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NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI
OFFICE DES EAUX DU NUNAVUT

EXPLORATION/ REMOTE CAMP SUPPLEMENTARY QUESTIONNAIRE

Applicant: Department of National Defence **Licence No: _____**
(For NWB Use Only)

ADMINISTRATIVE INFORMATION

1. Environment Manager: **N/A** Tel: **N/A** E-mail: **N/A**

   Please contact Major Christopher Greaves for referral to the North Warning System Office Environmental Representative.

2. Project Manager: **Major Christopher Greaves** Tel: **819-939-4963**
   E-mail: **Christopher.Greaves@forces.gc.ca**

3. Does the applicant hold the necessary property rights? **Yes**

4. Is the applicant an 'operator' for another company (i.e., the holder of the property rights)? If so, please provide letter of authorization.

5. Duration of the Project

   ☐ One year or less Start and completion dates: _____
   X Multi Year:

   If Multi-Year indicate proposed schedule of on site activities
   Start: C**urrent ongoing operations which began in the 1950s** Completion: **not applicable**

CAMP CLASSIFICATION

6. Type of Camp

   ☐ Mobile (self-propelled)
   ☐ Temporary
   X Seasonally Occupied: **Intermittently May to Sept**
   ☐ Permanent
   X Other: **Quarterly**_____

7. What is the design, maximum and expected average population of the camp?

BAF-3, Brevoort Island is a Long Range Radar Site (LRR) for the North Warning System (NWS). BAF-3 is an unmanned site, but it is visited by staff from Iqaluit, the Logistics Support Site (LSS-Q), on scheduled quarterly preventive and corrective maintenance trips and on an as needed basis. From May to September there may be an average of 5 to 20 personnel on-site due to seasonal project activity and occasional Third Party visitors.

8. Provide history of the site if it has been used in the past.

BAF-3 is a modern site build in the 1980's. It was built in the same location as an abandoned United States Air Force (USAF) relay station. BAF-3 is part of the North Warning System (NWS) with radar sites extending from the Yukon across the Arctic and down the Labrador coast. On 31 October 1995, the site transitioned from manned to unmanned status. Over the years, the Prime Mission of the radar sites remains unchanged: to detect airborne objects within the Arctic Surveillance area.

BAF-3's facilities include site buildings with their integral mechanical and electrical systems, power generation system, fuel tank, radar, antennas, satellite ground terminals, weather equipment, and roads

CAMP LOCATION

9. Please describe proposed camp location in relation to biogeographical and geomorphological features, and water bodies.

BAF-3 is located near the southern end of Brevoort Island, off the east coast of Baffin Island, Nunavut. The site is 366 m above sea level. BAF-3 is 250 km North East of Iqaluit. The geographical coordinates of the site are: 63° 20' 24"N, 64° 08' 40"W.

Brevoort Island is approximately 40 km long and 10 km wide. It is an irregular hilly island consisting of mostly igneous or metamorphic bedrock overlain in placed by stony, sandy, glacial fill intermixed with fluvial and marine deposits. Water and wind generated erosion move the poorly-developed, this, mineral soil into valleys and hollows, leaving slopes and hilltops bare. There is a general lack of vegetation, much of the ground is either barren or covered with a thin veneer of lichen.

Land mammals are not abundant on Brevoort Island. Lemmings and arctic hare have been reported. Polar bears use coastal portions of the island extensively in winter and there is evidence of denning and the presence of young on the south side of the island. A few caribou, arctic foxes, and arctic wolves may come and go across the frozen Robinson Sound, but they are not thought to be resident on the island.

Marine mammals are more numerous than land mammals at Brevoort Island. Walrus make use of the straits between Brevoort Island and the Lemieux Islands to the east. Walrus are present in the area all summer and a large scale movement into the Lemieux Islands in mid-September. Other marine mammals occurring in the water around Brevoort Island include harp seal, ringed seal, and bearded seal. Scattered whale sightings, including records of bowhead, minke, and beluga whales have been reported.

Bird life on and around Brevoort Island is limited. Nesting colonies of glaucous gulls have been reported. Nesting by black guillemot is suspected on the southeastern end of Brevoort Island.

10. How was the location of the camp selected? Was the site previously used? Was assistance from the Regional Inuit Association Land Manager sought? Include maps and/or aerial photographs.

The BAF-3 site was selected based on the requirements of the Department of National Defence. Site maps have been included in the submission for this Water Use Licence Renewal/Amendment.

11. Is the camp or any aspect of the project located on:

X	Crown Lands	Permit Number (s)/Expiry Date: ____**N/A**_____
☐	Commissioners Lands	Permit Number (s)/Expiry Date: _____
☐	Inuit Owned Lands	Permit Number (s)/Expiry Date: _____

12. Closest Communities (direction and distance in km):

The closest communities to BAF-3 are:

1. **Iqaluit, 220 km to the west. Flight time from Iqaluit is 2 hours and 40 minutes by helicopter under normal conditions; and**
2. **Pangnirtung, 320 km to the North West.**

13. Has the proponent notified and consulted the nearby communities and potentially interested parties about the proposed work?

Not applicable. The site is unmanned and is visited by the Operation & Maintenance Contractor based in Iqaluit. These employees include Iqaluit residents and northern hires from other communities. For work, job openings are posted in a variety of ways including ads in northern newspapers and on Raytheon's website.

14. Will the project have impacts on traditional water use areas used by the nearby communities? Will the project have impacts on local fish and wildlife habitats?

No.

PURPOSE OF THE CAMP

15.
- ☐ Mining (includes exploration drilling)
- ☐ Tourism (hunting, fishing, wildlife observation, adventure/expedition, etc.) (Omit questions # 16 to 21)
- **X** Other ___**National Defence**_____

16. Activities (check all applicable)

Not applicable - not a mining camp.

- ☐ Preliminary site visit
- ☐ Prospecting
- ☐ Geological mapping

- ☐ Geophysical survey
- ☐ Diamond drilling
- ☐ Reverse circulation drilling
- ☐ Evaluation Drilling/Bulk Sampling (also complete separate questionnaire)
- ☐ Other: _____

17. Type of deposit (exploration focus):
Not applicable - not a mining camp.
    - ☐ Lead Zinc
    - ☐ Diamond
    - ☐ Gold
    - ☐ Uranium
    - ☐ Other: _____

DRILLING INFORMATION

18. Drilling Activities
Not applicable - not a mining camp.
    - ☐ Land Based drilling
    - ☐ Drilling on ice

19. Describe what will be done with drill cuttings?
Not applicable - not a mining camp.

20. Describe what will be done with drill water?
Not applicable - not a mining camp.

21. List the brand names and constituents of the drill additives to be used? Includes MSDS sheets and provide confirmation that the additives are non-toxic and biodegradable.
Not applicable - not a mining camp.

22. Will any core testing be done on site? Describe.
Not applicable - not a mining camp.

SPILL CONTINGENCY PLANNING

23. The proponent is required to have a site specific Spill Contingency Plan prepared and submitted with the application This Plan should be prepared in accordance with the *NWT Environmental Protection Act, Spill Contingency Planning and Reporting Regulations, July 22, 1998* and *A Guide to the Spill Contingency Planning and Reporting Regulations, June 2002*. Please include for review.

    North Warning System Spill Contingency Plan has been included in the submission for this Water Use Licence Renewal/Amendment (Annex Q2).

24. How many spill kits will be on site and where will they be located?

    Two (2) spill kits are on-site:
    - the POL (petroleum, oil, lubricants) Spill in the garage at the summit; and

- the Chemical Spill Kit in the Technical Services Module.

See BAF-3 Site Plan (Annex Q4) for spill kit locations.

25. Please describe the types, quantities, and method of storage of fuel and chemicals on site, and provide MSDS sheets.

Jet A1 is the fuel used on-site. Jet A1 fuel and locations are listed below.

LOCID	Location	Fuel Usage	Tank Size (L)	Max Fill Volume (L)	Usable Volume (L)
BREW22G	Summit	PGS	90,000	84,528	82,857
BREW22H	Summit	PGS	90,000	84,528	82,857
BREW22I	Summit	PGS	90,000	84,528	82,857
BREW22J	Summit	PGS	90,000	84,528	82,857
BREW22K	Summit	PGS	90,000	84,528	82,857
BREW22Q	Summit	PGS	50,000	46,917	45,981
BREW22R	Summit	PGS	50,000	46,917	45,981
BREW21C	Summit	Vehicle Refueller	9,000	8,472	8,277
BREW20A	Summit	Aviation	46,000	43,259	42,129
BREW22L	Beach	PGS	90,000	84,528	82,857
BREW22M	Beach	PGS	90,000	84,528	82,857
BREW22N	Beach	PGS	90,000	84,528	82,857
BREW22O	Beach	PGS	90,000	84,528	82,857
BREW22P	Beach	PGS	90,000	84,528	82,857
BREW22F	Summit	PGS	9,000	8,472	8,277
		Summit Totals:	**568,000**	**533,418**	**522,801**
		Beach Totals:	**450,000**	**422,640**	**414,285**
		Site Totals:	**1,018,000**	**956,058**	**937,086**

Other items such as batteries, aerosols, and cleaning products are stored in the warehouse and in the buildings where they are used. Drums of oil and glycol and a limited number of cylinders are stored in the warehouse as shown on the BAF-3 Site Plan (Annex Q4). A Safety Data Sheet for Jet A1 is attached (See Annex Q5).

WATER SUPPLY AND TREATMENT

26. Describe the location of water sources.

The water source is the lake. See B BAF-3 Site Plan (Annex Q4).

27. Estimated water use (in cubic metres/day):

X Domestic Use**: 1,700 m³ Annually** Water Source: **Water Lake**

☐ Drilling: _____ Water Source: _____

X Other: **50 m³ Annually (industrial use)** Water Source: **Water Lake**

28. Describe water intake for camp operations? Is the water intake equipped with a mesh screen to prevent entrapment of fish? (see *DFO 1995, Freshwater Intake End-of-Pipe Fish Screen Guideline*) Describe:

Water from a natural fresh water lake is pumped into a water truck; the water intake is equipped with a mesh screen. The water is then transferred to the four raw water tanks located at the station; water from these tanks is distributed through the station for domestic use.

Water use varies depending on the number of people on-site, i.e. from no water used if the site is unattended to a maximum of 3 m^3/day if the site is at full capacity. The seasonal activity from May to September varies from year to year.

29. Will drinking water quality be monitored? What parameters will be analyzed and at what frequency?

Yes, the drinking water quality is monitored on a quarterly basis and monthly basis when site is ramped up. Bacteriological water tests are performed at two locations. Both samples are collected from regular consumption and food preparation areas.

The water is tested for bacteriological parameters including E. coli and Total Coliforms. A Heterotrophic Plate Count (HPC) is also completed. All water analysis must pass guidelines prior to water consumption.

On an annual basis a chemical water sample analysis is performed by an outside testing facility. Two samples are taken: one from the water source (lake) and one from a point of consumption inside the building. The samples are shipped to a testing facility where they are analyzed for the physical and chemical water properties listed below.

Physical and Chemical Parameters:

Alkalinity	**Hardness**	**Phenols**
Ammonia	**Hydrogen sulphide**	**Potassium**
BODS	**Iron**	**Sodium**
Calcium	**Mamesium**	**Sulphate**
Chloride	**Manganese**	**Tannin and lignin**
Colour	**Nitrate**	**Total Dissolved Solids**
Conductivity	**Nitrite**	**Total Kieldahl Nitrogen (TKN)**
Chemical Oxygen Demand	**PCBs**	**Turbidity**
Fluoride	**pH**	

Bacteriological Parameters:

E. coli	**Heterotrophie Plate Count (HPC)**
Fecal streptococci	**Total and Fecal coliforms**

30. Will drinking water be treated? How?

Site drinking water is treated using multiple filters (including granular activated carbon filters) and ultraviolet (UV) light.

31. Will water be stored on site?

Raw (untreated) water is stored in two 854 m^3 (854,000 L) raw water storage tanks next to the monitoring point, BAF-1 (the flow meter in the fill line to the raw water tanks). Treated drinking water is piped directly to water taps. See BAF-3 Site Plan (Annex Q4).

WASTE TREATMENT AND DISPOSAL

32. Describe the characteristics, quantities, treatment and disposal methods for:

X Camp Sewage (blackwater)

Sewage (blackwater) and greywater are combined in the sewage system. The sewage system comprises two sumps, and a holding tank in small out buildings. When the level in one of the sumps reaches a set level it is automatically pumped into the holding tank. When the level in the holding tank reaches a set level it is automatically discharged. Sewage is not discharged daily. When the septic tank nears or reaches capacity, the sewage is discharged out the sewage outfall pipe to the receiving sump.

Up to 10 m^3 is discharged from two to five times a year, depending on the number of people that have visited the site.

The site has one incinerating toilet which reduces sewage to ash; the ash is disposed of off-site. The incinerating toilet's cycling time (interval between usages) does not make it practical to support anything but a short site visit by a few staff. It is primarily in place in case the site fails in the winter and freezes. Under these conditions, a small crew would be dispatched to the site to restore power and thaw the site. The incinerating toilet would be used until the sewage system was thawed and returned to a serviceable state. It cannot meet the demands of a ramped up site.

The Department of National Defence requests that the sampling point is SHE-2 be discontinued. Sewage will be handled as per the plan "Sewage Disposal Update: Sumps for Sewage Outfalls at CAM-3, FOX-3, DYE-M, and BAF-3", dated January 28, 2010 and its addendum attached as Annex Q6 "Sewage Disposal Update: Sumps for Sewage Outfalls at CAM-3, FOX-3, DYE-M, and BAF-3 Addendum", dated July 13, 2018.

See BAF-3 Site Plan (Annex Q4) for the location of the sewage outfall.

X Camp Greywater

Grey water and sewage (blackwater) are both handled by the sewage system described above. Please see "Camp Sewage (blackwater)" above.

X Solid Waste

Nonhazardous, combustible solid waste is typically paper, paper product, cardboard, rags, kitchen waste, and etc. The quantity depends on the number of people on-site. A year that long periods of the site being attended would generate an estimated 150 m^3 of non-hazardous, combustible solid waste. This type of waste is incinerated in an on-site incinerator as described in item 33. Ash from the incinerator is removed from the site.

Currently all ash and non-combustible hazardous waste is packaged and shipped to Iqaluit for disposal.

X Bulky Items/Scrap Metal

These items are packaged and stored on-site until they can be transported for disposal off-site at an appropriate facility; typically this occurs every two to four years.

X Waste Oil/Hazardous Waste

These items are packaged and shipped to a licensed disposal facility every one or two years.
An average annual inventory typically includes:
- 7 drums Waste oil;
- 1 to 2 drums Waste glycol;
- 10 drums Waste fuel;
- 1 drum Waste paint;
- 1 drum Waste oil filters;
- 1 drum Waste oily rags;
- 1 crate Waste batteries, wet, filled with acid; and
- 1 crate Waste batteries, nonspillable

See BAF-3 Site Plan (Annex Q4) for the locations where HAZMAT is stored on-site.

☐ Empty Barrels/Fuel Drums

These items are re-used to contain the same liquids.

☐ Other:

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33. Please describe incineration system if used on site. What types of wastes will be incinerated?

The on-site incinerator is a Consumat System Inc. Model C-32P. It is a forced are incinerator designed to handle combustible waste such as paper, cardboard cartons, wood scrap, combustible floor sweepings, and cafeteria waste.

The general performance characteristics are:

> **"The incinerator comprises a refractory lined combustion chamber (no grate is required) into which waste is loaded and to which a small supply of air is admitted. The waste is initially heated by an auxiliary burner and undergoes essentially a pyrolysis process. For normal wastes the reaction proceeds automatically without the need for additional fuel. The advantage of this method of primary burning, as opposed to the more ususal technique of inducing active combustion by the introduction of large volumes of forced are, is that waste decomposes under quiescent conditions. Consequently carry over of particulate matter, which would subsequently contribute stack emissions, is minimized."**
>
> **"The partial combustion products pass into an after burning secondary chamber, which is mounted immediately above the main combustion chamber."**

"The gases are admixed with additional air and elevated in temperature to ensure successful burn out of smoke. The gases are cooled before discharge by entrained ambient air."

(Ref: Operations and Maintenance Manual for Brevoort Long Range Radar Site, Volume 9 – Interior Architectural Systems, 820E20 Packaged Incinerator, dated 1988-12-01, Issued by the Department of National Defence)

34. Where and how will non-combustible waste be disposed of? If in a municipality in Nunavut, has authorization been granted?

All non-hazardous non-combustible domestic solid waste is disposed of through a contract with the City of Iqaluit for the deposit of waste in the local municipal dump.

35. Describe location (relative to water bodies and camp facilities) dimensions and volume, and freeboard for all sumps (if applicable).

Not applicable

36. Will leachate monitoring be done? What parameters will be sampled and analyzed, and at what frequency?

Not applicable

OPERATION AND MAINTENANCE

37. Have the water supply and waste treatment and disposal methods been used and proven in cold climate? What known O&M problems may occur? What contingency plans are in place?

Both the water supply and waste treatment and disposal methods at this site have been in use for many years and they are proven in cold climates.

ABANDONMENT AND RESTORATION

38. Provide a detailed description of progressive and final abandonment and restoration activities at the site.

Not applicable. The Prime Mission is scheduled to at least 2035. No abandonment or restoration is planned at this time. As indicated in the current Water Use Licence for this site (Part H); a site Abandonment and Restoration Plan will be submitted to NWB six months prior to the decommissioning of the BAF-3.

BASELINE DATA

39. Has or will any baseline information be collected as part of this project? Provide bibliography.

- ☐ Physical Environment (Landscape and Terrain, Air, Water, etc.)
- ☐ Biological Environment (Vegetation, Wildlife, Birds, Fish and Other Aquatic Organisms, etc.)
- ☐ Socio-Economic Environment (Archaeology, Land and Resources Use, Demographics, Social and Culture Patterns, etc.)
- ☐ Other: _____

REGULATORY INFORMATION

40. At a minimum, you should ensure you have a copy of and consult the documents below for compliance with existing regulatory requirements:

- ✓ ARTICLE 13 – *NCLA -Nunavut Land Claims Agreement*
- ✓ NWNSRTA – *The Nunavut Waters and Nunavut Surface Rights Tribunal Act, 2002*
- ✓ *Northwest Territories Waters Regulations, 1993*
- ✓ NWB - Water Licensing in Nunavut - Interim Procedures and Information Guide for Applicants
- ✓ NWB - Interim Rules of Practice and Procedure for Public Hearings
- ✓ RWED – *Environmental Protection Act, R-068-93- Spill Contingency Planning and Reporting Regulations, 1993*
- ✓ RWED A Guide to the Spill Contingency Planning and Reporting Regulations, 2002
- ✓ NWTWB - Guidelines for Contingency Planning
- ✓ *Canadian Environmental Protection Act, 1999 (CEPA)*
- ✓ *Fisheries Act, RS 1985* - s.34, 35, 36 and 37
- ✓ DFO - Freshwater Intake End of Pipe Fish Screen Guideline
- ✓ NWTWB - Guidelines for the Discharge of Treated Municipal Wastewater in the NWT
- ✓ Canadian Council for Ministers of the Environment (CCME); Canadian Drinking Water Quality Guidelines, 1987
- ✓ Public Health Act - Camp Sanitation Regulations
- ✓ Public Health Act - Water Supply Regulations
- ✓ *Territorial Lands Act* and *Territorial Land Use Regulations*; Updated 2000