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Stantec Consulting Ltd. Application for Water License for Geotechnical Investigation at the Nanisivik Naval Facility

Application Summary

July 9, 2010

Stantec Consulting Ltd. (Stantec) has submitted an application to the Nunavut Water Board for a water license to complete a geotechnical drilling program at the existing Mine Port Facility at Nanisivik. The geotechnical drilling program is being completed in support of construction of the Nanisivik Naval Facility. The project activities will primarily involve land-based small diameter drilling at various locations around the Mine Port Facility and a test pitting program at potential borrow areas. Marine based drilling may be required in the area of the existing wharf facilities; this will be determined following evaluation of data collected from the land based drilling at the wharf in August/September 2010. Marine based drilling would take place on the sea ice, likely in 2011. Stantec will complete drilling with its subcontractor Logan Geotech Inc.

The geotechnical investigation will include land based boreholes for the assessment and upgrading of the existing wharf facilities and several upland facilities including tank farms, heliport, base structures and mechanical facilities. The subsurface geotechnical information collected during the drilling program will enable designers and project managers to assess the stability of the wharf, design and construction of foundations for new infrastructure, and/or repair/rehabilitation of the existing infrastructure components. Proposed borehole locations at the Mine Port Facility and potential borrow areas are provided in the attached drawings.

The skid-mounted drill and all equipment needed to complete the land based boreholes will be mobilised to the Mine Port Facility aboard a seasonal shipping vessel once the shipping season opens. Equipment necessary to complete marine based drilling will also be mobilise to site so it is standing by in the event marine based drilling is required. All Stantec personnel will fly to and stay in Arctic Bay, NU; personnel will travel by truck to the Mine Port Facility daily.

Boreholes associated with the wharf will be drilled to a depth of 5 m into permafrost or a maximum of 40 m. Inclinator tubing and a string of thermocouple thermistors will be installed in two boreholes located in the existing wharf sheet pile cell; these will monitor future movement of the cells and the characteristics of the permafrost. Three thermistor strings will also be installed in boreholes of the wharf backup area, for a total of five thermistor strings to monitor ground temperatures.

Upland boreholes will be located strategically in order to establish geotechnical conditions at the proposed structures and civil works. Upland boreholes for tank foundations will be drilled to a minimum of 5 m into bedrock or 25 m below proposed founding elevation, whichever occurs first. For other structures, Stantec will drill 5 m below proposed founding level. Upland boreholes will be advanced using flight augers where appropriate to minimize the use of water.

Casing and diamond coring methods will be used to sample bedrock and permafrost where possible. Most soil sampling will be conducted using split spoons and standard penetration testing methods. Bedrock will be cored in NQ size. All soil samples and rock core will be logged on site daily and packaged for shipment to the laboratory; samples will be shipped out at the end of the drilling program. Samples that must be refrigerated for permafrost testing will be shipped by refrigerated air cargo or tested on site for moisture content prior to thawing.

Potential borrow pit areas will be investigated through a test pitting program using a rubber tired backhoe or tracked excavator. One to two test pits, up to 4 m deep, will be dug per borrow area and immediately backfilled once samples are collected. The test pitting program will help characterise granular material present in each borrow area.