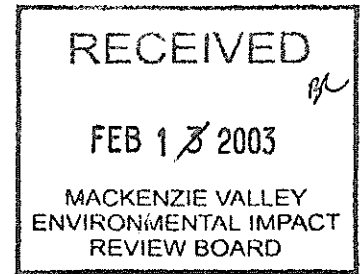


DE BEERS
A DIAMOND IS FOREVER



Rec'd Feb 10/03

07 February 2003

Mackenzie Valley Environmental Impact Review Board (MVEIRB)
Box 938, 5102 – 50th Avenue
Yellowknife, NT X1A 2N7

Attention: Glenda Fratton, Environmental Assessment Coordinator

Dear: Glenda

SUBJECT: Meeting Minutes: Fish Habitat on the Northwest Peninsula

Please accept the attached minutes from a meeting with the Department of Fisheries and Oceans held on 28 January 2003 for submission to the Public Registry. This meeting was held in response to issues raised during the MVEIRB Technical Sessions.

Should you have any questions, please feel free to contact the undersigned.

Sincerely,

SNAP LAKE DIAMOND PROJECT

for

Robin Johnstone
Senior Environmental Manager



DE BEERS CANADA MINING INC.

#300 – 5102 50th AVENUE
YELLOWKNIFE NT X1A 3S8 CANADA
TEL (867) 766-7300 FAX (867) 766-7347



De Beers

SNAP LAKE DIAMOND PROJECT

NOTES FROM MEETING

Date/Time: Jan 28, 2003 File No: 7.1.3
1:30 pm - 4 pm

Location: DFO, Yellowknife Written By: H. Machtans,
Boardroom Golder Assoc

Subject: This meeting served as a follow-up to the De Beers commitment during the November Technical Sessions to provide more information to DFO on fish habitat on the northwest peninsula where De Beers proposes to build the Snap Lake Diamond Project. In advance of this meeting, DFO had provided a letter to De Beers (see attached) dated Jan 15, 2003 outlining the additional information they deem necessary for review and assessment of the project. The purpose of the meeting was to review the letter request in detail to insure all parties understand from DFO's perspective what needs to be provided.

Project Title: Snap Lake Diamond Project Date of Notes: Jan 29, 2003

Present: Colleen English (De Beers)
Rick Schryer, Hilary Machtans (Golder Associates)
Marc Lange, Dave Balint, Julie Dahl, Elaine Blais (DFO)

Distribution: R. Johnstone, De Beers
D. Kelly, Golder Associates
Public Registry

ITEM NO	ITEM	ACTION
1.	Golder displays new air photos figures that highlight the project footprint relative to the peninsula waterbodies more clearly than the EA maps. DFO requests date and year of photos.	De Beers to find out year and month of air photo. (De Beers Exploration Response Jan 29, 2003: photos taken August 1998)
2.	The first request in DFO letter - complete tally of waterbodies within and near project footprint. DFO explains that this information is missing. They would like a complete listing of all waterbodies and then a clear rationale for what	De Beers to make master list of all waterbodies on the peninsula. De Beers to make clear the process used to screen a waterbody in or out of the impact assessment. Should be provided in

ITEM NO	ITEM	ACTION
	was considered fish habitat and what was not. All agree this is not clearly stated in one cohesive section of the EA. Ideally this information should be submitted to the public registry in advance on the technical report due date of Feb 14, 2003. Estimate this will take about a week to prepare and review so the target date of submission is Feb 10th.	technical memo to DFO and the public registry by Feb 10th.
3.0	DFO would like to see a quantification of habitat types for the affected peninsula waterbodies similar to what was prepared for Snap Lake. This would be tabulated and would quantify the expected (if any) losses to fish habitat from the peninsula waterbodies. This would be a separate calculation of loss to habitat than the calculation already presented in the EA for Snap Lake. Again, this information would be required in advance of the technical reports so target date for submission should be Feb 10th.	De Beers to tabulate fish habitat loss calculations. Should be provided in technical memo to the public registry Feb 10th.
4.0	DFO requested more information on the Stream 27 watershed. Golder asked why this watershed is of interest since it is outside the project footprint. Golder showed a new draft air photo figure that could be provided in the Feb. 10th technical memo that clearly shows Stream 27 watershed is outside the footprint. DFO agreed that if it's outside the footprint and no direct impacts to the watershed are expected, no further information is required.	De Beers to provide air photo figure with the project elements outlined to clearly show the Stream 27 watershed.
5.0	DFO requested more information on the benthic and zooplankton community of the peninsula waterbodies. Golder advised that this information was not collected for small lakes or streams. DFO stated that lack of this information was not critical but it	No action required.

ITEM NO	ITEM	ACTION
	would have been one further piece of evidence to use in the screening of the lakes. Golder advises that the impact assessment will assume these waterbodies have invertebrate communities.	
6.0	DFO requested that maximum flooded areas (Radarsat) be presented. They suggested this data be used to get a good idea of connectivity of streams to Snap Lake or other waterbodies during high water periods. Golder noted that Radarsat has a resolution of 25 m so this would not assist De Beers with identifying flood widths of very small waterbodies. Golder noted that maximum flood width was measured in field surveys and could also be extrapolated from air photos.	De Beers to provide maximum flood widths for waterbodies. De Beers to use maximum width of waterbodies when calculating waterbody size for no net loss accounting.
7.0	DFO requested that habitat and bathymetry for peninsula waterbodies should be presented. This should include the percentage substrate composition for the peninsula waterbodies. Golder said that maps with habitat could be presented but that substrate could only be presented as dominant/subdominant for the inland lakes. DFO said that would be acceptable as long as one could compare the substrate to tables from DFO Manuscript 2614 that list what substrate is preferred by which life stage of particular species of fish.	De Beers to ensure habitat maps are presented with bathymetry maps in technical memo on Feb 10th.
8.0	DFO requested conductivity data for each peninsula waterbody. Golder said this data was collected and provided in the EA for most waterbodies but this data could be represented in one appendix of the technical memo. DFO said that would be acceptable - they anticipated that the water quality data might be one more line of evidence in deciding what is or is	De Beers to reexamine water quality data from waterbodies from the peninsula to determine if it can be used in the decision making process as to what is fish habitat and what is not. This data will be put in an appendix in the Feb 10th tech memo.

ITEM NO	ITEM	ACTION
	not fish habitat. Golder said that the water quality from the inland lakes is very similar and likely could not be used to distinguish fish habitat from non-fish habitat but the data would be reexamined.	
9.0	DFO requested that detailed calculations for the lost habitat on the peninsula (if any) be presented (repeat of Item 3). All agreed that the full details for a No Net Loss Plan may not be able to be provided at this stage because consultation and final habitat accounting was not yet complete. In spite of these circumstances, DFO wants as much information on De Beer's commitment to the No Net Loss process and consultation (if needed) as possible to be presented.	Information to be provided as per Item 3.
10.	Golder requested advice from DFO on how they would like the issue of the potential loss of nutrient contribution on small waterbodies on the peninsula to be accounted for. DFO advised that if a water body is categorized as not-fish bearing but might have limited seasonal indirect contribution to habitat, make this clear in the accounting but if the contribution is expected to be very small (not meaningfully measured), note in the accounting that this could not be quantified.	De Beers to note waterbodies on the peninsula that provide indirect habitat contribution.
11.	There was general discussion about the request for information about Snap Lake in the DFO letter. Concerns that DFO and other reviewers had in the technical sessions about Total Dissolved Solids (TDS) and Dissolved Oxygen (DO) in Snap Lake were raised. The DFO technical report will identify TDS and DO as major issues associated with the development of the project. DFO suggested that any new information to address	De Beers intends to submit a TDS Technical Memo no later than February 10 th . Further information regarding DO in Snap Lake will not be available in advance of the deadline for submission of intervenors Technical Reports.

ITEM NO	ITEM	ACTION
	these issues would be useful to all reviewers prior to the technical report on Feb 14. Dave Balint also stated that he was prepared to review any submission by De Beers prior to the finalization of the technical report.	



Fisheries
and Oceans

Pêches
et Océans

Fish Habitat Management
Suite 101, 5204-50th Avenue
Yellowknife, Northwest
Territories
X1A 1E2

Your file *Votre référence*

Our file *Notre référence*

SC00196

January 15, 2003

De Beers Canada Mining Inc.
300 5102-50th Avenue
Yellowknife, NT
X1A 2P8

Attention: Robin Johnstone, Senior Environmental Manager

Dear Robin:

Enclosed herewith is a brief description of some of the specific information requirements for all aquatic habitats as discussed previous to and during the technical sessions. Also included are other information requests discussed during the sessions.

I have also enclosed a generic description of some of the rationale and information requirements for the Assessment of No Net Loss of Productive Capacity of Fish Habitats.

Should you have any further questions, please call at your convenience.

Yours truly,

Dave Balint
Fish Habitat Biologist
Fish Habitat Management
Department of Fisheries and Oceans- Western Arctic Area

DB

Additional Information Required by DFO to Assess Fish Habitat No Net Loss Accounting in the De Beers Snap Lake Environmental Assessment

Some of the specific information that DFO requires is listed below.

All water bodies adjacent and within the mine footprint need to be evaluated and assessed whether they contribute directly or indirectly to fish. This habitat needs to be quantified for the NNL accounting. Several water bodies indicated on topographic maps were not identified within the EA Report.

An assessment of S-27 and lakes drained by S-27 should also be undertaken and presented. These habitats (S-27) and quantifiable data were not submitted as part of the EA.

An assessment of the aquatic community should also be undertaken where connectivity or indirect use is likely. This will ensure that the focus is on the aquatic ecosystem and food supply.

De Beers needs to provide/submit a supplemental document with more detail on aquatic habitat as described above. The document should include photos, the topography of areas surrounding lakes and streams, and bathymetry data where it is lacking.

The document should contain:

- ◆ Accurate aquatic habitat maps. These should also be submitted in GIS format to quantify the areal extent of water bodies. GIS maps should depict the maximum extent of flooded area at the time of spring freshet for water bodies and aquatic habitat patches within, and adjacent to, the project footprint. Such maps could be derived from air photos and/or RADARSAT imagery¹.
- ◆ Accurate survey data that depicts ephemeral and persistent stream channels in the project footprint area.
- ◆ Substrate and aquatic vegetation maps overlaid on top of existing bathymetry data for lakes (i.e. Figures 9.5-7/8). Substrate data should contain at least 3 classes; for example, fine, coarse and boulder. The percentage of each class should be delineated by proportion and location in each water body and indicated on mapping. The proportion

¹ RADARSAT is an effective sensor for mapping surface flooding. A single fine-beam image at the appropriate time of year would capture the entire Snap Lake watershed and adjacent watersheds.

of each substrate type should also be depicted within each aquatic habitat patch.

- ◆ Conductivity data needs to be presented for each water body as described above.
- ◆ Quantification of aquatic habitats into relevant habitat categories, e.g.,
 - a) Fish-bearing;
 - b) Presumed fish-bearing;
 - c) Non fish-bearing, connected to downstream fish bearing;
 - d) Non fish-bearing, not connected to downstream fish bearing; and,
 - e) Total area of ephemeral streams.

Note that DFO does not require the use of this particular habitat classification system and other systems may also be suitable. The rationale for classifying a water body as non fish-bearing should be backed up by a complete description of sampling methods, sampling effort, sampling locations, time of sampling, and duration of sampling.

2. Snap Lake

- ◆ Late spring (under ice) predicted dissolved oxygen isopleths adjacent to the diffuser at 19 years post operation. This information should be presented as a series of horizontal "slices" through the water column at surface, 6m, 12m, 18m, 24m and 28m depths (similar format as the TSS plot shown in EA Figure 9.4-14). The graphic should also superimpose the position of the lake trout spawning shoals shown on Figure 9.5-6. Dissolved oxygen calculations should explicitly consider sediment oxygen demand and the increased biomass of phytoplankton and organic material deposition to the Main Area of Snap Lake. Lastly, calculations should be undertaken to estimate the percentage of Snap Lake water volume that falls below the CCME dissolved oxygen guideline, for the different basins on Snap Lake.
- ◆ Information was to be provided to delineate the area and concentrations of TDS where TDS levels would increase. The EA report stated that this was based on a whole lake basis and this was to be confirmed or substantiated.
- ◆ Invertebrate population and biomass data at depth.
 - Biomass data from the reference lakes was to be provided. Please indicate or provide species lists from these lakes as well.

Information Requirements to Assess No Net Loss

When submitting project proposals that could adversely affect fish and fish habitat, proponents need to provide DFO with:

- Plans, specification, studies, procedures, samples and other information required to permit an assessment of the potential impact of the project on fish and fish habitat; and,
- Mitigation and/or compensation measures proposed to alleviate potential impacts and /or compensate for any loss in the capacity of habitat to produce fish.

The proponent must also provide evidence that proposed mitigation and /or compensation measures will be effective, that their effectiveness will be monitored and that any deficiencies will be corrected.

The information presented below is a general description of information requirements to assess No Net Loss.

There are a number of components that must be considered when examining>NNL:

- 1: Habitat Impact Types
- 2: Fish Habitat Categories
- 3: Amounts of Habitat
- 4: Suitability Values
- 5: Weightings of Life Stages and Species
- 6: Habitat Supply Calculation
- 7: Comparison of scenarios
- 8: Issues needing attention
- 9: Monitoring and Defining Success

A brief discussion of the items follows.

Habitat Impact Types

It is important to be aware of the way development projects can affect fish habitat. One way to ensure that the assessment includes a breakdown by amounts of habitat of areas that are lost, modified or created as a result of the proposed development activities. The number of impact types is limited, though the exact nature of impacts may vary considerably:

- Loss
- Modified direct
- Modified indirect
- Compensation Modified
- Compensation Created
- Unchanged

Inclusion of the last category is important as proponents will often include areas in analyses which remain unchanged by the development but may distort interpretation of the assessed changes by diluting the analysis.

Loss types will only appear in pre-development scenarios and compensation created only in post-development scenarios. It is also important to check that the modified areas match in paired pre/post scenario comparisons.

Fish Habitat Categories

There is no single method of designating the range of habitat categories that might be encountered in any particular aquatic ecosystem. In general habitat classifications are based on combinations of depth range, substrate and cover

compositions. These are relatively stable characteristics. In addition, features concerned with water clarity, temperature regime, and water movement and/or turbulence may be used to delineate habitat patches. Since it is often difficult to discriminate among habitat categories based on measures of fish abundance, performance, or benefit, in most instances relatively simple classification with a limited number of categories will be sufficient to describe features affected by development activities.

Amounts of Habitat

The amounts of habitat involved are usually measured in areal units as development activities are land-based and have an areal footprint. Amount might also be specified using volume and possibly in other units in particular instances. Area is the most likely unit of measurement.

The habitat will normally occur as a mosaic of patches at the location of the proposed development.

Suitability Values

Suitability values provide a relative measure between 0 and 1 of the suitability, importance, potential productivity contribution, preference of components of the fish assemblage (species, life stage, process stage (migration)) by habitat category. They are a surrogate for a productivity based metric since in most instances it is not practical to directly measure the exact production contribution of any habitat patch. The use of a relative scale simplifies the calculation of habitat supply and avoids trivial debates about the significance of particular numbers of biomasses or production of fish.

Weightings for Life Stages and Species

Given that suitability values are specified for sets of life stages, species, and assemblages, there needs to be some way to aggregate the information to allow an overview as well as providing a basis for directing the assessment of more important elements. Weights are used to do this aggregation. The weights are applied hierarchally. Within species, all life stage/processes are important and hence a set of weights that sums to 1 are applied. If there were well established science, showing the relative importance of habitat availability by life stage for the successful completion of a species life cycle, it would be possible to assign differential life stage weights. However the state of science is such that it is not possible to measure the differentials. Hence the default preference for life stage weights is that they are equal and sum to 1.

Depending on whether the assessment is occurring in a species rich or species poor environment, different approaches to higher level aggregation weights.

In areas with few species, a set of species weights summing to 1 may be used to aggregate the analyses of habitat supply. These weights need not be equal though again a default choice would be to make them equal. Fisheries data and resource user preference may be used to apply differential weights. For example in the far north, there may only be 3 or 4 species present and some like lake trout and arctic charr may be preferred species for fisheries use by local people and recreationalists. Hence higher weights could be applied to preferred species and low ones to less preferred again with the sum squalling 1.

In areas with many species, such as the Great Lakes, it may be more practical to identify groupings of species based on life history traits (thermal preferences, size at maturity, trophic level) and /or fishery usages. Within groups species would be treated as having equal weights. Between groups weights can vary to place emphasis of important features, e.g. piscivores versus non-piscivores, or fishery versus non-fishery species.

Habitat Supply Calculations

The habitat supply calculation for a single scenario can be summarized in a relatively simple spreadsheet using the various elements described in the previous sections. Net change is assessed by comparison of pre-/post-development scenario pairs.

The basic calculation unit for habitat supply is the product of the amount of habitat and its suitability for a life stage, species, or group. Typically the units will be area and the result will be weighted suitable area (WSA) = Area*Suitability.

Comparison of scenarios

Scenarios are broadly divided by when they occur such as before or after the development activity. Net change analysis is generally concerned with the final outcome though obviously any construction activity that caused a large permanent change to fish habitat or fish would be of concern.

Pre-development

- Baseline with no mitigation

- Baseline with mitigation applied

Post-development

- Final outcome with no compensation

- Final outcome with compensation applied.

Comparisons will always be undertaken using matched pre-/post pairs of scenarios. It may be necessary to create several pairs as alternate development options are considered. The nature of each pre-scenario is determined with the impacts imposed by the post-scenario.

Issues Needing Attention

It is always possible to choose a frame of reference wherein any impacts will seem trivial or inconsequential. This is why it is important to ensure minimal amounts of unchanged habitats are included in any analysis.

Temporal changes in productive capacity during the development of the project or subsequent to completions as habitat patches mature or change naturally must be considered though the general objective is to project the long-term state of the habitat patches. The amount of compensation required should consider how long it takes to stabilize and the trajectory to the stability (steep and then slow, linear, or slow then steep, for example).