DE BEERS
CANADA
GAHCHO KUÉ PROJECT

November 13, 2012

To Whom It May Concern

Water Survey of Canada - Monitoring Water Downstream of Gahcho Kué

One of the commonly heard concerns from Aboriginal groups is the effects of the Gahcho Kué Project (the Project) on the downstream aquatic environment. Also in the May 2012 Technical Sessions for the Project, an alternate watershed connection was suggested. Based on these questions and concerns and a long term commitment to reduce downstream Project effects, De Beers contacted the Water Survey of Canada (WSC) to get them involved in the monitoring of water downstream of Gahcho Kué.

The attached report summarizes the field activities undertaken by the WSC in the vicinity of the Project in 2012. A path forward for follow up survey work and potential locations for long term monitoring are listed. It is anticipated that the data from the downstream monitoring stations will be made available on the www.wateroffice.ec.gc.ca website.

If you have any further questions please do not hesitate to contact.

Regards,

Craig Blackie
Superintendent, Aquatic Permitting

Attachment

A DIVISION OF DE BEERS CANADA INC.
SUITE 300, 5102 – 50th AVENUE, YELLOWKNIFE, NT X1A 3S8
TEL: 1 (867) 766-7350 FAX: 1 (867) 766-7351
www.debeerscanada.com

THE DE BEERS GROUP OF COMPANIES 1888

Hydrological Investigations of the Kirk Lake Watershed
DeBeers Canada - Gahcho Kue Exploration Site

Prepared for DeBeers Canada by:
Bob Reid, Manager NT/NU, Water Survey of Canada
Lee Ross, Hydrometric Technologist, Water Survey of Canada

17 October 2012

1.0 Introduction

In the summer of 2012, Water Survey of Canada (WSC) staff in Yellowknife had discussions with DeBeers Canada staff regarding operations of hydrometric gauging stations in the vicinity of the Gahcho Kue project site located about 280 km ENE of Yellowknife. Initially, our discussion focused on the four active stations near the East Arm of Great Slave Lake, then on potential gauging stations in the Kennady Lake/Kirk Lake area. During the talks, a potential hydrological "connection" between Kirk Lake and Fletcher Lake was also discussed.

To assist with the discussions, the WSC Client Services technician prepared a map delineating the watershed of Kennady Lake to Kirk Lake, including the area of interest between Kirk and Fletcher Lake. At the meeting, we decided that a site visit would be useful to observe the potential new gauging sites and to investigate the area between Kirk and Fletcher Lakes. As such, a site visit to Gahcho Kue was scheduled on 12 September 2012 for two WSC staff from Yellowknife. When we arrived on site, we travelled by helicopter to observe the natural outflow stream from Kennady Lake and the proposed route for water discharge during mining operations. This report is the summary of our Gahcho Kue site observations.

2.0 Gahcho Kue site visit

We departed from Yellowknife at 1230 on 12 September and arrived on site at Gahcho Kue around 1500 due to weather and logistics delays en route. Upon arrival, DeBeers site staff provided an orientation and safety briefing before we departed by helicopter from Kennady Lake to Kirk Lake.

Figure 1. An example of the lake connections between Kennady and Kirk Lakes

We started our aerial survey by following the natural discharge pathway from Kennady Lake to Kirk Lake and observed the outflow channel to be a chain of small lakes connected by wide, shallow, rocky channels (Figure 1). There were no suitable hydrometric sites identified along this pathway.

At the outlet of Kirk Lake, the discharge is through a confined channel that drops through a set of rapids (Figure 2). The reach below the rapids appeared to be stable with a cross-section suitable for discharge measurements. Above the outlet of Kirk Lake, we saw several suitable locations for a gauging station, with bedrock for benchmarks and deep pools for water level sensor deployment. The bedrock control at the outlet and the apparently stable channel would likely provide a consistent stage-discharge relationship for developing a rating curve. As well, there appeared to be suitable landing areas for fixed wing and rotary wing aircraft at the site. Further reconnaissance work is required to determine precise gauge site and measurement section locations.

Figure 2. Kirk Lake outflow

On the return to Kennady Lake, we observed a second potential gauging site at the outlet of Lake N11. Lake N11 is along the proposed mine water discharge pathway that would experience an increase from natural flows during the dewatering of Kennady Lake. The Lake N11 outflow channel is shallow and rocky (Figure 3) but appeared to be confined enough that flow measurements could be made and a stage-discharge rating curve could be developed. Lake N11 appeared to have a suitable location for a water gauging station, but the lake is quite small, so access would likely be limited to rotary wing aircraft. Further reconnaissance work is required to determine precise gauge site and measurement section locations.

Figure 3. Lake N11 outflow (flow is from right to left in photo)

3.0 Kirk Lake – Fletcher Lake "Connection"

During our aerial survey, we investigated the area between Kirk Lake and Fletcher Lake for a hydrological connection. We flew over the area, then hovered about 2 metres above the ground along the shore of Kirk Lake. From this position, we could see that the land elevation increased from the shore to a height-of-land between Kirk and Fletcher Lakes. We also observed that there was no visible water flow from Kirk Lake into Fletcher Lake. From Kirk Lake, we flew over the height-of-land to the shore of Fletcher Lake (about one kilometer), where we again hovered about 2 metres above the ground and could see that the land elevation increased from the shore to the height-of-land between Fletcher and Kirk Lakes. We also observed that there was no visible water flow from Fletcher Lake to Kirk Lake.

From our observations in the area between Kirk and Fletcher Lakes, it appeared that the water level of either lake would have to increase a significant amount before any water would flow over the height-of-land between the two lakes. A level survey of this area would determine the elevations of the two lakes and of the height-of-land between them.

Although it was apparent that there is no surface flow between Kirk and Fletcher Lakes, there may be a potential for sub-surface flows to occur through bedrock fractures. As stated above, the relative elevations of Kirk and Fletcher Lakes can be measured by a level survey, and the potential direction for subsurface flow could be determined from the

gradient. Water level gauges on each lake, referenced to a common datum, would provide continuous lake elevation and gradient data.

Figure 4. Looking south from Kirk Lake over height-of-land towards Fletcher Lake

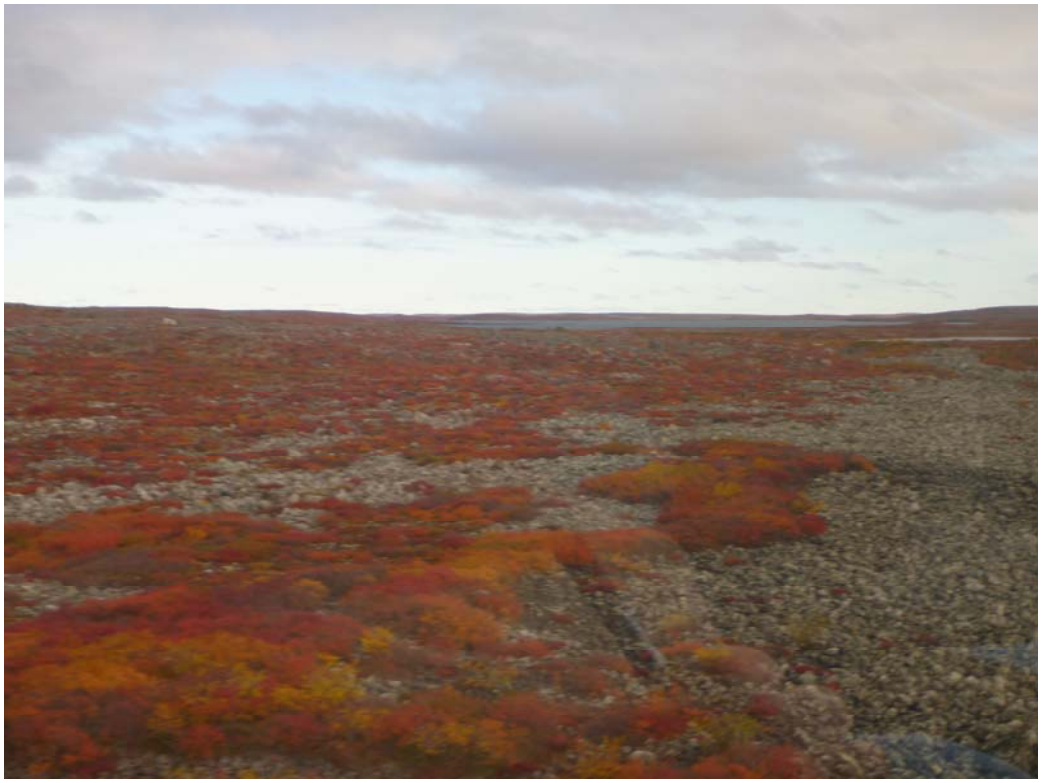

Figure 5. Height-of-land between Kirk and Fletcher Lakes

Conclusions

1. Kirk Lake appears to have good locations for water level gauge and the outflow channel appears to be suitable for flow measurements from which to develop a lake stage-channel discharge rating curve. Site reconnaissance trips by a field crew at high and low flows, and in winter, are necessary to confirm the suitability of the site for a hydrometric gauging station.

2. Lake N11 appears to have a good site for a water level gauge and the outflow channel appears to be adequate for flow measurements from which to develop a stage-discharge rating curve. Site reconnaissance trips by a field crew at high and low flows, and in winter, are necessary to confirm the suitability of the site for a hydrometric gauging station.

3. There were no apparent surface flows occurring between Kirk Lake and Fletcher Lake. The height-of-land between the two lakes appeared to be several metres above either lake. A level survey could determine the elevations of both lakes and of the height-of-land. The potential for and direction of subsurface flows could also be determined from the elevation difference between the two lakes. Water level gauges on Kirk Lake and Fletcher Lake, referenced to a common datum, could give continuous water levels and the gradient between the two lakes.

4. Costs to establish hydrometric gauging stations at these sites, including site reconnaissance, station construction and annual operations can be provided on request.