Waste Rock

SECTION B8: Stockpiles

SECTION B9: Mine Development

SECTION B10: Geology

SECTION B11: Mine

SECTION B12: Mill

SECTION C1: Pits

SECTION D1: Facility

SECTION D2: Facility Construction

SECTION D3: Facility Operation

SECTION D4: Vessel Use

SECTION E1: Offshore Survey

SECTION E2: Nearshore Survey

SECTION E3: Vessel Use

SECTION F1: Site Cleanup

SECTION G1: Well Authorization

SECTION G2: Onland Exploration

SECTION G3: Offshore Exploration

SECTION G4: Rig

SECTION H1: Vessel Use

SECTION H2: Disposal At Sea

SECTION I1: Municipal Development

Description of Existing Environment: Physical Environment

We are working with CHARS and the community to identify the site to conduct testing in order to minimise impact with any existing roads/trails, marine routes, etc. that are in existence at present time

Description of Existing Environment: Biological Environment

We are working with CHARS and the community to identify the site to conduct testing in order to minimise impact with any existing wildlife that are in existence at present time

Description of Existing Environment: Socio-economic Environment

The test area will be within 10km of the CHARS facility and therefore the Cambridge Bay community. No other significant socioeconomic elements will be impacted or within the test site.

Miscellaneous Project Information

Identification of Impacts and Proposed Mitigation Measures

Noise Pollution affecting Wildlife - Our prototype is designed to run almost silently with the noise of water flooding the sea ice dominating.Hunting grounds disruption - Having a presence or conducting activities in known hunting grounds could disrupt food availability for the local community. Guidance from the local HTO will aid in the selection of a site with minimal impacts. Sea Ice Trails/Pathways - Blocking routes across the sea ice could disrupt local communities. By including the community and Kitikmeot Inuit Association in this process, we can choose a site that presents no impact on transportation across the sea ice.

Cumulative Effects

Our activities take place in a localised area to test sea ice thickening using a water pump and therefore would not generate any significant impacts on the environment.

Impacts

Identification of Environmental Impacts

	PHYSICAL	Designated environmental areas	Ground stability	Permafrost	Hydrology / Limnology	Water quality	Climate conditions	Eskers and other unique or fragile landscapes	Surface and bedrock geology	Sediment and soil quality	Tidal processes and bathymetry	Air quality	Noise levels	BIOLOGICAL	Vegetation	Wildlife, including habitat and migration patterns	Birds, including habitat and migration patterns	Aquatic species, incl. habitat and migration/spawning	Wildlife protected areas	SOCIO-ECONOMIC	Archaeological and cultural historic sites	Employment	Community wellness	Community infrastructure	Human health
Construction																									
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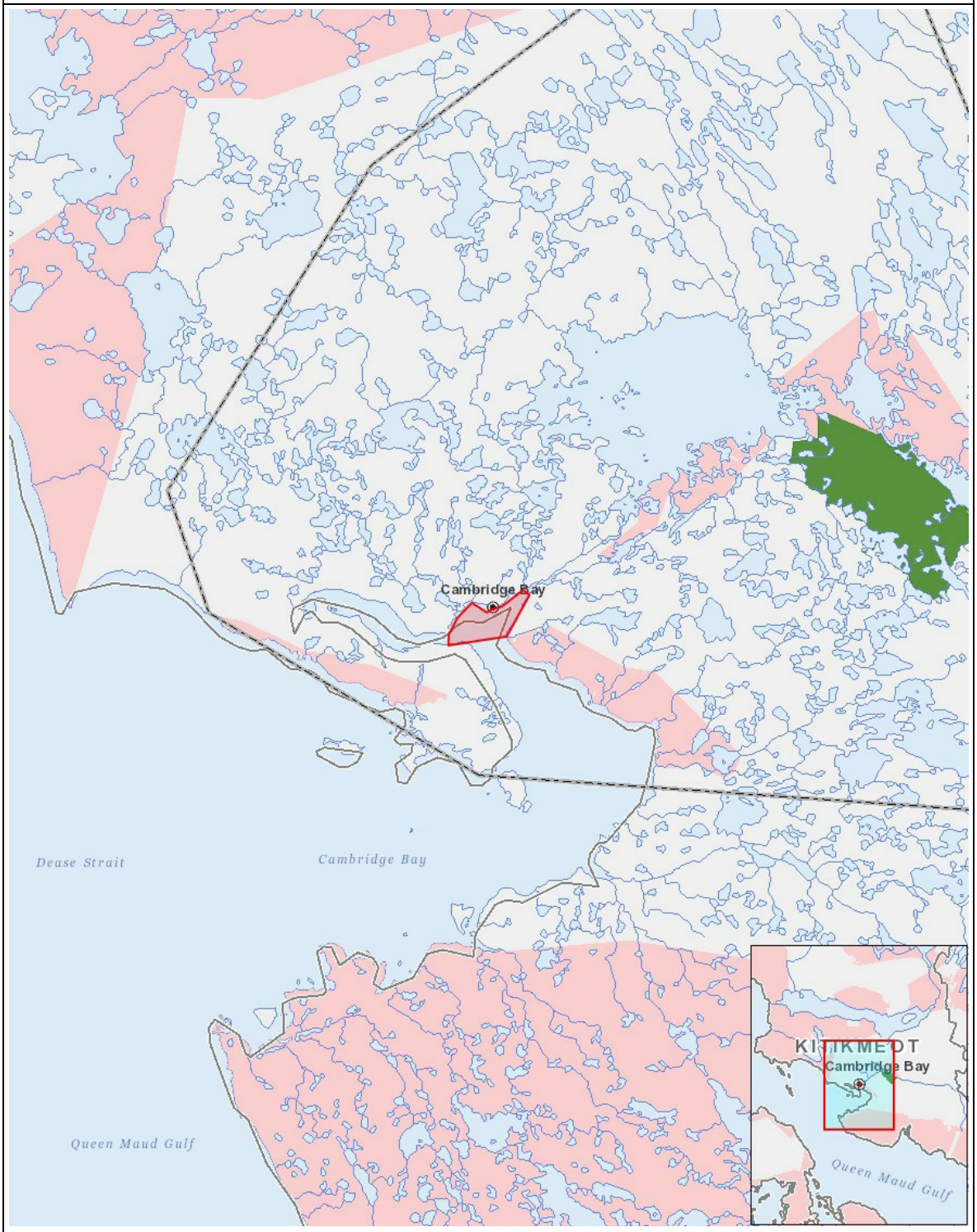
Operation																									
Scientific/International Polar Year Research		M	-	-	-	U	U	-	-	-	-	M	M		-	M	-	M	M		-	-	P	-	-
Decommissioning																									
Scientific/International Polar Year Research		M	-	-	-	U	U	-	-	-	-	M	M		-	M	-	M	M		-	-	P	-	-

(P = Positive, N = Negative and non-mitigatable, M = Negative and mitigatable, U = Unknown)

Project Location



List of Project Geometries

1 polygon Real Ice - CHARS Testing Area on Sea Ice (Exact area within polygon TBC by CHARS)