CANADA-NUNAVUT GEOSCIENCE OFFICE
BUREAU GÉOSCIENTIFIQUE CANADA-NUNAVUT
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KANATAMI-NUNAVUMI GEOSCIENCE TITIGAKVIIT

Appendix A

Hall Peninsula Integrated Geoscience (HPIG) project

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626 ᑐᓴᐅᓪ ᐃᓕᓴ, ᑎᑎᕋᖅᑯᓕᖅ 2319 ᐃᖃᓗᐃᓕ, ᓄᓇᕗᑦ X0A 0H0 ᐅᖃᓕᑕᐅᑎᓪᓗᒍ: (867)975-4412 ᓴᖅᑭᖅᑯᑭᐅᑎᓪᓗᒍ: (867)979-0708
ᖃᕆᔨᐅᔾᔪᑯᑦ ᑐᕿᓯᑎᓪᓗᒍ: Nunavut.Geoscience@nrcan.gc.ca

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1. Introduction

The Hall Peninsula Integrated Geoscience Project is being coordinated by the Canada-Nunavut Geoscience Office and will be delivered in collaboration with partners from the Geological Survey of Canada, universities, industry and Federal and Territorial governments. It will strive to use local Inuit-Owned businesses and hire Nunavummiut. Field work will be conducted during the summers of 2012-2013 with the possibility of an additional, less intensive, year in 2014 based from Iqaluit.

Large areas of Nunavut lack basic geoscience information – maps, data and modern geologic interpretations – required by resource companies to make efficient exploration and infrastructure development decisions. Hall Peninsula on southern Baffin Island represents one of these areas and was designated a mapping priority in the 2002 Nunavut Geological Needs Assessment.

The long-term outcome of this work is to reduce risks to exploration, resource development and land use planning on Hall Peninsula. It will provide framework geoscience information and address regional geological problems through bedrock, surficial and thematic studies. All information will be made publicly available using the latest in GIS and data dissemination technology.

2. Location of undertaking

The project will be conducted on all or parts of six NTS (scale 1:250 000) map sheets (see map 1). Specifically, these map sheets include 25 J, I, P and O and 26 A and B. The most intensive work will be conducted in map sheets 25O and 26B. Mapping will be conducted out of tent-based camps in map sheet 25 O (CNGO South Camp) in 2012 and map sheet 26 B (CNGO North Camp) in 2013. These camps will be located on Crown Land. Field work will be conducted approximately from June 20th to August 20th in 2012 and 2013. If an additional year happens in 2014, fieldwork will be based from Iqaluit.

Proposed 2012 camp location (CNGO South Camp) (see map 2):
UTM: 645579mE 7018263mN
DMS: 63°15'49.516"N 66°05'56.604"W
DD: 63.263754(N) -66.099056(W)
NTS Map Sheet No: 025O08 Scale: 1:50,000

Proposed 2013 camp location (CNGO North Camp) (see map 3):
UTM: 570990.10mE 7153337.46mN
DMS: 64°29'52.977"N 67°31'19.905"W
DD: 64.498049(N) -67.522196 (W)
NTS Map Sheet No: 026B05 Scale: 1:50,000

3. Description of undertaking

The proposed campsites are located on glaciofluvial terraces overlooking lakes (see maps 2 and 3). South Camp is located southeast of Iqaluit (~135 km) while North Camp is located northeast of Iqaluit (~95 km). Before field season, fuel and gear will be brought to the campsites by ski and/or wheel planes. We will be supplied (groceries, mail, etc…) approximately once every 14 days from Iqaluit by a Twin Otter aircraft equipped with tundra

wheels. We will have two helicopters in camp supporting up to 25 scientists and support staff. At the end of field season, everything will be brought back to Iqaluit by plane.

The main common tents are Weatherhaven models built with three layers, including insulation, covering an aluminum frames each outfitted with a diesel burning stove. The kitchen tent will consist of two 14'x16' tents arranged end-to-end. It will house the kitchen, dining facilities and food storage. Other communal Weatherhaven tents will include 2 office tents (end-to-end), a shower tent and a gear storage tent. Each person will have their own personal tent, which could be a Logan tent – double-walled canvas, single pole 10'x8' or another type of personal all-season tent. The pilots, engineer and cook will each have a 10'x12' gabled double walled canvas tents on an aluminum frame and outfitted with a diesel burning stove.

Kitchen equipment includes 3-4 propane-fired and/or electric refrigerators, 2 propane-fired stoves, an electric freezer, a professional mixer, pots/pans/dishes etc. Electricity to the kitchen and office tents will be provided by a 3500 or 5000 W diesel generator. Water for the kitchen and shower tents will be pumped from a local water source (nearby stream or lake) once or twice daily and stored in a 1000 L plastic container. We will use a gas pump equipped with a metal screen. On average, we expect to use between 500 L and 1000 L of potable water per day. Over the course of a 50-day field season the total amount is expected to be between 25m^3 to 50m^3. Greywater will be disposed of in pits that will be dug at least 35m from a water body and covered with fill on a regular basis. Similarly, pits for sewage disposal will be dug at least 50m from a water source and downstream/downslope from the potable water source.

The chief geologist will handle most of the camp logistics including safety issues, camp maintenance, daily phone calls to our expeditor, and management of camp staff. Meaningful and engaging community collaboration will be a very important factor in the success of the project. Ongoing interaction with the City of Iqaluit, Hamlet of Pangnirtung, QIA, HTA's and Arctic College is expected. We plan on bringing these organizations to visit our camp, our geologists and learn about recent results. We will use local businesses and hire local residents as often as possible.

4. ***Quantity of water involved***

We estimate the total daily water use between 500 and 1000 L per day (0.5 to 1 m^3/day). Water will be used for personal use (drinking and washing).

Water returned to source

<0.5 m^3/day

5. ***Waste***

Sewage:

- The quantity of sewage for a maximum of 25 people in camp at any one time is estimated around 100 L per day (0.1 m^3/day).
- Holes will be dug in the ground (gravel outwash) at least 50m from the nearest water source and downstream from the main camp. Tents and wooden structures will be used as toilet facilities and the holes will be filled as necessary.

Greywater:

- Greywater will be produced from washing dishes, showering and washing clothes by hand. All detergents used will be environmentally friendly and biodegradable.
- The quantity of greywater for a maximum of 25 people in camp at any one time is estimated around 400 to 500 L per day (0.4 to 0.5 m^3/day).
- Holes will be dug in the gravel outwash plain next to the kitchen and shower tents and at least 35m from the nearest water source. These holes will be filled in as necessary.
- All sleeping tents will be at least 150m away from the kitchen and shower tents.

Other:

- Non-combustible waste will be shipped out of the camp and disposed of at the City of Iqaluit municipal waste facility. All local authorizing organizations will be consulted prior to the field work to ensure the municipal waste site can accommodate additional refuse.
- Combustible waste will be incinerated in empty metal fuel drums equipped with a portable industry standard incinerator and the ashes will be cooled and buried.
- We will consult the local community to determine the best method of disposing the empty fuel drums. At minimum, they will be removed from the camp site and left with the community. If they are not needed by the community we will transport them out of the community to an approved storage or disposal site.

6. ***Options***

Locations of the proposed camps have been selected using aerial photos and by visiting them in August 2011. The sites were chosen because of their proximity to water, the possibility of landing a twin Otter on tundra wheels and their general location in the study area. Alternative sites, with similar attributes, are quite scarce in the study area.

7. ***Predicted environmental impacts and proposed mitigation measures***

No long-term environmental impacts are expected. With the permission of INAC and the QIA, we will set up a temporary, low-impact basecamp for the duration of the mapping project. Two helicopters (Bell 206L) and one ATV will be the only vehicles stationed at the camp. A temporary airstrip will be established for a Twin Otter to deliver supplies and personnel every 14 days, approximately. The site will be thoroughly cleaned following demobilization and everything brought back to Iqaluit. All combustible garbage will be incinerated and the chilled ashes will be buried. Non-combustible garbage will be shipped to the municipal landfill site in Iqaluit. A fuel cache will be established at the camp which will store no more than 220 drums of aviation fuel, 3 drums of diesel and 1 drum of gasoline. The fuel will be stored in a self-supporting insta-berm and spill kits will be close by.

8. ***Water rights of existing and other users of water***

The project will not affect the quality, quantity, or flow of water in the area. No other water rights user is known for the proposed camp areas.

9. Inuit water rights

The project will not substantially affect the quality, quantity, or flow of water flowing through Inuit Owned Lands.

10. Consultation

QIA and the City of Iqaluit personnel have already been consulted in October and November 2011 and so far no concerns habe been raised. Iqaluit HTA, Hamlet of Pangnirtung and Pangnirtung HTA will also be consulted before January 2012 and we will continue to keep QIA and the City of Iqaluit inform.

11. Spill contingency plan (November 2011)

11.1. Description of undertaking:

A fuel cache will be established at the camp which will store no more than 220 drums of aviation fuel, 3 drums of diesel and 1 drum of gasoline. The fuel will be stored in a self-supporting insta-berm. The base camp fuel cache will be inspected daily. Spill kits will be established at all designated refueling sites.

11.2. Petroleum storage, inventory & transfer:

Electrical pumps supplied by the helicopter contractors will be used for the transfer of Jet B aviation fuel. Smoking, sparks, or open flames are prohibited in fuel storage and fuelling areas at all times.

A manual pump will be used to transfer gasoline and diesel from drum to jerry cans, for use with 1000W and 5000W generators and the water pump.

Refuelling will be done in designated areas, all equipped with spill kits. Secondary containment will be used in areas of refuelling.

11.3. Risk assessment and mitigation of risk:

11.3.1 Petroleum products and other fuels

1) **Drummed products**: Leaks or ruptures may affect storage containers of petroleum products.
2) **Fuel containers**: Leaks or ruptures could affect plastic jerry containers holding gasoline at generator stations.
3) **Propane cylinders**: Propane leaks may occur at the valves of propane containers.

Regular inspection and maintenance in accordance with recognized and accepted standard practices at the camp will reduce any risks identified above. The large fuel cache at the camp will be inspected daily.

Propane tanks will be transported with appropriate Dangerous Goods documentation. Tanks will be stored and secured in an upright position. Valves will be checked regularly and sealed with teflon tape, where required.

Spill response training will be provided to all personnel in camp, with particular attention to those individuals who will regularly be handling fuels. The training will include a presentation, mock spill, review of spill kit contents and their use, and reporting.

Spill kits will be positioned at all refueling stations, including two designated locations for each helicopter, at the transfer point for gasoline from drum to jerry cans and at each generator location. A description of the contents and configuration of the fuel spill kits is provided in section 11.6

11.4. Responding to failures and spills

11.4.1 Spill response contact list

24 hour Spill Line
(867) 920-8130
http://env.gov.nu.ca/node/66

INAC Water Resources Inspector
Iqaluit, NU
(867) 975-4295

Environment Canada
Iqaluit, NU
(867) 975-4644
24-hour pager (867) 766-3737

GN-DOE
(867) 975-7700
Manager of Pollution Control and Air Quality
(867) 975-7748

Qikiqtani Inuit Association
Salamonie Shoo
Lands and Resources
P.O. Box 1340
Iqaluit, NU X0A 0H0
Tel: (867) 975 8422
Fax: (867) 979 1643

11.4.2 Basic steps – Spill Procedure

In the case of any spill or other environmental emergency, it is necessary to react in the most immediate safe and environmentally responsible manner. No spill or incident is so minor that it can be ignored and every spill must be reported.

The basic steps of the spill response plan are as follows:

1. *Ensure* the safety of all persons at all times.
2. *Identify* and find the spill substance and its source, and, if possible stop the process or shut off the source of the flow.
3. *Inform* the on-site coordinator or his /her designate at once, so that he/she may take the appropriate actions. Appropriate action includes the notification of the spill to the 24-hour Spill line and INAC Water Resource Officer, a copy of the Spill Report can be found in Addendum I.
4. *Contain* the spill or environmental hazard, as per its nature, and as per the advice of the Spill Line and the INAC Water Resource Officer as required.
5. *Implement* any necessary cleanup and/or remedial action.

11.4.3 Basic Steps – Chain of Command

1. *Immediately* notify and report to the 24-hour Spill Line at (867) 920-8130, and the Water Resource Officer at (867) 975-4295, Environment Canada personnel at (867) 766-3737, Qikiqtani Inuit Association Land Inspector at (867) 975-8422

2. ***A Spill Report Form (Addendum 1)*** is filled out as completely as possible before or after contacting the 24 hour Spill Line.

11.4.4 Other contacts for spill response/assistance and further reporting
Nunavut Water Board.....(867) 360-6338

Fisheries and Oceans Canada, Habitat Impact Biologist.....(867) 979-8007

Government of Nunavut Department of Environment.....(867) 975-5910

Qikiqtani Inuit Association, Land Use Inspector.....(867) 975 8422

11.5. Taking action:

11.5.1 Spill Response Actions for Gasoline and Jet B Aviation Fuel
Take action only if safety permits. Stop the source flow if safe to do so and eliminate all ignition sources. ***Never smoke*** *when dealing with these types of spills.*

On Land:
Build a containment berm using soil material or snow and place a plastic tarp at the foot of the berm for easy capture of the spill after all vapors have dissipated.
Remove the spill by using absorbant pads or excavating the soil, gravel or snow.
Remove spill splashed on vegetation using particulate absorbant material.
Contact regulatory agencies for approval before commencing with the removal of any soil, gravel or vegetation.

On Muskeg
Do not deploy personnel and equipment on marsh and vegetation.
Remove pooled gasoline or Jet B with sorbent pads and/or skimmer.
Flush with low pressure water to herd oil to collection point.
On advice from regulatory agencies, burn only in localized areas e.g., trenches, piles or windrows.
Do not burn if root systems can be damages (low water table)
Minimize damage caused by equipment and excavation.

On Water
Contain spill as close to release point as possible.
Use containment boom to capture spill for recovery after vapors have dissipated
Use absorbent pads to capture smaller spills.
Use skimmer for larger spills.

On Snow and Ice:
Build a containment berm around spill using snow.
Remove the spill using absorbant pads or particulate sorbent material.
The contaminated ice and snow must be scraped and shoveled into plastic buckets with lids, 205 liter drums, or polypropylene bags

Storage and Transfer
All contaminated water, ice, snow, soil and clean up supplies will be stored in closed, labeled containers. All containers will be stored in a well ventilated area away from incompatible materials.

Disposal

Any contaminated material will be shipped to a site to an appropriate and approved facility. The DOE monitors the movement of hazardous wastes from generators, carriers to receivers, through a tracking document (Waste Manifest). A waste manifest will accompany all movements.

11.5.2 Spill Response Actions for Propane

Take action only if safety permits. Gases stored in cylinders can explode when ignited. ***Never smoke*** *when dealing with these types of spills.*

On Land:
Do not attempt to contain the propane release
On Water
Do not attempt to contain the propane release
On Snow and Ice:
Do not attempt to contain the propane release

General
It is not possible to contain vapors when released
Water spray can be used to knock down vapors if there is no chance of ignition.
Small fires can be extinguished with dry chemical of CO2
Personnel should withdraw immediately from the area unless the leak is small and can be stopped immediately upon being detected
If tank is damaged, gas should be allowed to disperse and no recovery attempt should be made
Personnel should avoid touching release point on containers since frost forms very rapidly
Keep away from tank ends

Storage and Transfer
It is not possible to contain vapors when released

Disposal
Any contaminated material will be shipped to a site to an appropriate and approved facility. The DOE monitors the movement of hazardous wastes from generators, carriers to receivers, through a tracking document (Waste Manifest). A waste manifest will accompany all movements.

11.6. Spill Equipment:

Spill kits will be on site at all designated refuelling stations. Spill kits consist of:

- heavy PVC tarp, impermeable to jet B aviation and gasoline spills, sized in accordance with fuel containers (12x14' for drums of Jet B, 4x4' for jerry cans of gasoline at generator stations
- aluminum stakes to secure impermeable tarp to ground
- particulate absorbant
- petroleum sorbent pads
- 2 pair pvc gloves
- 2 pair safety goggles
- disposable bags
- 1 shovel
- fire extinguisher per spill site

11.7 Permits and Licences:

The applicant has applied for all necessary Land Use and scientific research permits and licences. These include:

Nunavut Research Institute.....Licence #:.....issued: in progress
Nunavut Impact Review Board....Report #:.....issued: in progress
INAC Landuse Permit.....Permit #:.....issued: in progress
Qikiqtani Inuit Association.....Landuse Permit.....issued: in progress
Nunavut Water Board.....Licence:.....issued: in progress

11.8. Contacts:

Project Proponent:

David Mate
Chief geologist
Canada-Nunavut Geoscience Office
626 Tumiit Plaza, Suite 202
Box 2319 / B.P. 2319
Iqaluit, Nunavut, Canada X0A 0H0
Tel: 867-975-4412
Blackberry: 613-282-3942
Fax: 867-979-0708
dmate@NRCan.gc.ca

Addendum 1

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR	REPORT TIME	☐ ORIGINAL SPILL REPORT, OR	REPORT NUMBER
B	OCCURRENCE DATE: MONTH – DAY – YEAR	OCCURRENCE TIME	☐ UPDATE # _____ TO THE ORIGINAL SPILL REPORT	____-____
C	LAND USE PERMIT NUMBER (IF APPLICABLE)	WATER LICENCE NUMBER (IF APPLICABLE)		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION	REGION ☐ NWT ☐ NUNAVUT ☐ ADJACENT JURISDICTION OR OCEAN		
E	LATITUDE DEGREES MINUTES SECONDS	LONGITUDE DEGREES MINUTES SECONDS		
F	RESPONSIBLE PARTY OR VESSEL NAME	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION		
G	ANY CONTRACTOR INVOLVED	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE)	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE	SPILL CAUSE	AREA OF CONTAMINATION IN SQUARE METRES	
J	FACTORS AFFECTING SPILL OR RECOVERY	DESCRIBE ANY ASSISTANCE REQUIRED	HAZARDS TO PERSONS, PROPERTY OR ENVIRONMENT	
K	ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS			

L	REPORTED TO SPILL LINE BY	POSITION	EMPLOYER	LOCATION CALLING FROM	TELEPHONE
M	ANY ALTERNATE CONTACT	POSITION	EMPLOYER	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION STATION OPERATOR	EMPLOYER	LOCATION CALLED YELLOWKNIFE, NT	REPORT LINE NUMBER (867) 920-8130

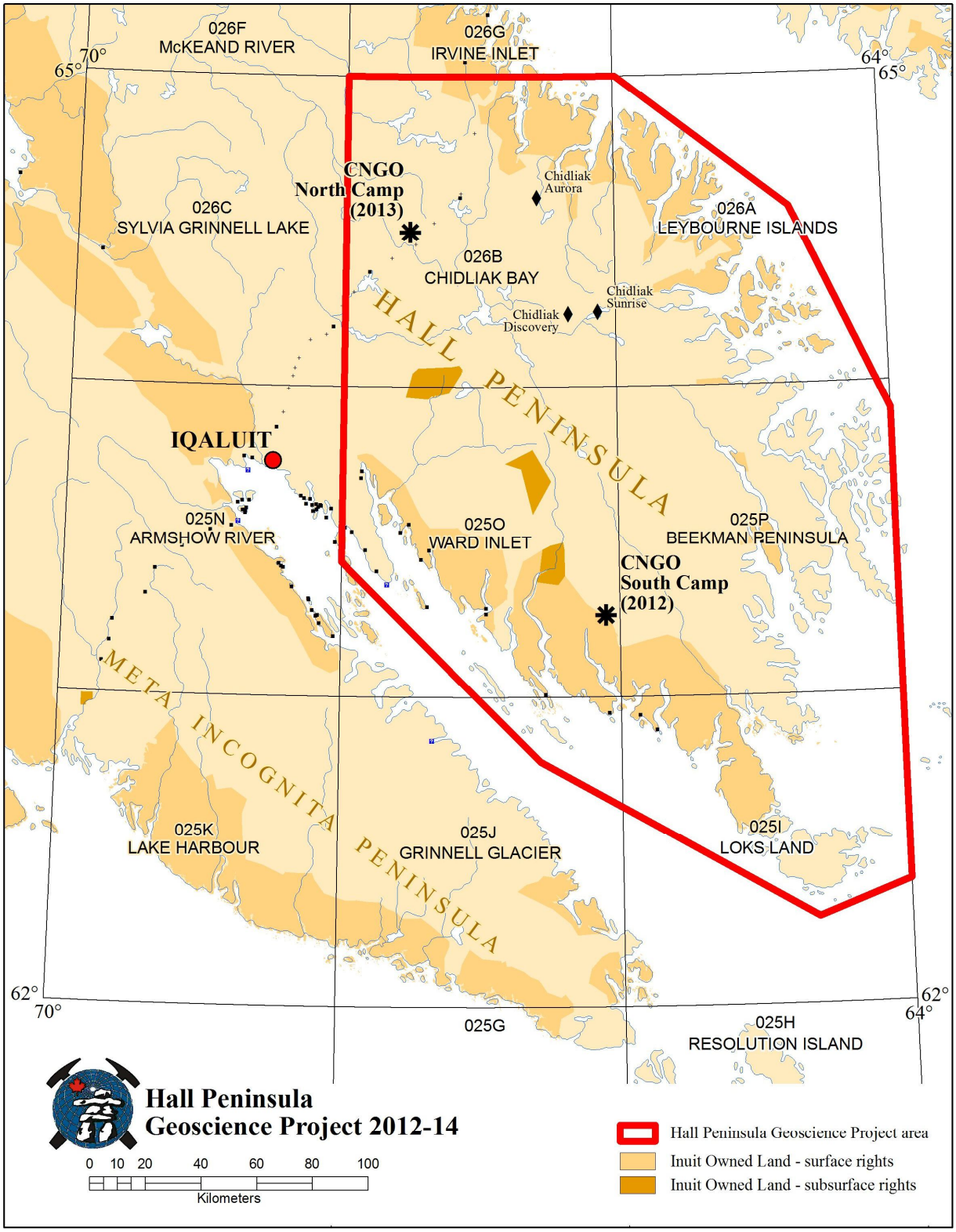
LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC	SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN	FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

PAGE 1 OF ____

12. Location maps

MAP 1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026G
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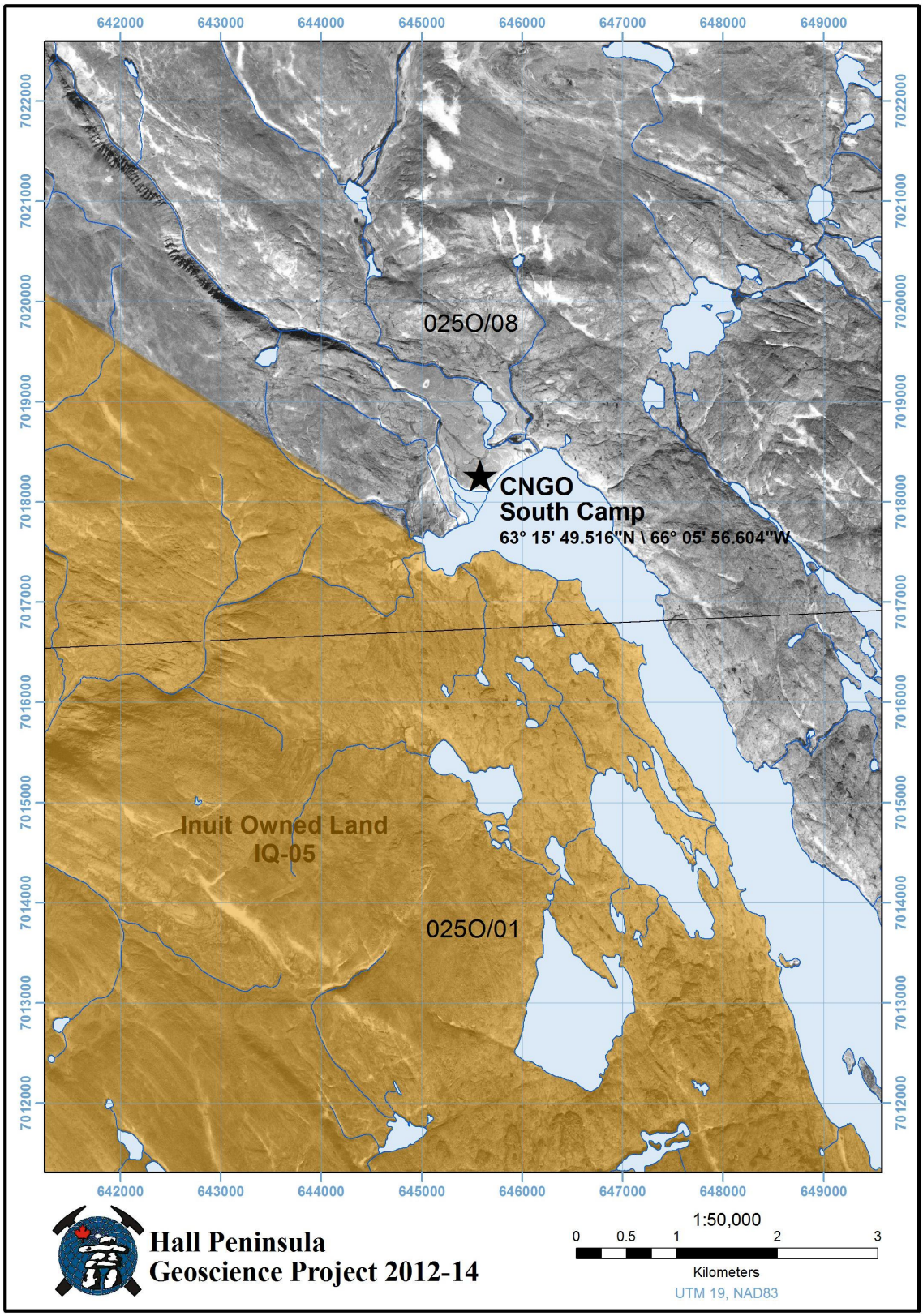
65°
64°
65°
CNGO
North Camp
(2013)
Chidliak
Aurora
026C
SYLVIA GRINNELL LAKE
026A
LEYBOURNE ISLANDS
026B
CHIDLIAK BAY
Chidliak
Sunrise
Chidliak
Discovery
HALL PENINSULA
IQALUIT
025N
ARMSHOW RIVER
025O
WARD INLET
025P
BEEKMAN PENINSULA
CNGO
South Camp
(2012)
META INCOGNITA PENINSULA
025K
LAKE HARBOUR
025J
GRINNELL GLACIER
025I
LOKS LAND
62°
70°
025G
025H
RESOLUTION ISLAND
62°
64°
Hall Peninsula
Geoscience Project 2012-14
0 10 20 40 60 80 100
Kilometers
Hall Peninsula Geoscience Project area
Inuit Owned Land - surface rights
Inuit Owned Land - subsurface rights

MAP 2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025O/08
CNGO
South Camp
63° 15' 49.516"N \ 66° 05' 56.604"W
Inuit Owned Land
IQ-05
025O/01
Hall Peninsula
Geoscience Project 2012-14
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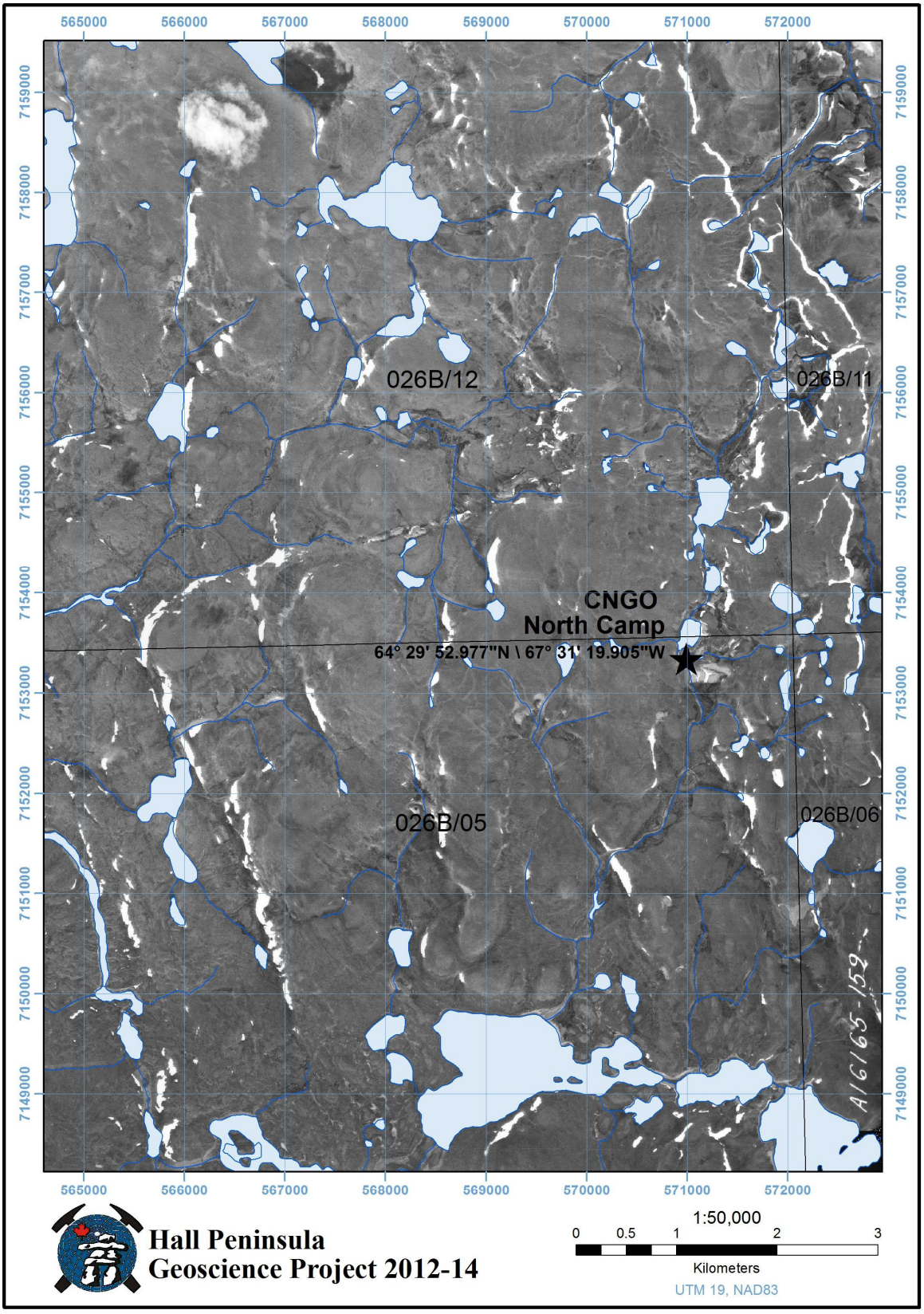
Kilometers
UTM 19, NAD83

MAP 3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026B/12
026B/11
CNGO
North Camp
64° 29' 52.977"N \ 67° 31' 19.905"W
026B/05
026B/06
A16165-159
Hall Peninsula
Geoscience Project 2012-14
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Kilometers
UTM 19, NAD83