Appendix A

Tehery-Wager Geoscience Project

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1. Introduction

The Tehery-Wager Geoscience Project is being coordinated by the Geological Survey of Canada in collaboration with partners from the Canada-Nunavut Geoscience Office and Canadian universities. Field work will be conducted during the summers of 2015 and 2016 (approximately from June 26th to August 7th), with a possibility of extending into 2017 if funding cannot be secured for 2016. Every effort will be made to use local Inuit-Owned businesses and hire Nunavummiut throughout the course of the project.

Large areas of Nunavut lack basic geoscience information – maps, data, and modern geological interpretations – required by resource companies, community agencies, and land-use planners to make efficient exploration and infrastructure development decisions. The Tehery-Wager area west of Hudson's Bay represents one of these areas and was designated a mapping priority in the Federal Government's 2013-2020 Geo-Mapping for Energy and Minerals Program.

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

2. Schedule of Activities

Mobilization of fuel at camp sites is planned to take place in March or April of 2015 and 2016. In 2015, mobilization of camp gear into the Lorillard camp site via Twin or Turbo Otter will take place between ~June 26-29th. Field work will be conducted out of the base camp between ~June 30th and August 3rd. Demobilization of the Lorillard 2015 camp will be conducted between ~August 4-7th using a Twin or Turbo Otter at which point camp will be completely removed. In 2016, our gear will be mobilized into the Nanuq camp by June ~29th. Field work will be conducted out of this camp between ~June 30th and August 3rd. Our gear will be completely removed from the Nanuq camp by August ~7th, 2016.

3. Location of undertaking and preliminary plan

The project will be conducted on all or parts of eight NTS (scale 1:250 000) map sheets (see location map). Specifically, these map sheets include 46 D and E and 56 A, B, C, F, G, and H. The area is known to support major habitats for the following species: caribou (i.e. Northeastern Keewatin caribou calving grounds), gyrfalcon, peregrine falcon, and polar bear (including denning areas). The proposed field work is designed to have minimal to no impact on wildlife or major habitats that support wildlife. Fist-size rock samples will be taken with a rock hammer. Glacial sediment samples (till) will

be collected from the soil surface (<30 cm depth) with a hand shovel. Following the sampling, the holes will be filled in with excavated sediments. Small stream sediment and water samples will also be collected. There will be no drilling or mechanical excavation. No other material will be collected while taking geological observations (i.e. plant specimens, fossils, fish, etc.). Helicopter flying (above 300 m altitude) will be done in a responsible manner to minimize any disruption of the wilderness, particularly the wildlife.

Several traditional or spiritual sites (e.g., Daly Bay area) containing structures such as tent rings and inuksuit are known to exist within the proposed map area. There are also two known carving stone quarries in the Daly Bay area (64°09.434'N, 89°43.881'W; 64°15.039'N, 89°47.196'W). The proposed field work will not result in any disturbance to historical/spiritual or carving stone sites, but efforts will be made to find new potential carving stone deposits within the project area.

Mapping will be conducted out of a temporary tent-based camp in map sheet 56 B (Lorillard Camp) in 2015 and out of an existing exploration camp in map sheet 56 G (Nanuq Camp) in 2016 (to be confirmed). These camps are located on Crown Land.

Proposed 2015 camp location (Lorillard Camp) (see map):
UTM: 638424mE 7168920mN, Zone 15
DMS: 64°37'0.86"N 90°06'18.73"W
DD: 64.616905°N -90.1052°W
NTS Map Sheet No: 056B09 Scale: 1:50,000

Tentative 2016 camp location (Nanuq Camp) (see map):
UTM: 589243mE 7235215mN, Zone 15
DMS: 65°13'40.80"N 91°05'27.60"W
DD: 65.228000°N -91.091000°W
NTS Map Sheet No: 056G03 Scale: 1:50,000

4. Options

Location of the proposed 2015 Lorillard camp has been selected using aerial photos and by visiting the site in July 2012. The site was chosen because of its proximity to water, the possibility of landing a Twin or Turbo Otter on tundra wheels and its general location in the study area. Alternative sites, with similar attributes, are very scarce in the study area. The tentative 2016 Nanuq camp has been chosen to minimize our footprint on the land.

5. Description of undertaking, camp infrastructure, and equipment

The proposed campsite for 2015 is located on an alluvial plain overlooking the Lorillard River, ~145 km north-northeast of Chesterfield Inlet and ~286 km east-northeast of Baker Lake (see map). Before the field season, fuel and gear will be brought to the campsite by ski and wheel planes, respectively. A small camp crew will set up our camp ~4 days before we start field work on June 30th, 2015. We will be supplied (groceries, mail, etc.) approximately once every 7 days from Chesterfield Inlet by a Twin or Turbo Otter aircraft equipped with tundra wheels. We will have one helicopter in camp supporting up to 15 scientists and support staff. On August 4-7th, at the end of the field season, everything will be taken down and brought back to its original source (Ottawa or other) by plane or sea lift. The kitchen/dining tent will consist of one 14'x32' tent on an aluminum frame. Other communal tents will include one 14'x32' office tent, a 14'x16' shower tent, and two 14'x16' storage tents (for gear and kitchen supplies). 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 pilot, engineer, and cook will each have a 10'x12' gabled double walled canvas tent on an aluminum frame and outfitted with a diesel burning stove.

Kitchen equipment includes one propane-fired and/or electric refrigerator, one propane cook stove, one medium size freezer, cookware, dishes, tables, chairs etc. Electricity to the kitchen, shower, and office tents will be provided by a 2000W or 3500W diesel generator. Water for the kitchen and shower tents will be pumped from the river 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 300 L and 600 L of potable water per day. Over the course of a 42-day field season the total amount is expected to be between 13.5 m^3 to 25.2 m^3. Greywater will be disposed of in pits that will be dug at least 35 m from a water body and covered with fill on an as-needed basis. Similarly, pits for sewage disposal will be dug at least 35 m from a water source and downstream/downslope from the potable water source.

In 2016, we tentatively plan to use the existing camp infrastructure owned by Peregrine Diamond's Ltd. at Nanuq located ~210 km north of Chesterfield Inlet and ~255 km northeast of Baker Lake. Discussions with a Peregrine Diamonds' representative are currently underway. The site includes kitchen, dry storage, office, and communal sleeping tents, all with aluminum frames, and was constructed in accordance to Nunavut land and water use regulations. We would also use the existing outhouses and greywater disposal site. If the Nanuq camp cannot be used for the 2016 field season, an appropriate camp site will be chosen during the summer of 2015 and a temporary tent-based camp will be set up in 2016 with the same infrastructure as the Lorillard camp.

The project leader will handle most of the camp logistics including safety issues, camp maintenance, communications, 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 Hamlets of Chesterfield Inlet, Baker Lake, and Rankin Inlet, Kivalliq Inuit Association, Hunters and Trappers Association, and Nunavut Arctic College is expected. We plan on bringing many of these

organizations to visit our camp to learn about our work and recent results. We will use local businesses and hire local residents as much as possible.

6. Fuels to be used

6.1. Description of undertaking:

A fuel cache will be established at the base camp in 2015 and 2016, which will store no more than 120 drums (205 L each) of aviation fuel, 4 drums (205 L each) of diesel, and 1 drum (205 L) of gasoline. The fuel will be stored in a self-supporting insta-berm with barrels lying on their sides with the bungs oriented in a horizontal position (3 o'clock and 9 o'clock). The base camp fuel cache will be inspected daily. We will also have up to 5 cylinders (~45 L each) of propane.

Two smaller satellite fuel caches containing less than 4000 L of aviation fuel will also be established, one located near Nanuq camp and the other about 70 km east of Lorillard camp (locations to be confirmed). Spill kits will be established at all designated refuelling sites.

6.2. Petroleum storage, inventory & transfer:

Electrical fuel 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 diesel and gasoline from drums to jerry cans, for use with 2000W or 3500W generators and the water pump. Refuelling will be done in designated areas, all equipped with spill kits. Open fuel drums being used for active refuelling will be placed in a mini-berm as a means of secondary containment.

7. Spill contingency plan

7.1. Risk assessment and mitigation of risk:

7.1.1 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. All fuel caches will be located at least 30 m above the high mark of any water body.

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 refuelling stations, including the designated location for the helicopter, at the transfer point for gasoline from drum to jerry cans and at the generator location. A description of the contents and configuration of the fuel spill kits is provided in section 11.6.

7.2. Responding to failures and spills:

7.2.1 Spill response contact list

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

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

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

Government of Nunavut – Department of Environment
(867) 975-7700
Manager of Pollution Control and Air Quality
(867) 975-7748

Kivalliq Inuit Association
Lands Department
P.O. Box 340
Rankin Inlet, NU X0C 0G0
Phone: (867) 645-5725
Fax: (867) 645-2348

7.2.2 Basic steps – Spill Procedure

In the case of any spill or other environmental emergency, it is necessary to react in the most immediate, safest, 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* 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 AANDC 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 AANDC Water Resource Officer as required.
5. *Implement* any necessary cleanup and/or remedial action.

7.2.3 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, Kivalliq Inuit Association Land Use Inspector at (867) 645-5735

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

7.2.4 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
Kivalliq Inuit Association, Land Use Inspector.....	(867) 645-5735

7.3. Taking action:

7.3.1 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 absorbent pads or excavating the soil, gravel or snow.
Remove spill splashed on vegetation using particulate absorbent 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 absorbent 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 damaged (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 absorbent pads or particulate absorbent 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 an appropriate and approved facility. The Department of Environment monitors the movement of hazardous wastes from generators, carriers to receivers, through a tracking document (Waste Manifest). A waste manifest will accompany all movements.

7.3.2 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 or CO_2.
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 an appropriate and approved facility.
The Department of Environment monitors the movement of hazardous wastes from generators, carriers to receivers, through a tracking document (Waste Manifest). A waste manifest will accompany all movements.

7.4. 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 absorbent
- petroleum absorbent pads
- 2 pairs of pvc gloves
- 2 pairs of safety goggles
- disposable bags
- 1 shovel
- 1 fire extinguisher

7.5 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
AANDC Land Use Permit.....	Permit #:.....	issued: in progress
Kivalliq Inuit Association.....	Certificate of exemption: KVX15N03	issued: March 19, 2015
Nunavut Water Board.....	Licence:.....	issued: in progress

7.6 Contact:

Project Proponent:

Natasha Wodicka
Research Scientist
Geological Survey of Canada (Natural Resources Canada)
601 Booth Street
Ottawa, Ontario Canada K1A 0E8
Tel: (613) 947-4795
Fax: (613) 992-5694
Natasha.Wodicka@NRCan-RNCan.gc.ca

8. Waste and disposal methods

Sewage:

- The quantity of sewage for a maximum of 15 people in camp at any one time is estimated around 70 L per day (0.070 m^3/day).
- Holes will be dug in the ground (gravel outwash) at least 35 m from the nearest water source and downstream/downhill from the main camp. Tents or 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 15 people in camp at any one time is estimated around 250 to 300 L per day (0.25 to 0.30 m^3/day).
- Holes will be dug in the gravel outwash plain next to the kitchen and shower tents and at least 35 m from the nearest water source. These holes will be filled in as necessary.
- All sleeping tents will be at least 100 m away from the kitchen and shower tents.

Other:

- Non-combustible waste will be shipped out of the camp and disposed of at a local municipal waste facility (Chesterfield Inlet or Baker Lake). 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.

9. Methods of transportation

Field camp mobilization and demobilization, including fuel caching, will be supported by Twin or Turbo Otter on skis or tundra tires, as required.

During field work, one helicopter (Bell 206 Long Ranger or equivalent) will be based at the camp site and used to drop off and pick up mapping crews at the beginning and end of each day. Once dropped off, crews will walk across the land along ~10 km transects to their helicopter pick-up destination. Other crews will conduct short traverses (<250 m) on foot from helicopter landing sites.

Additionally, the helicopter and/or Twin or Turbo Otter will be used to conduct crew changes, and haul groceries, supplies, samples, and garbage in and out of camp as needed.

10. Components of the environment

The area is known to support major habitats for caribou (i.e. Northeastern Keewatin caribou calving grounds), gyrfalcon, peregrine falcon, and polar bear (including denning areas). Members of the community of Chesterfield Inlet indicated to us that June was a critical time for caribou calving. Therefore, we are planning to start field work on June 30th.

Several historical or spiritual sites (e.g., Daly Bay area) containing structures such as tent rings and inuksuit are known to exist within the proposed map area. There are also two known carving stone quarries in the Daly Bay area (64°09.434’N, 89°43.881'W and 64°15.039'N, 89°47.196'W). The proposed field work will not result in any disturbance to historical or carving stone sites, but efforts will be made to find new potential carving stone deposits within the project area.

11. Predicted environmental impacts and proposed mitigation measures

No long-term environmental impacts are expected. With the permission of Aboriginal Affairs and Northern Development Canada and the Kivalliq Inuit Association, we will set up a temporary, low-impact base camp for the duration of the mapping project in 2015 and use the existing base camp at Nanuq in 2016. One helicopter (Bell 206LR or equivalent) will be the only vehicle stationed at the camp. A temporary airstrip will be established for a Twin or Turbo Otter to deliver supplies and personnel every 7 days, approximately.

The proposed work will not have any impact on the wildlife itself or on the major habitats that support the wildlife. Helicopter flying (above 300 m altitude) will be done in a responsible manner to minimize any disruption of the wilderness, particularly the wildlife.

12. Proposed reclamation plan

Demobilization of the 2015 Lorillard camp will entail removal of tents and gear, shipping out non-combustible garbage to the municipal landfill site in Chesterfield Inlet or Baker Lake, and repositioning of any overburden or soil to its original extent, when possible. All combustible garbage will be incinerated and the chilled ashes will be buried. The 2015 site will be thoroughly cleaned following demobilization and all field equipment brought back to its original source (Ottawa or other). The same reclamation plan will be invoked at the 2016 site, except for the removal of tents and field equipment belonging to Peregrine Diamonds Ltd.

13. Consultation and local hiring

Personnel from the Kivalliq Inuit Association, Hamlet, and Hunters and Trappers Association of Chesterfield Inlet were consulted in June 2014, and we will continue to keep them informed as the project develops. The Hamlet of Baker Lake and its Hunters and Trappers Association will be consulted before the 2016 field season.

Each year we are seeking to hire one field assistant from the Nunavut Arctic College Environmental Technology Program, as well as a wildlife monitor, an expediter, and labourers to help with fuel caching from the local communities. We will also be purchasing goods and services from local businesses and using local accommodations while in transit to the field.

14. Quantity of water involved

We estimate the total daily water use between 300 and 600 L per day (0.3 to 0.6 m^3/day).
Water will be used for personal use (drinking and washing).

Water returned to source
<0.5 m^3/day

15. 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 user is known for the proposed camp areas.

16. Inuit water rights

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

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			

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17. Location map