



## NIRB Application for Screening #125147

### Pond Inlet atmospheric measurements

<b>Application Type:</b>	Amendment
<b>Project Type:</b>	Research
<b>Application Date:</b>	5/31/2017 1:40:07 PM
<b>Period of operation:</b>	from 2017-07-11 to 2019-04-01
<b>Proposed Authorization:</b>	from 2017-07-11 to 2019-04-01
<b>Project Proponent:</b>	Sangeeta Sharma Environment and Climate Change Canada 4905 Dufferin Street Toronto Ontario M3H 5T4 Canada Phone Number:: 416-739-5820, Fax Number::

## DETAILS

### Non-technical project proposal description

English: The Canadian Aerosol Baseline Measurement (CABM) program under the Climate Chemistry Research Measurement and Air Quality Research sections are proposing to measure changes in the levels of absorbing (black carbon) and scattering aerosols and gases that may accompany increased ship traffic and increasing mining activities in the Canadian Arctic as well as from an increase in forest fires at more southern latitudes. In particular, black carbon, which is a strong light absorber and released into the atmosphere from the incomplete combustion of fuels, is recognized as one of the "Short Lived Climate Forcers" that may contribute to more rapid melting of Arctic ice. The proposed measurements will allow us to estimate changes in the climate and air quality-related properties of the atmospheric aerosol and gases and they will be used to verify EC models for the prediction of Arctic climate and air quality. We already had measurements conducted at Resolute Bay location under the project NIBR number 13Y010 from June 2013 until June 2017. We are implementing same measurements at the Pond Inlet location. Both locations are closer to the predicted pathway for ships in the northwest passageway. We have already established baseline measurements at Resolute Bay and now proposing to install same set of instruments at Pond Inlet and would like to start these measurements in July so that the baseline conditions can be monitored before ship traffic increases significantly across the region. This site will also be a complimentary site to already operational site in the high Arctic at Alert, Nunavut. No of people involved: There are at most 4 people traveling for initial installation and then at most two people for annual calibration of instruments. Method of Transport: Transport from Resolute Bay to Pond Inlet will be via charter from Polar Continental Shelf. At Pond Inlet, we will need a truck to transport instruments. Methodology: Various instruments are used to measure particles and gases; Continuous light absorbing photometer (CLAP) for particle absorption, Nephelometer for scattering, Scanning Mobility Particles Sizer for particle size distribution, Condensation Particle Counter (CPC), Single Particle Soot Photometer (SP2) for black carbon and Airpointer that will measure gases such as SO<sub>2</sub>, O<sub>3</sub>, CO, and PM<sub>2.5</sub> concentrations. There data collection will be from several in-situ instruments. Data: This Arctic site will be an additional 5th site to Canadian Aerosol Baseline Measurement (CABM) program already in operation since 2005. The data will be used to support: the World Meteorological Organization (WMO) atmospheric & climate change research and will be submitted to the World Data Center. Reporting: Data will be archived in both internal and publicly available databases (e.g. WMO, NASA – National Aeronautics and Space Administration, AMAP. Research results are published in recognized scientific journals. Structures created: Wildlife building at Pond Inlet will be used to house these instruments. Temporary sample lines will be installed at the Wildlife building. No other structures will be built for the instruments. Local resources and accommodations: local motel will be used for our stay while installing equipment and for calibration trips. A local contractor will also be hired for filter changes and to keep an eye on equipment once a week. Location of project: Wildlife building is in the residential area. Location of project to sensitive areas: No History of site: This is a new site built by Wildlife



Activities

Activities

Location	Activity Type	Land Status	Site history	Site archaeological or paleontological value	Proximity to the nearest communities and any protected areas
Pond Inlet Air Measurements	Researching	Crown	New building owned by Environment Canada within the community	Not known	The research building owned by Wildlife Environment and Climate Change Canada is within the community of Pond Inlet.

Community Involvement & Regional Benefits

Community	Name	Organization	Date Contacted
Information is not available			

Authorizations

Indicate the areas in which the project is located

North Baffin

Authorizations

Regulatory Authority	Authorization Description	Current Status	Date Issued / Applied	Expiry Date
Information is not available				

Material Use

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

Equipment Type	Quantity	Size - Dimensions	Proposed Use
Continuous Light Absorption Photometer (CLAP)	1	10x10x16 cm	continuous measurement of particle absorption
Nephelometer (Neph)	1	40cm longx60 cm widex 120 cm high	Measurement of particle scattering
Scanning Mobility Particle Sizer (SMPS)	1	30 cm x 40 cm x 60 cm	to measure particle size distribution
Condensable particle counter (CPC)	1	26 cm h x 18 cm wide x 25 cm deep	To measure number of particles
Single Particle Soot Photometer (SP2)	1	48 cm Wide x 61 cm Long x 26 cm high	To measure black carbon
Airpointer	1	74 cm x 35 cm x 83 cm	Measures gases and PM 2.5 mass

Detail Fuel and Hazardous Material Use

Detail fuel material use:	Fuel Type	Number of containers	Container Capacity	Total Amount	Units	Proposed Use
Butanol	hazardous	12	1	12	Liters	Use for operational purpose in CPC and SMPS
CO2 gas	hazardous	1	57	57	Lbs	For calibration of Neph
Methanol	hazardous	2	1	2	Liters	cleaning of optics and lens
calibration tank NO=3.45 ppm, NO2=0.05 ppm and SO2=4.5 ppm	hazardous	1	57	57	Lbs	Calibration of Airpointer instrument
calibration gas mixture NO=5.2 ppm, NO2=0, SO2=4.9 ppm	hazardous	4	25	100	Lbs	Calibration of Airpointer
Activated Charcoal	hazardous	2	1	2	Liters	removal of moisture and pollution
permeation tubes NO2 (350 ng/min @ 50oC), SO2 (210ng/min @ 50oC), H2S ( 76 ng/min @ 50oC)	hazardous	3	6	18	Lbs	calibration source mostly for storage purposes until calibration is required

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
Researching	Hazardous waste	10 kg	transported south for proper disposal	none
Researching	Non-Combustible wastes	2 large and 4 small tanks	transported south for proper disposal	non
Researching	Other, Cardboard boxes	cardboard boxes	dump or recycle	none

Environmental Impacts:

All waste will be properly discarded during and after completion of the project. This list is below and method of disposal is also listed below.

Description of Existing Environment: Physical Environment

Description of Existing Environment: Biological Environment

Description of Existing Environment: Socio-economic Environment

Identification of Impacts and Proposed Mitigation Measures

Cumulative Effects

Impacts

Identification of Environmental Impacts

	ntal areas				y.			ue or fragile landscapes	geology	lity	athymetry					bitat and migration patterns	at and migration patterns	abitat and migration/spawning	as	M I C	ltural historic sites				ture
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		P H Y S I C A L	Designated environment	Ground stability	Permafrost	Hydrology / Limnology	Water quality	Climate conditions	Eskers and other unique	Surface and bedrock geology	Sediment and soil quality	Tidal processes and biogeochemistry	Air quality	Noise levels	B I O L O G I C A L	Vegetation	Wildlife, including halophytes	Birds, including habitat	Aquatic species, incl. Invertebrates	Wildlife protected areas	S O C I O - E C O N O M I C	Archaeological and cultural heritage	Employment	Community wellness	Community infrastructure	Human health
Construction																										
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Operation																										
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Decommissioning																										
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(P = Positive, N = Negative and non-mitigatable, M = Negative and mitigatable, U = Unknown)

Project Map

