DE BEERS
CANADA
GAHCHO KUÉ PROJECT

September 13, 2012 File: S110-01-10

Chuck Hubert
Senior Environmental Assessment Officer
Mackenzie Valley Environmental Impact Review Board
Suite 200, 5102 – 50th Avenue
PO Box 938
Yellowknife NT X1A 2N7

Dear Mr. Hubert:

Deninu Kue First Nation – Round 2 Information Request
Responses - Gahcho Kué Project Environmental Impact Review

De Beers is pleased to provide the Mackenzie Valley Environmental Impact Review Board with responses to Round 2 Information Requests submitted by the Deninu Kue First Nation.

Sincerely,

Veronica Chisholm

Veronica Chisholm
Permitting Manager

Attachment

c: M. d'Entremont, Senior Wildlife Biologist, LGL Limited
R. Bjornson, Deninu Kue First Nation

September 2012

GAHCHO KUÉ PROJECT ENVIRONMENTAL IMPACT STATEMENT
ROUND 2 INFORMATION REQUEST RESPONSES

Round 2 Information Request Number: DKFN 1

Source: Deninu Kué First Nation

Subject: Gahcho Kue Fish Habitat Compensation Plan

Reference: Gahcho Kue Fish Habitat Compensation Plan – Update (June 29th, 2012)
Section 2.1 Approach (page 2)

Preamble

The fish habitat compensation options follow the federal Department of Fisheries and Ocean's policy and guidelines. While we agree with the compensation options, implementing these options in a hierarchical manner does not always meet the best interest of local first nations.

Request

The options preferred by De Beers Canada have time horizons longer than a lifetime and tremendous unpredictability in outcome. The preferred option of the DKFN is to fund the rehabilitation of fish habitat close to a First Nations community. We request that this option be considered and discussed with DFO and the individual FN communities.

Response

De Beers has engaged local aboriginal communities and discussed fish habitat compensation options on several occasions, and is indeed willing to consider off-site options in the vicinity of aboriginal communities. The most recent example of this engagement was a series of site workshops from August 10 to 22, 2012 where the opportunities for potential off-site options were discussed in addition to options in the vicinity of Kennady Lake. Furthermore, De Beers will be hosting a joint workshop with Fisheries and Oceans Canada (DFO) on September 20, 2012, which will provide an additional opportunity for community representatives to express their views and suggest off-site options.

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GAHCHO KUÉ PROJECT ENVIRONMENTAL IMPACT STATEMENT
ROUND 2 INFORMATION REQUEST RESPONSES

Round 2 Information Request Number: DKFN 2

Source: Deninu Kué First Nation

Subject: Gahcho Kue Fish Habitat Compensation Plan

Reference: Gahcho Kue Fish Habitat Compensation Plan – Update (June 29th, 2012)
Habitat Compensation Plan Options 1 and 2

Preamble

De Beers has opted to create similar habitat and increase productive capacity of existing habitat at or near the development site. This will partially be done by raising the water levels of smaller lakes west of Kennady Lake.

Request

Increasing the water levels of lakes within the D, E and N watersheds poses a risk to the environment, particularly from the potential release of methyl mercury. This risk is unpredictable in its outcome. While the plan admits that monitoring will be done to identify issues, such as potential increases in mercury, mitigation options for this impact are not identified. Further, the shallow lake complex in the D,E and N watersheds will still be shallow after raising water levels and it is questionable whether this action would add any over wintering habitat to the area. Therefore, we request that De Beers reconsider the habitat compensation options as mentioned in IR Number; DKFN #1.

Response

Creating lakes is a commonly used means of achieving “no net loss” for large scale projects in other parts of Canada, and De Beers believes that the risks of increased mercury in the water are minimal and overwintering habitat for fishes would be improved for this area. However, after engagement with aboriginal communities (most recently during the period August 10 to 22, 2012) and meetings with Fisheries and Oceans Canada (DFO), De Beers is reconsidering the “raised lake” fish habitat compensation option and evaluating other compensation options for the No Net Loss Plan. As stated in the response to DKFN_1, De Beers is actively pursuing potential off-site options through ongoing engagement with aboriginal communities, including the Deninu Kué.

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GAHCHO KUÉ PROJECT ENVIRONMENTAL IMPACT STATEMENT
ROUND 2 INFORMATION REQUEST RESPONSES

Round 2 Information Request Number: DKFN 3

Source: Deninu Kué First Nation

Subject: Gahcho Kue Fish Habitat Compensation Plan

Reference: Gahcho Kue Fish Habitat Compensation Plan–Update (June 29th, 2012)
Section 2.2.1.1 Operations

Preamble

The design of habitat compensation features is focusing on two areas: developing rocky reef habitats; and establishing vegetated bays to provide spawning and rearing habitat for Northern Pike.

Request

The establishment of more rearing and spawning habitat for Northern Pike may change the species composition of the lake towards this predator at the expense of other predators and smaller prey fish. Due to the unpredictable outcome of implementing these measures, monitoring is being planned; however, once detrimental effects to the fish community have been identified from this predator-prey imbalance mitigating this effects will be more challenging. We request that De Beers reconsider the habitat compensation options as mentioned in IR Number; DKFN #1.

Response

The habitat compensation features as discussed in Section 2.2.1 of the Golder (2012) technical memorandum titled, *Gahcho Kué Fish Habitat Compensation Plan – Updated* (submitted June 29, 2012), refers to the raised D-E-N lakes. Based on input from communities and Fisheries and Oceans Canada (DFO), this option is being reconsidered as described in the response to DKFN_2.

Reference

Golder (Golder Associated Ltd.). 2012. Gahcho Kué Fish Habitat Compensation Plan–Update. Technical Memorandum prepared by Golder Associates Ltd. for De Beers Canada Inc., June 29, 2012.

De Beers Canada

September 2012

GAHCHO KUÉ PROJECT ENVIRONMENTAL IMPACT STATEMENT
ROUND 2 INFORMATION REQUEST RESPONSES

Round 2 Information Request Number: DKFN 4

Source: Deninu Kué First Nation

Subject: Gahcho Kue Fish Habitat Compensation Plan

Reference: Gahcho Kue Fish Habitat Compensation Plan – Update (June 29th, 2012)
Section 3.1.1 Project HSI Models

Preamble

Habitat suitability index (HSI) models are proposed to assess the losses associated with the Project on fish habitat and the relative gain in habitat developed through habitat compensation. Models are based on previous examples in the north, recent literature on northern fish species and are adjusted as required for the specific habitats and fish species that are affected.

Although the fish population in the majority of Kennady Lake will be killed through the dewatering of the lake it is essential to properly describe the baseline fish population as the benchmark for the desired status and habitat compensation following closure of the mine. De Beers carried out three daytime hydroacoustic surveys of which one had to be disregarded based on technical difficulties and thus tried to enumerate the Kennady Lake fish population. We feel for the following reasons that this task has only been partially completed if at all:

- Fish, especially larger fish (>20cm) evade boats during daytime especially in shallower lakes such as Kennady Lake and to our knowledge all hydroacoustic surveys to date have been carried out during daytime. From our own experience and firmly supported by the literature (i.e. MacLellan and Hume 2010) the results of daytime hydroacoustic surveys generally produce significantly lower overall fish densities and particularly significantly lower densities of fish larger than 20 cm. Larger fish due to their higher swimming speed can evade the boat at a higher rate than smaller fish before being detected in the narrow beam of the hydroacoustic sonar. Although we appreciate the short period of darkness found in summer at the Gahcho Kue project site, the month of September will accommodate the completion of night-time hydroacoustic surveys. In addition to a short dark period, De Beers also stated safety concerns for the completion of hydroacoustic surveys at night. We therefore recommend to use the daylight hours to geo-

reference safe transects and follow those transects when carrying out the survey at night.

- De Beers only processed and included the hydroacoustic data for fish larger than 18 cm in their estimate of the Kennady Lake fish population. Typically, the number of fish smaller than 18 cm makes up the majority of the fish density of a lake and therefore likely the majority of fish have not been included in the fish population estimate. We appreciate that De Beers was mainly concerned with the fish that are in the size classes large enough to be harvested for consumption when the lake is dewatered but this approach neglects to detect and describe the majority of fish in Kennady Lake and is therefore unsuitable as a baseline study.
- De Beers referred to a peer-reviewed paper (Hartman and Margraf 2007) to justify that the daylight hydroacoutsic surveys are suitable to describe a fish population in high latitude lakes. In our opinion and based on our own experience with hydrocaoustic surveys the Hartman and Margraf (2007) paper is not suitable to show the that daytime hydrocaoustic surveys are as effective as night-time surveys. Hole Lake, the lake surveyed by Hartman and Margraf has glacial water and is likely naturally turbid; therefore, it is not as strongly influenced by daylight as a non-glacial lake. Hole Lake is also small (approximately 50 ha) and has very variable and high fish densities of up to 9,834 fish/ha (Hartman and Margraf 2003). Comparisons with the conditions in Kennady Lake can therefore not appropriate.
- Based on our own experience in oligotrophic lakes, daytime fish target densities determined by hydroacoustic surveys are always lower than night-time densities and daytime surveys are always biased towards smaller fish. Typically daytime surveys densities were between 5-7 times lower than night-time densities (Bussanich et al. 2006, Plate et al. 2011, Plate et al. 2012a and Plate et al. 2012b). The application of this knowledge to the Kennady Lake example would mean that the small fish population in Kennday Lake was hugely underestimated by carrying out the surveys during daytime. In addition, the numbers of fish smaller than 18 cm, in most cases the majority of fish in a lake were not described at all.

Request

The HSI Model is very simplistic and does not consider the effects of predation or intraspecific competition. Please see IR Number DKFN #3 for potential outcomes that are not considered. Therefore the resulting gains in habitat units for each species remain to be an educated guess and the calculation of habitat gains are the same. The adequate estimation of the fish population in Kennady Lake is an essential part of the baseline assessment and habitat compensation planning. Effective baseline surveys need to be carried out before any assessments can be made on the significance of effects and the description of the habitat compensation goals for the Gahcho Kue Project.

Request for Additional Baseline Work:

- Timing Recommendation: The new moon phase (which ensures a dark night) and a long dark period from 9:35PM to 5:49AM and from 8:00PM to 7:05AM in the Gahcho Kue Project area can be expected in the time periods around August 17, 2012 and September 15, 2012. We recommend to carry out the surveys during either one of these periods.
- Survey Frequency Recommendation: We recommend carrying out at least three night time surveys to reduce the confidence bounds of the calculated fish estimates.
- Data Analysis Recommendation: De Beers mentioned that they had difficulties to analyze the number of hydroacoustic targets <18cm length because of signal to noise ratios. We therefore recommend to send the hydrocaoustic raw data to Don Degan at Aquqacoustics Inc. (http://www.aquacoustics.com/) to be analyzed using his extraordinary experience with hydroacoustic data and the “Echoview” software that specifically sorts targets from noise.

Response

De Beers Canada Inc. (De Beers) is confident that the reported abundance of fish in Kennady Lake, based on side- and down-looking sonar, is appropriate for the environmental impact assessment of the proposed Gahcho Kué diamond mine project (Project). Considerable work has been conducted in Kennady Lake between 1996 and 2010 using a variety of sampling techniques, to assess the

species composition and relative abundance of fish residing in the lake. The fish sampling techniques undertaken in Kennady Lake since 1996 are described in Annex J and Addendum JJ of the 2010 EIS (De Beers 2010), and include the following:

- angling, gill netting, and minnow trapping in summer 1996;
- angling and gill netting in fall 1996;
- gill netting and minnow trapping in summer 1999;
- angling in winter 2004;
- angling, backpack shoreline electrofishing, boat electrofishing, gill netting, and minnow trapping in summer 2004;
- angling, backpack shoreline electrofishing, and gill netting in fall 2004;
- backpack shoreline electrofishing in summer 2005; and
- gill netting in summer 2010.

Mark/recapture population estimates were also conducted in 2004 to provide population estimates for Kennady Lake (Section J4.4.5 of Annex J, De Beers [2010]). The hydroacoustic sampling conducted in 2010 was an additional method used to provide further information on the abundance of fish in the lake. Collectively, all fish sampling undertaken from 1996 to 2010 have informed the total estimates of fish species composition and abundance in Kennady Lake.

Surveys were conducted during the daylight hours and followed predetermined transect routes to meet health and safety requirements for working at the exploration camp at Kennady Lake. Although night-time surveys were considered for the hydroacoustic surveys, the risk of the night-time work at the remote camp location was deemed not acceptable by De Beers Health and Safety Protocols and Requirements.

A key strength of the hydroacoustic sampling design was the replication of surveys and the illustration of low daily variability in the data; August 16 and August 18, 2010 population estimates differed by only 1,960 fish (i.e., only 10%

of the mean). Further, post-processing methods were consistent with those used in previously published research (see Knudsen and Saegrov 2002; Wanzenbock et al. 2003) (Addendum JJ, Section JJ3.4.1 of the 2010 EIS [De Beers 2010]). Another key strength of the study was the conservative calculation of mean fish density and associated confidence interval.

The conservatisms used for the Kennady Lake hydroacoustic survey are explained in detail further below, but in brief, the conservatisms include the following:

1) The use of post-processing methods that have a tendency to be positively biased due to inclusion of some possible non-fish echoes (i.e., bottom intrusion).

2) A conservative calculation of the confidence interval for mean fish densities, which was based on the following:

    a. the sub-basin of Kennady Lake as the statistical sampling unit, rather than the transect, which could have otherwise introduced biases associated with inflating sample sizes, e.g., incorrectly estimated error;

    b. the use of sub-basin as a 'cluster' variable in the calculation of the standard error; where use of the default function would have generated a narrower confidence interval; and

    c. a normal distribution rather than a Poisson distribution, which would have otherwise generated a much tighter confidence interval.

3) A conservative calculation of the total fish population in Kennady Lake (Addendum JJ, Section JJ4.4.1 [De Beers 2010]), where the total number was based on the mean reported density applied to the entire surface area of Kennady Lake, including the K5 basin (Area 8), which is a shallow section of the lake that likely supports a low density of fish, such as lake trout. Area 8 has a mean depth of about 3 m and a maximum depth of about 9 m (a small

hole in the southern portion of the basin), whereas Kennady Lake overall has a mean depth of about 5 m, with a maximum recorded depth of about 18 m.

Fish density in Kennady Lake was estimated to be 23.3 fish per ha (0 to 51.2 fish per ha; 90% confidence interval [CI]; Addendum JJ, Section JJ4.4.1 [De Beers 2010]). This was within the range of densities reported at waterbodies in the central Canadian Arctic where fish salvages counted actual fish numbers for a given area or volume of water (e.g., about 1 to 100 fish per ha; McEchern et al. 2003; Mainstream 2006; Azimuth 2009). Kennady Lake is an oligotrophic, relatively small, shallow, headwater lake and so the expectation is that densities would be relatively low. There is no evidence in the literature, or from fish salvage programs undertaken in the Canadian Arctic, to suggest that fish densities are much higher in northern lakes (e.g., 1,000 fish per ha), as may be the case in larger waterbodies at lower latitudinal locations (e.g., Coquitlam Reservoir; see references listed in the Preamble).

We agree that some smaller fish may have been excluded from the study design (as stated in the baseline, Addendum JJ, Section JJ3.4.1 [De Beers 2010]) given that hydroacoustics are generally ineffective in shallow, littoral waters that can provide habitat for small-bodied fish. However, the effects of light on the efficiency of the hydroacoustic assessment (i.e., use of daytime versus night-time surveys) for Kennady Lake may not be as significant as suggested by the author of the Information Request (IR). The basis of the comment was likely drawn from experiences with a different fish community, species, and ecosystem. For example, the studies being referenced in this IR are larger, more productive lake systems at lower latitudes in southern British Columbia (e.g., Coquitlam Reservoir; see references listed in the Preamble). The Coquitlam Reservoir represents a flooded area of over 1,100 ha where one would expect densities to be higher than that recorded in an Arctic waterbody, such as Kennady Lake. The Coquitlam Reservoir is also home to kokanee salmon (*Oncorhynchus nerka*). Unlike lake trout in Kennady Lake, kokanee are characterized by pronounced diel vertical movements within the water column, moving from pelagic to near surface for feeding. Also, the Coquitlam Reservoir does not appear to have an abundant large fish predator, such as lake trout or northern pike, present that would crop the abundant kokanee population. Furthermore, abundant pelagic prey items (e.g., cisco) are not available in Kennady Lake. This likely contributes to the

observed higher abundance of larger fish sizes and low abundance of the smaller sized fish in Kennady Lake.

The comment regarding fish being "frightened away and undetected near or under the boat" is a commonly understood phenomenon and that is why both down- and side-looking transducers were deployed in Kennady Lake. The side-looking transducer collects data in the upper part of the water column up to distances of 40 to 50 m away from the boat, where effects from the boat are minimal.

Furthermore, the observed trend of larger fish targets in the hydroacoustic data could simply reflect the population structure of abundant fish species in the lake where the slow-growing environment favours dominance of larger bodied fish. Azimuth (2009) suggested that Arctic lakes are often characterized by a dominance of large lake trout with very low annual growth and low mortality rates. In these situations, it is likely that relatively few small, young fish are recruited into older age-classes due to predation by the larger fish. In other words, small fish must attain a certain minimum size in order to avoid predation and the longer they take to achieve that size, the more likely they are to eventually become prey. In low productivity Arctic lakes, such as Kennady Lake, smaller fish simply take too long to grow beyond the gape (i.e., mouth size) limitation of larger lake trout. This population dynamic, described by Azimuth (2009) for the Meadowbank Gold Project, has been reported for other waterbodies and is commonly discussed in the peer-reviewed literature (e.g., Hobson and Welch 1995; Berg et al. 2010; Keyse et al. 2007).

With regard to the timing of the hydroacoustic survey, De Beers is confident that the timing of the survey in mid-August was justified. As lake trout, which were one of the main target species of the survey, typically congregate and spawn on rocky shoals or shoreline areas of Kennady Lake in late August or early September, hydroacoustic surveys at that time of the year would likely miss an important component of the fish community. Also, typically the weather conditions at the project area deteriorate in the fall (i.e., higher winds, cold temperatures, sudden storms), which are not optimal conditions for a hydroacoustic survey in a shallow system such as Kennady Lake.

Post-Processing Approach:

De Beers is confident that the use of the BioSonics Visual Analyzer™ software was appropriate for generation of the abundance estimate for impact assessment purposes. In our opinion, the main advantage of the much more expensive Echoview software is a quicker processing time through use of broad filters that require less site-specific visual inspections of signal-to-noise ratios, rather than the generation of estimates that are more accurate.

The following paragraphs summarize information that was stated in Addendum JJ of the 2010 EIS (De Beers 2010), and provides clarification on the fish sizes assessed during the hydroacoustic survey.

As stated in Addendum JJ, Section JJ3.4.1, the hydroacoustic data were processed in BioSonics Visual Analyzer™ 4.1.3.6. The approach was designed to be easily replicated in the future, and was consistent with that used in previously published research (see Knudsen and Saegrov 2002; Wanzenbock et al. 2003). Furthermore, processing methods followed the user manual for the software (BioSonics 2004), and were later verified by Biosonics® technical support staff (e.g., Brian Moore, personal communication, Sept. 21, 2010).

For clarification, a threshold of -50 decibels (dB) was set for the horizontal (418 kiloHertz [kHz]) data and a threshold of -55 dB was set for the vertical (199 kHz) data. The proposed thresholds eliminated very small fish (e.g., small forage fish and small young-of-the-year [YOY]) from the analyses and simplified data processing by eliminating targets resembling invertebrates or interference. The goal was to include as many sizes of fish as possible, but also provide an estimate that was more relevant to the larger sport or domestically important fish species. For example, for vertical beaming, the -55 dB threshold eliminated fish that were less than 4.4 cm in length according to the target strength (TS) equation for 199 kHz data (Love 1971). However, as noted in Addendum JJ, Section JJ4.4.1 (De Beers 2010), the hydroacoustic data indicated that the majority of the fish targets identified from vertical beaming were greater than 23 cm in length.

Based on the hydroacoustic targets identified, Visual Analyzer™ derived the number of fish per unit area (m^2), as well as target strength distributions in 2-dB groups. Echograms showing target echoes and their voltage returns were captured in 'screen shots', which were presented in Addendum JJ, Appendix JJ.1. All fish targets identified by Visual Analyzer™ were evaluated. Target signal-to-noise ratios and the proximity of targets to the lake bottom profile were considered in assessing whether targets were valid. In some cases, Visual Analyzer™ outputs of FPUA (fish per unit area) were modified and set to zero for pings where targets clearly resembled the lake bottom, interference, or rocks. However, in other cases, there was a modest level of uncertainty in the identity of a target; these targets were included in the analysis as part of a conservative approach (and thus, this approach likely overestimated density predictions).

Conclusion

As discussed above, De Beers is confident that the reported abundance of fish densities in Kennady Lake is appropriate for impact assessment and De Beers does not see the utility of additional baseline hydroacoustic work (i.e., results would not change the conclusions of the environmental assessment). If the Project proceeds, the proposed fish salvage program will validate the fish population in the dewatered or partially dewatered portions of the lake, as has been done with other recent mining developments in the North.

References

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GAHCHO KUÉ PROJECT ENVIRONMENTAL IMPACT STATEMENT
ROUND 2 INFORMATION REQUEST RESPONSES

Round 2 Information Request Number: DKFN 5

Source: Deninu Kų́é First Nation

Subject: Gahcho Kue Fish Habitat Compensation Plan

Reference: Gahcho Kue Fish Habitat Compensation Plan–Update (June 29th, 2012)
Section 4.2.1 Lake Habitat Gain Areas

Preamble

Under the subsection "Unaltered Habitat" on page 20 it is stated: "This category of habitat gain includes areas that were dewatered during the operations phase but are refilled at closure, and otherwise remain unaltered from pre-development conditions in terms of substrate and depth characteristics".

Request

It is completely unrealistic to believe a lake bottom that will be dewatered for 15-20 years; being exposed to wind, sun, rain, snow and ice throughout this period will remain unaltered from pre-development conditions as a lake bottom. Therefore, we request that all "Unaltered Habitat" be taken out of the Habitat Gain category and be added to the category of habitat that has been harmfully disrupted or altered.

Response

As described in Section 4.2.1 of the *Gahcho Kué Fish Habitat Compensation Plan – Update* memo (Golder 2012), Unaltered Habitat (in terms of habitat gains) includes areas that were dewatered during the operations phase but are refilled at closure, and otherwise remain unaltered from pre-development conditions in terms of substrate and depth characteristics. In terms of losses, these areas are considered under the Habitat Disruption category. As per Section 4.1.1 of Golder (2012), the proposed Gahcho Kué Project (Project) will result in disruption to approximately 429.3 ha of lake area being dewatered and unavailable as habitat during the operational and refilling periods, but will be re-submerged at closure and will remain otherwise unaltered by Project activities.

Although it is anticipated that there may be short-term changes in the lake bottom during the period when these habitats are dewatered, or partially dewatered, it is

expected that the substrate and depth characteristics (i.e., the variables used in the Habitat Suitability Index [HSI] models) in these areas of the re-filled Kennady Lake at post-closure will return to a state similar to that prior to development. Therefore, the re-submerged areas will provide fish habitat with physical attributes and habitat suitability similar to pre-development conditions.

De Beers is continuing to engage with Fisheries and Oceans Canada (DFO) on determining the appropriate type of compensation for these areas as part of the ongoing development of the detailed fish habitat compensation plan.

References

Golder (Golder Associated Ltd.). 2012. Gahcho Kué Fish Habitat Compensation Plan – Update. Technical Memorandum prepared by Golder Associates Ltd. for De Beers Canada Inc., June 29, 2012.

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GAHCHO KUÉ PROJECT ENVIRONMENTAL IMPACT STATEMENT
ROUND 2 INFORMATION REQUEST RESPONSES

Round 2 Information Request Number: DKFN 6

Source: Deninu Kué First Nation

Subject: Gahcho Kue Water Quality Objectives and Sediment Quality Objectives

Reference: Water Quality Objectives (WQO) and Sediment Quality Objectives (SQO) for the proposed Gahcho Kue Project – Initial Development Process Section 1.0 Introduction

Preamble

It is recognized that monitoring will be conducted to meet the standards identified in the WQO and SQO. Details of this monitoring will be identified in the Aquatic Effects Monitoring Program that will be resolved during the regulatory process.

Request

Although De Beers is not legally required to present the details of their suggestions for the Aquatic Effects Monitoring Program before the regulating permitting, we request that these details be provided during the EIS process to further solidify De Beers' commitment to meeting the WQOs and SQOs.

Response

De Beers has initiated the development of an Aquatic Effects Monitoring Plan (AEMP). It is envisaged that a meeting will occur late October or early November 2012 to present this outline to aboriginal communities and government regulators prior to the public hearings phase. It is De Beers' intent for this meeting to engage and elicit feedback on the conceptual AEMP structure, which is considered an important step in the continued development of the AEMP in advance of the licensing phase of the Project.

De Beers Canada

September 2012

GAHCHO KUÉ PROJECT ENVIRONMENTAL IMPACT STATEMENT
ROUND 2 INFORMATION REQUEST RESPONSES

Round 2 Information Request Number: DKFN 7

Source: Deninu Kué First Nation

Subject: Gahcho Kue Water Quality Objectives and Sediment Quality Objectives

Reference: Water Quality Objectives (WQO) and Sediment Quality Objectives (SQO) for the proposed Gahcho Kue Project – Initial Development Process Section 2.0 Process for Development of the Water and Sediment Quality Objectives

Preamble

Point 4 on page 2 mentions additional work being completed at Snap Lake and Ekati to develop site-specific water quality objectives for several components. Snap Lake Mine is developing site-specific WQOs for total dissolved solids, strontium and nitrate. Ekati Mine has developed site specific WQOs for nitrate and strontium.

Request

We request that De Beers provide the specific WQOs that were established for these mines and the reasons that new WQOs are being developed. This is essential to inform interveners which water quality parameters unexpectedly turned out to be much higher than expected during operation. The Gahcho Kue project can learn from these results and should include relevant parameters into the potential substances of potential concern list.

Response

Snap Lake is developing site-specific water quality objectives (WQOs) for total dissolved solids (TDS) and nitrate. The nitrate WQO will build on the nitrate WQO developed by Ekati and presented on the public record. Snap Lake is not developing a WQO for strontium, but is rather conducting additional testing to verify that strontium is not a substance of potential concern (SOPC). Ekati will use the information on strontium developed by Snap Lake.

WQOs are developed on a site-specific basis and are not always consistent between northern mines. Despite the mines and the proposed Gahcho Kué Project (Project) being located within the Northwest Territories, they are large distances apart (the existing mines are greater than 80 kilometres from the

Project), are located within different watersheds, possess subtle differences in terms of baseline chemistry and hydrological conditions, comprise different mining operations (i.e., underground versus open pit mining), and have distinctive water management plans. Therefore, the nature of the pathways to potential effects in the receiving environment differs for each active mine operation and the Project and requires a site-specific assessment.

De Beers will continue to review the outcomes of the studies undertaken by other mines, as they become available and as appropriate to the Project, to inform the development of site-specific WQOs. As the Project proceeds, there will be on-going review of monitoring results to determine the need for any revision of WQOs.

De Beers Canada

September 2012

GAHCHO KUÉ PROJECT ENVIRONMENTAL IMPACT STATEMENT
ROUND 2 INFORMATION REQUEST RESPONSES

Round 2 Information Request Number: DKFN 8

Source: Deninu Kué First Nation

Subject: Gahcho Kue Water Quality Objectives and Sediment Quality Objectives

Reference: Water Quality Objectives (WQO) and Sediment Quality Objectives (SQO) for the proposed Gahcho Kue Project – Initial Development Process Table 1 Predicted Water Quality in Kennady Lake during Post-closure

Preamble

Table 1 provides only the CCME guidelines for water quality. It is well known that for many parameters CCME Water Quality Guidelines do not exist, and this is admitted on page 2 (point #1) of the Initial Planning Process document.

Request

We request that water quality guidelines for all parameters be presented. Values from the US EPA, FAO or other regulating agencies can be used where CCME guidelines do not exist, as was stated on page 2 of the document.

Response

Since the submission of the Golder (2012) technical memorandum titled, *Water Quality Objectives (WQO) and Sediment Quality Objectives (SQO) for the proposed Gahcho Kué Project – Initial Development Process*, on June 18, 2012, WQOs for the proposed Project have been evaluated and a recommendations document prepared. This is a separate technical memorandum titled, *Water Quality Objectives (WQO) and Sediment Quality Objectives (SQO) for the Proposed Gahcho Kué Project – Recommendations,* which will be submitted to the MVEIRB Public Registry on September 13, 2012.

In addition to the water quality substances of potential concern (SOPCs) identified in the Golder (2012) technical memorandum, water quality benchmarks have been proposed for all other EIS assessed water quality substances, not because of potential concerns, but rather to provide information requested by regulatory agencies.

Two key factors were considered in the development of the interim benchmarks for the Project:

- the comparison of predicted water chemistry concentrations to measured baseline concentrations, and
- the comparison of projected water quality concentrations to Canadian Council of Ministers of the Environment (CCME) water quality guidelines (WQGs) (CCME 1999, with updates to 2012).

Where CCME guidelines did not exist for some substances, the projections were compared to the nearest equivalent benchmarks from the United States Environmental Protection Agency (USEPA) or Canadian provincial WQGs.

Additional benchmarks compared to water chemistry concentrations were: the USEPA water quality criterion for cadmium – in addition to the CCME WQG for cadmium, which is currently under revision; the Ontario WQGs for antimony and vanadium; and, the British Columbia WQGs for barium, beryllium, cobalt, and manganese.

References

CCME (Canadian Council of Ministers of the Environment). 1999, with updates to 2012. Canadian Environmental Quality Guidelines. Winnipeg, MB, Canada.

De Beers (De Beers Canada Inc.). 2012. Environmental Impact Statement Supplemental Information Submission for the Gahcho Kué Project. Submitted to the Mackenzie Valley Environmental Impact Review Board, Yellowknife, NWT, Canada.

Golder (Golder Associates Ltd.). 2012. Water Quality Objectives (WQO) and Sediment Quality Objectives (SQO) for the Proposed Gahcho Kué Project – Initial Development Process. Technical Memorandum prepared by Golder Associates Ltd. for De Beers Canada Inc., June 27, 2012.