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Letter: Request for use of water or deposit of waste without a license

Dynamics and Change of the Devon Ice Cap, Nunavut

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In accordance with Guide 9, approval for use of water or deposit of waste without a license is requested for the research project 'Dynamics and Change of the Devon Ice Cap, Nunavut'. Activities pertaining to the project are carried out on the Devon Ice Cap, Nunavut (75º20.39'N, 82º40.58'W) by the University of Alberta's Arctic and Alpine Research Group (P.I.: Martin Sharp).

Timeframe: 2017 April 20 - June 15; Expected to continue through 2018.

Project Description: We are using continuously recording GPS systems mounted on bedrock outcrops adjacent to the Devon Ice Cap to monitor elastic deformation of the Earth's crust resulting from changes in the mass of the ice cap over time. The crust will sink if ice mass increases, but rise if ice load decreases. 5 GPS systems have been installed adjacent to glaciers with differing flow rates (3 fast and 2 slow) to see if ice dynamics influence rates of mass change in the different glacier drainage basins. We will also conduct ground based radar surveys and collect shallow ice cores from the upper 5-10m of the ice cap to describe the extent/thickness of ice bodies formed by refreezing of meltwater in the snow and firn. The presence of such ice bodies may increase the fraction of meltwater that runs off to the ocean since they prevent meltwater from draining into the snow and firn where it can refreeze and instead promote horizontal drainage.

We access the ice cap from Resolute Bay by PCSP Twin Otter or helicopter, and travel on the ice by snowmobile or helicopter. We establish a base camp on the ice cap summit, but most work is carried out from mobile 2 or 3-person camps. Instruments installed on or next to the ice will be removed at the end of the project. A detailed description of project undertakings is found in Box 7 of this application and our application letter for NRI is included for additional project-specific information.

Description of water use: Total water use for our three person field party is <0.05 cu m/day. Melted snow is used to provide water for domestic use (Guide 9, Classification of undertakings, item 8). Our camps are minimal with no permanent buildings or structures. To minimize the impacts of our research activities every effort is made to keep the camp clean, solid waste is backhauled to Resolute Bay and water consumption is reduced for example by washing dishes without water. A spill contingency plan, prepared in December 2010 in accordance with the Consolidation of Spill Contingency Planning and Reporting Regulations R-068-93, as set by the Nunavut Water Board, with regard to our previous license 3BC-BGI0813 is reviewed before and after each field campaign and changes are made if necessary.