**Nunavut Water Board File No. NWB1BOS0106**

# NUNAVUT WATER BOARD

## DECISION

*Date of Decision: October 5, 2001*

**IN THE MATTER OF** Article 13 of the *Nunavut Land Claims Agreement,*

**- and -**

**IN THE MATTER OF** the renewal of Hope Bay Joint Venture's Boston Gold Project's water license.

*Cite as:* re: Boston License Renewal 2001

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## SUMMARY

On February 6, 2001, the Nunavut Water Board (NWB) received an application for the renewal of license NWB1BOS9801 from Hope Bay Joint Venture (Hope Bay Gold Corporation Inc. and Miramar Hope Bay Ltd. or HBJV). Following screening of the Application by the Nunavut Impact Review Board (NIRB), the NWB held a pre-hearing teleconference on April 25, 2001. Following the pre-hearing conference, the NWB decided to proceed by way of a written hearing. After considering HBJV's Application and submissions from several parties (the Kitikmeot Inuit Association (KIA), the Department of Indian and Northern Affairs Canada (DIAND), Fisheries and Oceans (DFO), Environment Canada (EC), the Nunavut Wildlife Management Board (NWMB), the Hamlet of Cambridge Bay and Brodie Consulting Ltd.), the NWB decided to renew HBJV's Boston water license for a term of five years. The license authorizes HBJV to use up to 150 cubic metres of water per day for all purposes, from Aimaoktak (Spyder) Lake. The NWB attaches other conditions with respect to waste disposal, sewage and sludge, minewater, fuel storage and spill contingency, acid rock drainage and metal leaching from ore and waste rock piles, abandonment and restoration, and water monitoring. On the issue of the assessment of the cost of abandonment and restoration, the NWB asks HBJV to re-submit a reclamation plan and cost estimate based among other things on off-site solid waste disposal for Boston only. Until HBJV submits the revised plan and cost estimate, the NWB requires the Licensee to maintain a $1.7 million security deposit as per the previous license.

## I. PROCEDURAL HISTORY AND BACKGROUND

Procedural History

This matter involves the renewal of water license NWB1BOS9801 for Hope Bay Joint Venture[1] (HBJV)'s Boston Gold Project. This license authorizes Hope Bay Joint Venture (HBJV) to use water and dispose of waste in conjunction with bulk sampling operations. The Boston Gold Project site is located on Inuit Owned Land, of which the Kitikmeot Inuit Association (KIA) is the surface landowner. The site is located on a peninsula situated on the south shore of Spyder Lake, known as *Aimaoktak* Lake in *Innuinaqtun*, in the Kitikmeot region of Nunavut at longitude 106°22' West and latitude 67°39' North.

The initial water license N7L2-1652 was issued to BHP Minerals Canada Ltd. by the Northwest Territories Water Board on August 1, 1995. On April 23, 1997, after powers over the regulation, use and management of water in the Nunavut Settlement Area were devolved to the NWB pursuant to the *Agreement Between the Inuit of the Nunavut Settlement Area and her Majesty the Queen in Right of Canada* (NLCA), the NWB approved an amendment to license N7L2-1652 authorizing the Licensee to upgrade the sewage treatment facilities and to add a water second intake structure to facilitate mine operations.

On August 1, 1998, the NWB renewed BHP's Boston water license for a term of three years. As with the previous license, this new license, NWB1BOS9801, authorized BHP to use water and dispose of waste in conjunction with the bulk sampling operations. The assessment of the financial security required of BHP was decided by the NWB following a public hearing held in Cambridge Bay, Nunavut, on February 22, 1999. In its decision,

[1] A joint venture between the Hope Bay Gold Corporation Inc. and Miramar Hope Bay Ltd.

the NWB decided to require $1.7 million of BHP, which amount represented the full cost of reclamation of the site by a third party less a credit for BHP's good compliance record[2].

In 1999, the Boston property was sold to Cambiex Exploration Inc., who applied for the assignment of the Boston license. On October 27, 1999 the NWB approved the assignment of license NWB1BOS9801. In 2000, Cambiex Exploration Inc. changed its name to Hope Bay Gold Corporation Inc. and later entered into a joint venture with Miramar Hope Bay Ltd to form the Hope Bay Joint Venture (HBJV).

On February 6, 2001, the NWB received an application for license renewal from HBJV (Application). In accordance with Article 12 of the NLCA, the Application was screened by the Nunavut Impact Review Board (NIRB) to determine whether it had significant impact potential and whether it required review prior to processing by the NWB. The NIRB Screening Decision[3] indicated that the Application could be processed without a review under Part 5 or 6 of Article 12 of the NLCA. Following receipt of the decision and review of comments from interested and concerned parties[4], the NWB decided to hold a hearing before approving the application. Notice of the public hearing was given

[2] "Security Deposit for BHP Boston Gold Project" April 21, 1999. Page 1.

[3] Screening Decision of the Nunavut Impact Review Board (NIRB) on Application: NIRB 01WR008 dated March 8, 2001. The decision of the [NIRB] Board in this case is 12.4.4 (a) the proposal may be processed without a review under Part 5 or 6 [of Article 12 of the NLCA]; NIRB may recommend specific terms and conditions to be attached to any approval, reflecting the primary objectives set out in Section 12.2.5. The screening decision outlines the following: authority of the NIRB; primary objectives; reasons for decision; terms and conditions with respect to drill and trench sites, water, fuel and chemical storage, waste disposal, wildlife, environmental structure & storage facilities, archaeological sites, attachment from Fisheries and Oceans, reclamation, and other recommendations; and the validity of the NLCA.

[4] Comments were received from the following parties:

a) February 20, 2001: Jordan de Groot, Fisheries and Oceans
b) February 25, 2001: Anne Wilson, Environment Canada
c) February 26, 2001: Doug Crossley, Community Government & Transportation
d) March 2, 2001: Greg Cook, Indian and Northern Affairs Canada
e) March 12, 2001: John Donihee, Legal Counsel for KIA
f) March 14, 2001: Ruth Niptanatiak-Wilcox, Municipality of Cambridge Bay
g) March 14, 2001: Michelle Wheatley, Nunavut Wildlife Management Board

on March 26, 2001. A pre-hearing conference[5] was held on April 25, 2001 to inform the public about the Application and the process to be followed by the NWB.

At the pre-hearing conference (PHC), the NWB:

1) Identified interested parties[6];
2) Formulated technical issues: The main issue identified by the parties related to potential acid rock drainage[7] (ARD) and metal leaching.
3) Discussed the service of documents to the parties: Parties were informed that new data[8] was available form HBJV on the issues of ARD and supplemental information existing on the NWB public registry, and that these documents should be available to the parties. HBJV agreed to submit by May 31, 2001 an updated AR plan that would include the cost estimate of reclamation.
4) Discussed the format of the public hearing: Parties requested that the NWB not decide on the format of the hearing until parties had the opportunity to review new information. . The NWB agreed to give parties 30 days to review

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[5] The Pre-Hearing was initially scheduled for May 16, 2001 in Cambridge Bay, but on March 28, 2001 the date was revised to April 25, 2001 due to the availability of accommodation in Cambridge Bay. The revised Notice of the Pre-hearing was given in English and Innuinaqtun, to local, territorial and federal government agencies on March 28, 2001. However, rather than holding the pre-hearing conference in Cambridge Bay as scheduled, the conference was conducted via teleconference as all registered participants indicated their preference for a teleconference.

[6] The PHC was attended by representatives of the Hope Bay Joint Venture (HBJV), the Kitikmeot Inuit Association (KIA), the Department of Fisheries and Oceans (DFO), Environment Canada (EC), the Department of Indian and Northern Affairs Canada (DIAND), the Nunavut Department of Sustainable Development (DSD) and Mr. John Brodie, an independent expert retained by the NWB.

[7] The Dictionary of Environmental Science, Third Edition (Andrew Porteous, John Wiley & Sons Ltd.) defines acid rock, or mine drainage, as follows: "Many mining operations, particularly those that work sulphide ores…where pyrites (iron sulphide) are present, can, through a combination of air and moisture, form acidic and metal-bearing solutions. This combination of acids and metals can have severe local effects on the ecology of streams and rivers, and the metals can enter food chains and further affect life…"

[8] On May 7, 2001, the NWB received a letter dated May 3, 2001 from HBJV with a CD that contained the report titled "Acid Rock Drainage Characterization, Boston Property (Waste Rock) Final Report, Rescan Environmental Services Ltd., February 1999." and a letter from Larry Connell, consultant for HBJV titled "Review of Past ARD Characterization at the Boston Property".

new data on ARD before determining the closing date for final submissions and replies. Parties were given until June 17, 2001 to submit comments on the format of the public hearing and on whether the issue of ARD or any other water or waste related matter relevant to the renewal of license NWB1BOS9801 should be dealt with at the hearing.

On June 25, 2001, the NWB informed all parties that the Application would be processed by way of a written hearing and identified the issues that would be dealt with through the written hearing. The NWB also established the following deadlines for the written hearing:

1) Filing of written submission: July 17, 2001;
2) Replies to written submissions: July 24, 2001; and
3) Final submission by HBJV: July 31, 2001.

In light of the fact that License NWB1BOS9801 was due to expire on August 31, 2001, the NWB decided to extend the validity of the current License until a decision was made on this Application.

Background

Hope Bay Joint Venture is a partnership between Hope Bay Gold Corporation Inc. and Miramar Hope Bay Ltd. License NWB1BOS9801 was assigned to Cambiex Exploration Inc. on October 27, 1999.

The Boston Gold Project is located on a peninsula on the south shore of Aimaoktak (Spyder) Lake in the Kitikmeot region of Nunavut at a longitude of 106° 22' West and latitude of 67° 39' North. The terrain consists of glacial tills, clays, and some bedrock

outcrops, in the continuous permafrost area. Vegetation includes Arctic shrubs, mosses, and lichens.

Surface disturbances have been limited to a compact footprint of about 4 hectares, plus 1.5 hectares for the airstrip. Additional disturbances exist at diamond drill sites. Activities have consisted of drilling and underground bulk sampling. The latter has involved excavation of about 22,000 tonnes of ore and 114,000 tonnes of waste rock. Openings to the underground consist of a portal[9] and a vent raise[10]. Surface facilities include: ore and waste stockpiles, and ore processing plant, and numerous small buildings (offices, camp, shop, storage, etc.).

The chronology of development at the Boston site is roughly as follows:

- 1991 – BHP began preliminary exploration;
- 1993 – BHP initiated an environmental baseline;
- 1996 – BHP Underground bulk sampling began;
- 1997 – BHP Underground bulk sampling concluded;
- 1998 – BHP Surface drilling and resource evaluation started;
- 1999 – HBJV Advanced exploration work continues.

Description of Geology, Mineralogy, and Rock Types

Because the issues of possible ARD and metal leaching at Boston are pivotal in the review of HBJV's Application and the submissions presented by other parties, it is worthwhile describing and understanding beforehand the mineralization and rock types associated with the Boston ore body, which will require management during the term of the License.

[9] The surface entrance to a mine, tunnel or adit.
[10] A steeply inclined rectangular or cylindrical opening used for ventilation or for conveying ore or backfill.

The following description is extracted from data presented by HBJV with their Application[11]:

> *"A broad, continuous, north striking, shear-parallel zone of significant quartz-dolomite veining with associated pyrite mineralization defines the B-2 mineralized horizon. It has a length of approximately 900 m and a width of 25 to 50 m. Within the zone of alteration, the mineralization of economic interest consists of a series of narrow quartz veins and pods with sulphide[12] contents of 2-5% and gold contents of approximately 10-30 g Au/t. Individual lenses of economic interest within the zone are 2 to 10 m wide, 30 to 50 m long and 30 to 150 m in height."*
>
> *"The host rock in the immediate vicinity of the mineralization is a large carbonate alteration zone, which is made up mainly of iron carbonates. It is 900 m long and 25 to 50 m wide. On the east side of the carbonate altered rocks there are meta-basalts. On the west side of the carbonate altered rocks there are meta-sedimentary rocks. Turbidites, ranging from massive greywackes to fine argillites, are the main sedimentary rocks. They are thought to be younger than and most likely derived from the underlying extrusive mafic volcanics. The greywackes occur as wide, homogeneous fine-grained units. Only rarely are relict grains visible. Outside of the main shear zone, the greywackes are dark grey-brown and fairly easily recognizable. Within the deformed/altered zones, the greywackes are subject to the same sericite/dolomite alteration as are the mafic volcanics. Interlayered with the greywackes are fine grained, graphitic, pelitic, bedded argillites. Occasionally, bedding is well preserved and fining upwards can be observed in several sequences."*
>
> *"Gold mineralization is mainly associated with pyrite and usually occurs at the margins of quartz-dolomite veins in pyrite-mineralized wallrock. The pyrite typically forms in cubes and semi-massive blebs less than 1 mm to 10 mm in size, concentrated in bands along foliation planes of the wallrock as a halo around the quartz-dolomite veins. The pyrite halo is generally less than 15 cm in width, with progressively finer-grained pyrite bands radiating concentrically outwards from the vein. The large amount of iron carbonate present in the rock makes it a net acid consumer, in spite of the*

[11] NWB Supplemental Questionnaire, pp. 8-9
[12] A compound of sulphur and some other element (e.g., iron sulphide).

*presence of pyrite. Gold in the veins is present in contents averaging between 10 and 30 g Au/t."*

Based on the above description, the ore zone (B2, B3) is associated with alteration, quartz-dolomite veining and pyrite mineralization. The host rocks, which will comprise most of the waste rock during development, consist of basalts, mafic volcanics and metasediments, with varying amounts of carbonate alteration, made up mainly of iron carbonates (siderite, ankerite).

## II. ISSUES

Following the PHC, the NWB decided that the scope of the hearing would comprise the following issues:

1) All matters currently regulated under License NWB1BOS9801;
2) Potential acid rock drainage and metal leaching from ore and waste rock piles;
3) Abandonment and restoration of the undertaking;
4) Assessment of the cost to carry out the abandonment and restoration of the undertaking; and
5) Terms and conditions for the financial assurance.

## III. SUMMARY OF EVIDENCE

Hope Bay Joint Venture

In their initial Application of January 30, 2001, HBJV states that there were no major changes in the operation over the course of license NWB1BOS9801 and that they do not anticipate changes for the new Application. As such, HBJV is not seeking significant changes to the terms and conditions of the existing license. In addition to the Application and supporting documents, a revised Abandonment and Restoration Plan was re-submitted by HBJV in August 2001 as requested by the NWB on August 17, 2001. This plan is a revision to the original plan dated May 2001 submitted with the Application and covers activities at the Boston site only. The Plan assumes that some waste will be discarded at the Boston site in a solid waste disposal facility or underground.

HBJV's Application is for the renewal of the existing water license, which will enable the continued advanced exploration programs at Boston; covering prospecting, continued surface drilling, core splitting and logging on site, underground drilling/exploration and possible future development which may require handling of waste rock material and ore to be stored on surface or adjacent to existing waste/ore pads, domestic use and associated activities and possible additional environmental baseline data collection.

ARD characterization of the waste rock at the Boston property[13] was carried out in 1999 by Rescan Environmental Services Ltd. (Rescan) for BHP, who was the property owner at the time. HBJV forwarded this report to the NWB as part of their Application on May 3, 2001. A letter report[14] prepared by Knight Piesold (KP) was also included.

[13] Acid rock drainage characterization, Boston Property Waste Rock. Prepared by Rescan Environmental Services Ltd. for BHP. February 1999.

The final report on ARD characterization for the Boston Property (Rescan, 1999) indicated acid generation testwork was completed on samples collected in 1993, 1996, and 1997. Excavation samples were obtained and represent a volume of rock, not a specific rock type whereas drill core samples were chosen to represent rock types. The different rock types from which samples were obtained are as follows:

- Basalt - unaltered
- Basalt - weakly altered
- Basalt - moderately altered
- Basalt - strongly altered
- Zone B2 - alteration halo
- Zone B2 - mineralized zone
- Zone B3 - alteration halo
- Zone B3 - mineralized zone
- Gabbro - unaltered
- Quartz/carbonate dyke
- Metasediments - unaltered
- Metasediments - strongly altered

During the 1996/1997 exploration program conducted by BHP, a total of 136,000 tonnes of ore and development rock was brought to the surface from the decline[15] (KP, 2001). Static testing[16] in the form of Acid Base Accounting (ABA) was performed on Boston Property samples collected from the decline material during the 1996 and 1997 field season (283 samples) and from drill core material during the 1997 field season (43

[14] Review of Past ARD Characterization at the Boston Property. Prepared by Knight Piesold for Hope Bay Joint Venture. May 2001.
[15] A decline is a sloping opening, usually driven at a grade of about 15% to 20 %, for machine access from level to level or from surface to get to the ore and take the ore out.

samples). Due to the potential for some of the material to be used as construction material and/or stockpile on the surface, additional prediction testwork in the form of kinetic testing[17] was undertaken on 3 drill core samples.

Static testing was done on this material to identify the non-acid generating components, which were then used as construction material. The potentially acid generating materials were stored in stockpiles constructed upon pads composed of non-acid generating waste rock from the decline.

The majority of the material was found to have low acid-generating potential due to the preponderance of neutralizing minerals, mainly carbonates, relative to sulphide minerals. Kinetic testing was carried out on samples from the altered basalt, B2 mineralized zone and B3 alteration halo rock units because of their potential for surface storage and/or use as a construction material. The results of the kinetic testing indicated that while the altered basalt and B3 alteration halo rock units are unlikely to generate net acidity in the long term, the B2 mineralized zone will likely generate net acidity. Furthermore, potential metal leaching from all three samples is a concern, particularly for arsenic, copper and nickel.

Based on the testwork completed during the ARD characterization program, Rescan recommended the following:

1) Due to the potential for arsenic leaching, altered basalt material should not be used for construction purposes without further mineralogical analysis;

[16] Static testing is a procedure used for the prediction of potential ARD and metal leaching by determining the geochemical properties of a material. Other common ARD and metal leaching prediction procedures are kinetic testing and water extraction.

2) Existing piles of decline material located close to the Boston exploration camp should be covered to minimize infiltration and a diversion/collection system should be installed to prevent drainage from entering receiving waters;

3) Any altered basalt, B2 mineralized zone or B3 alteration halo material that is exposed during future development should be isolated to keep drainage from entering receiving waters;

4) On-site kinetic testing of materials that will be stored on the surface or used for construction should be initiated as soon as possible. Opportunistic sampling of seepage from existing and identified piles of decline material should occur whenever seeps are observed, to verify the results obtained from laboratory kinetic testing.

KP reviewed the Exploration and Bulk Sampling Program Waste Rock Disposal Plan (BHP, 1998) & (Rescan, 1999) final report and made the following conclusions/recommendations:

1) KP concurred that neutral metal leaching of arsenic, copper and/or nickel may be an issue at the Boston Property; however the body of evidence was too small and could not be relied upon at this stage to draw final conclusions.

2) KP further indicated that some of the data is contradictory and could not be explained by the current knowledge of ARD potential at this site, suggesting that additional data on neutral metal leaching potential needed to be collected once further underground development work would commence at the Boston Property.

[17] Kinetic testing is another procedure used for the prediction of potential ARD and metal leaching by determining the geochemical behavior of a material over time.

3) KP also pointed out in their review that the material mined to date had been placed on the surface in a manner appropriate to facilitate monitoring and control of any ARD that may occur over the short term while future mine plans develop. Material with uncertain acid generating potential had been placed on top of a layer of waste rock with known high buffering capacity.

4) The potential season over which contaminants can be transported out of the stockpiles is restricted to those months when temperatures are above freezing. Consequently, monitoring of runoff from the stockpiled material can be focused on the spring thaw and during the short summer season.

5) KP recommended that protocols be established to monitor for indications of ARD and/or metal leaching associated with the material currently stored within the stockpile area. However, placing a cover over the existing piles of decline material stored in the lay down area, as recommended in the 1999 Rescan report, was not deemed necessary, unless these materials were determined to be an active source of contaminant release.

6) KP considered the existing level of ARD characterization data to be adequate to plan closure for this site, if no further development were to take place. A potential closure option was to return the stockpiled material to the decline, from where it came, thereby minimizing further oxidation of the contained sulphide minerals. Alternatively, if mine development eventually proceeds, the stockpiled material would be processed through the milling circuit.

In summary, HBJV, in its Application and through subsequent submissions:

1) Is seeking a five (5) year license term with an expiry date of August 2006;

2) Agrees with the addition of a Surveillance Network Program (SNP) Station below the waste and ore stockpile to increase the database on

potential metal leaching from this area. The sampling frequency should be monthly during periods of flow and when the Boston camp is in operation. The parameters for analysis should be the same as those stated for SNP Station 1652-2. If metal leaching is in fact occurring, the HBJV is prepared to develop appropriate management plans to ensure minimal impacts to adjacent water bodies;

3) Does not see the validity of increasing the parameters for analysis at any SNP Station and suggests these requirements remain as currently specified in the current license;

4) Asks the NWB to seriously assess the need for additional studies as requested by other interveners;

5) Disagrees with DIAND's suggestion that the Rescan report recommendations should be implemented to address the issues of potential ARD. HBJV notes that Rescan did not investigate the practicality or viability of their recommendations before putting out their report (i.e. no work was done to identify how the piles were to be covered or where drainage ditches could be placed), therefore, until such time as more definitive information is available, HBJV believes that perceived issues can be addressed in a revised SNP program;

6) Notes that the body of waste characterization work conducted on this property to date has been quite extensive, and that the results suggest that acid generation is not likely to be a problem for the bulk of the waste materials, but that select rock types may warrant special management as there are indications that neutral metal leaching of arsenic, nickel and copper may be associated with some rock types;

7) Acknowledges that additional waste characterization work will be required as part of ongoing exploration activity to address these issues as the project moves forward;

8) Asks that the reports prepared by FSC and Lorax for the KIA, although valuable information, be considered as another set of data, which complements the already existing large information base and that conclusions and further requirements be scrutinized prior to the NWB suggesting new or expanded ARD/metal leaching programs.

9) Feels that the first step is to increase the SNP by one sampling station to increase our knowledge on ARD;

10) Asks the NWB to allow drilling on ice and land based drilling in some cases close to shore and within the 30 meter restriction so as to give HBJV flexibility to continue its exploration program;

11) Asks the NWB approval to dispose sewage sludge[18] on land rather than in a sump as a demonstration or test project;

12) Asks the NWB to approve an on-site Solid Waste Disposal Area in the renewed license or alternatively that the NWB provide positive and supportive comments to KIA enabling them to approve the site;

13) Asks the NWB that the requirements for a revised Quality Assurance and Quality Control (QA/QC) plan and Spill Contingency Plan be incorporated into the renewed license with submission in acceptable timelines (i.e., 90-120 days);

14) Asks the NWB to approve the August 2001 Boston-only A&R Plan, along with a reduced bonding requirement which more accurately reflects the current costs for reclamation based on revised cost estimate provided by Nuna Logistics.

In their final submission, HBJV points out that water License NWB1BOS9801 requires a bond in the amount of $1,700,000.00 and that this amount was provided in full effective January 1, 2001 by Letters of Credit.

[18] A mud-like residue (solids and some water).

Based on the current total bonding level provided by the HBJV of $1,700,000.00, and the revised cost estimate from the August 2001 A & R plan provided by Nuna Logistics for the Boston-only scenario to complete all restoration activities at either $1,285,100.00 (surface contouring and rehabilitation) or $1,337,911.00 (relocate stockpiled ore underground as recommended by BCL), HBJV asks the NWB to reduce the total bonding requirement in the order of between $362,000 to $415,000 depending on the selected option for the reclamation of stockpiled ore.

Finally, the HBJV also asked the NWB to have the opportunity to review the "draft" renewed license before the NWB finalizes it.

Kitikmeot Inuit Association

The Kitikmeot Inuit Association (KIA) is the Designated Inuit Organization in whose name title to Inuit owned surface lands in the Kitikmeot was vested upon ratification of the NLCA in 1993. The KIA manages Inuit Owned Lands (IOLs) on behalf of Inuit and in particular Kitikmeot Inuit. KIA's goal is to promote Inuit self-sufficiency and economic development in a manner consistent with Inuit cultural and environmental values and goals.

The KIA is the surface landowner of the land parcel located at Aimaoktak (Spyder) Lake upon which parts of the BHP Boston Project improvements and facilities are located.

The KIA interventions deal with two main issues: (1) acid rock drainage and metal leaching; and (2) abandonment and restoration and assessment of reclamation costs, and (3) payee of the security and its form.

KIA, as part of their review of the HBJV application, retained Ferguson Simek Clark Engineers (FSC) to assist in the interpretation of data relating to ARD and metal leaching. FSC in turn hired Bruce Matson of Lorax Environmental Services Ltd. (Lorax) to provide expert ARD advice. In June 2001, FSC staff visited the Boston site and conducted a limited field-sampling program of both rock and water at the site to provide additional information about ARD and metal leaching potential. The field sampling involved collection of ten samples taken from ten different locations within the ore piles, of which only three underwent acid base accounting analysis. Ten soil samples[19] were taken. Five water samples were collected within the runoff area and two were collected from the standing water in the camp.

FSC and Lorax prepared a review of the 1999 Rescan report and point out areas where they disagree on the interpretation. With respect to ARD, FSC/Lorax have the view that Rescan has overestimated the acid generating potential of the property, but agree that pH neutral leaching of arsenic, nickel and possibly other heavy metals remain an important concern.

The following preliminary conclusions on the issues of ARD and metal leaching were drawn after the preliminary analysis of the on site sampling results by FSC:

1) The three ore pile samples collected by FSC contained somewhat lower neutralization potential[20] (NP) values and had a higher total sulphur content than the material sampled by BHP geologists and Rescan.
2) KIA samples appear to be more diluted with quartz vein material associated with the ore.

[19] Nine samples taken based on grid pattern and one was taken in the area of a drill casing
[20] A general term for a sample or a material's capability to neutralize acidity.

3) All of the ore pile rock samples had paste pH > 7.5 which suggests the material is not currently acid generating.
4) Soil samples from the area down slope of the waste rock/ore storage had low net neutralization ratios and low sulphur contents.
5) All but one of the soil samples had paste pH <6, however KIA suspected that this may be a result of test procedure and/or not necessarily related to exploration activities.
6) Arsenic leaching from the waste rock was indicated in the water test results.
7) The presence of standing water appeared to exacerbate the leaching of arsenic and nickel, both of which exceeded the CCME Water Quality Guidelines for the Protection of Aquatic Life. FSC also indicated that there appeared to be sufficient assimilative capacity in the drainage system to lower the concentration of these two metals to within the CCME WQG for PAL, prior to the discharge to Aimaoktak (Spyder) Lake.

KIA recommended the following activities be carried out with respect to the concerns about ARD/metal leaching:

1) Paste pH values should be compared with other samples taken during baseline monitoring or samples from adjacent undisturbed slopes to establish if the slightly acidic soil pH values are the direct result of exploration activities.
2) Geochemical leaching characteristics of any new waste rock and eventually of mine tailings[21] should be determined to facilitate the design of management facilities;
3) Determine the presence, distribution and form of arsenic in the critical geologic units that will be mined;

[21] Material rejected from a mill after most of the recoverable valuable minerals have been extracted.

4) Ongoing determination of ARD and metal leaching potential for new areas of the mine as they are developed;
5) Maintain an inventory of which materials are placed in which location on the surface;
6) Establish monitoring stations to assess the quality of water discharged from the stockpiles, tailings and other altered surfaces including the roads and campsites in addition to any sampling in Aimaoktak (Spyder) Lake; the SNP should be reviewed and modified as required to monitor metal leaching from the ore and waste rock piles.

On the issue of abandonment and restoration of the site and the assessment of cost, KIA notes that in his May 14th, 2001 submission to the NWB, Mr. Brodie recommended that the security bond should reflect the costs of relocating stockpiled ore back into the underground development in the event that the exploration activity does not yield a producing mine. KIA agrees with this recommendation. Although the KIA does not comment on the amount of the current security deposit, they note in their July 17, 2001 submission that the A & R plan filed by HBJV is based on the assumption that some waste will be disposed of either underground or be buried at the solid waste disposal site at Boston. KIA points out that License NWB1BOS9801 prohibits the burying of scrap and other bulky wastes, the current KIA land use permit does not authorize the establishment of a dump, and furthermore clearly states that it would be unlikely that KIA would approve either a solid waste facility or the disposal of solid waste underground on IOLs at Boston. With this in mind, KIA submits that the assumptions used in the costing of the A & R plan underestimate the real cost of clean up and reclamation of the site. Specifically on the A & R Plan, KIA recommends (1) that the NWB should not approve an A & R plan based on solid waste disposal on IOLs or underground, and (2) that if any such facility for solid waste disposal was proposed by

HBJV, it would have to be screened pursuant to Article 12 of the NLCA before the NWB can approve it.

The KIA submissions, including its reply, on the topic of security conditions essentially rebuts the argument advanced by DIAND, except regarding the pledge of assets where KIA agrees with DIAND that, unlike in the previous license, this form of security should not now be accepted by the NWB. In the balance of their submissions, KIA tells the NWB that the arguments presented by DIAND with respect to the scope of NWB 's jurisdiction to set security conditions should be rejected. The suggestions that the security conditions fetter the Minister's discretion or that they constitute a delegation of the NWB's responsibilities arise from an interpretation of the terms of the water license that is not in accord with the plain language of the license and was never intended by the NWB or the parties giving evidence at the 1999 hearing. As long as the licensee maintains security in amounts fixed by the NWB and which are reassessed annually, based on the concept of progressive reclamation, a draw down by KIA will not in its opinion constrain the Minister's options.

On security, KIA concludes that the terms for access to water license security included in the 1999 decision are acceptable and that they should not be disturbed.

Department of Indian and Northern Affairs Canada

The submissions from the Department of Indian and Northern Affairs Canada (DIAND) essentially deal with (1) general matters included in the current license, (2) ARD and metal leaching, and (3) security provisions.

On the issue of waste disposal and effluent quality, DIAND feels that the Surveillance

Network from the previous license is sufficient but they propose the addition of Nutrients[22] as regulated parameters at the point of sewage effluent discharge to Aimaoktak (Spyder) Lake (Station 1652-4 and 5). Furthermore, DIAND recommends that the NWB amend the SNP to add Nutrients to the sampling requirements for Station 1652-3 to be sampled during periods of discharge.

Regarding HBJV's proposal for on-land disposal of sewage sludge produced by the sewage treatment facility, DIAND notes that this has not been commonly done before, and that more information regarding the amount of sludge, their composition, and possible runoff issues and mitigation measures should be provided to the NWB if the company wishes to explore this alternative.

Regarding fuel storage and spill contingency planning, DIAND is of the opinion that the 30-metre limits between a water body and a fuel storage facility should remain in the license, and that the Licensee should apply for an amendment if the construction of a facility within the 30-metre zone is contemplated. DIAND also recommends to the NWB to continue requiring from the Licensee to report all spills, regardless of volume, to the Spill Line as it is up to the signatories of the Working Agreement on Spills to make a decision on possible threshold for reportable spills.

On the subject of ARD and metal leaching, DIAND's submissions contain several recommendations, which are a combination of those made in the Rescan reports, and others made by Peri Mehling, P.Eng. of Mehling Environmental Management Inc. (MEMI), an independent consultant that was contracted by DIAND for the purposes of this review. In general MEMI[23] concurred with the Rescan recommendations.

[22] Total Phosphorous, Orthophosphorous, Total Nitrogen, Nitrate, Nitrite.
[23] Review of Hope Bay Joint Venture – Boston Project Geochemistry Issues. Prepared by Mehling Environmental Management Inc. for DIAND. June 2001.

DIAND concludes that the position of all interveners appears to be unified, as there seems to be a lack of understanding of the ARD potential of the material stored on surface and the evident metal leaching. Existing data from the Licensee suggests that the stored rock is leaching metals, possibly in neutral conditions, and that the neutralization potential of the ore may be decreased by the presence of iron carbonates. DIAND notes that the report submitted by the KIA also eludes to these problems and recommends that a correction be applied to the acid-base accounting results to provide a greater understanding of the actual neutralization potential.
DIAND believes that it is essential that the Licensee take measures to fully understand the long term ARD potential at this site and develop methods to mitigate the impacts of this and metal leaching. Consistent with other interveners, DIAND recommends further analysis to ensure adequate knowledge is available to evaluate the conditions of this site and develop effective monitoring and site management plans.

DIAND notes in their intervention, that according to site sampling conducted in the summer of 1999, standing water located downslope of the ore stockpiles contained high levels of metals[24]. The samples were high in sulphate indicating acid rock drainage; however, the pH was between 7.48 and 8.36, which suggests that the neutralizing potential of the ore is sufficient. Given the high metal content of this water, DIAND recommends that the SNP be modified to include sites that will enable effective monitoring of the quality of runoff water.

With regard to water management and metal leaching, DIAND requested that the NWB consider requesting the following:

1) Evaluation of the need for tighter containment of waste rock and ore stockpile runoff and leachate.

[24] Aluminum, Arsenic, Chromium, Iron, Lead, Nickel, Silver.

2) HBJV to follow up on suggestions contained in the Rescan report, which suggested that the ore piles/stockpiles be covered to minimize infiltration and that a collections/diversion system be installed to prevent drainage from entering receiving waters.
3) Water extraction tests (Modified SWEP)[25] should be conducted on uncrushed samples collected from the stockpiles that have been exposed for some period of time to indicate the presence/quantities of soluble metal products that are available for leaching from the rock surfaces.
4) A water management plan should be completed and should include provisions to contain run off water from the waste rock piles and a plan for the placement of newly excavated materials such that runoff and leachate can be collected and monitored.
5) Seepage monitoring should be conducted regularly.

With regard to ARD, metal leaching testing and analysis, DIAND requested:

1) Further evaluation of the existing static test results on the basis of kinetic and on-site monitoring results.
2) Further analysis to determine the effect of the iron carbonates and a determination of the carbonate forms attributable to calcites, dolomites and iron carbonates in the static test samples.
3) Field and laboratory kinetic tests should be initiated on additional samples (construction materials, waste rock, etc.) Tests should be conducted on a variety of samples including basalts with varying amounts of alteration. NP, metal and sulphide contents should be

[25] Water extraction tests are used to predict potential ARD and metal leaching and indicate the short term leaching characteristics and potential for metal release from a sample.

included in these tests to determine which materials will generate acidity or metal leaching under neutral conditions.

4) Future static tests should include mineralogical assessments (Rescan, 1999) and laboratory corrections of neutralization potentials for siderite.

With regard to waste rock characterization, DIAND requested:

1) Re-evaluation of criteria for selection of suitable construction materials on the basis of current information (i.e. kinetic test results).
2) Results of surface rinse extraction tests on uncrushed samples of material currently stored on surface, including representative ore, waste rock and underlying pad material.
3) Sampling and analysis plan for newly excavated materials, which should include siderite corrections, the use of ICP data to evaluate potential iron carbonate content as a fraction of reported carbonate content and kinetic tests on a range of materials, particularly basalt with various amounts of alteration, neutralization potential, sulphide and metal content.

On the issue of abandonment and restoration, DIAND recommends the annual review of the A & R plan, and requests that future closure plans assess the potential and timing for closure activities to fill with water and/or ice, as well as evaluate the space available below the active surface layer for disposal of waste rock in the decline from where it came. On July 17, 2001, under separate cover, DIAND provided comments on the May 2001 A & R plan and indicated that the Plan lacks sufficient details and does not address many of the environmental issues at the site including: hydrocarbon contaminated soil, areas with tundra burn and areas containing salt contamination and drilling wastes. Additionally DIAND indicated that the Plan did not describe work that

was undertaken during 2000-2001 to remediate these areas nor does it provide details as to how these sites will be reclaimed in the future. The Plan also lacked sufficient detail in the following areas: remediation of the ore stockpiles, solid waste disposal area and three ponds located in the proximity of the ore stockpiles. DIAND concludes that a more comprehensive plan should be submitted.

In terms of the security deposit, DIAND states that the conditions in the current license are unacceptable to the Government of Canada. In particular, DIAND contests the following conditions in the water license:

1) That the security instrument required as a condition of the license be issued jointly to the KIA and to the Receiver General of Canada;
2) That the security deposit be available for reclamation or abandonment and restoration not only under the NWB water license, but also under the land tenure agreement between KIA and the Licensee;
3) That the form of security could include a pledge of assets by the licensee; and finally
4) That a specific Alternative Dispute Resolution mechanism be used to govern discussions between the landowner and the licensee.

It is DIAND's contention that the decision by the NWB to these conditions on the security deposit was made outside of the NWB's mandate. DIAND submits that the NWB's decision with respect to these conditions fettered the discretion of the Minister of DIAND, and that the NWB's decision with respect to the security deposit is an inappropriate delegation of its authority. In contrast to the KIA position, DIAND believes that the NWB has no authority to require a licensee to post security for damages to private land under a water license, and that is the responsibility of the landowner, i.e. the KIA, and not the NWB, as part of a commercial transaction between two private

parties. In addition, DIAND points out that there is an incorrect assumption that the water license security would only be used to compensate the KIA and DIAND since this security is also available to compensate any person adversely affected by the issuance of the water license under section 17(2) of the Northwest Territories Waters Act. DIAND concludes that there is no evidence before the NWB that it has the authority to impose the conditions that it has imposed in the previous license concerning the security deposit.

Brodie Consulting Ltd.

The NWB retained Mr. John Brodie, principal of Brodie Consulting Ltd. (BCL) as an independent expert to assist with the review of the HBJV's Application. The terms of his engagement were to submit a written report on the Application and supporting documents, and be available for cross-examination on his written comments.

Mr. Brodie initially submitted to the NWB a site inspection report of the Boston Project in July 2000, expressing concerns for the ARD potential of the ore stockpile material after having "…observed that numerous rock fragments on essentially every ore stockpile contained sulphide mineralization…"[26]

[26] Letter from BCL to the NWB dated July 26, 2000.

In respect to the Application, BCL reviewed the 1999 Rescan report[27] and the 2001 Knight Piesold report[28] submitted by HBJV, and submitted a report to the NWB[29]. In his report, BCL concluded that:

1) The risk of ARD or metal leaching from the waste rock which was used for site construction purposes is low;
2) There is little risk of ARD developing in the stockpiled ore in the short term, but acidic conditions are expected to develop in the long term;
3) The security bond should reflect the need for relocation of the stockpiled ore back into the underground development, for a total additional cost of $380,000, including mobilization/demobilization by aircraft;
4) There is a risk of impact to receiving waters associated with metal leaching from the stockpiled ore;
5) The recommendations of the 1999 Rescan report covering the potentially leachable rock and seepage sampling should be followed;
6) At least one SNP Station to monitor runoff from the ore stockpile area should be established.

Department of Fisheries and Oceans

The Department of Fisheries and Oceans (DFO) filed two submissions with respect to the Application. In their February 20, 2001 submission, DFO indicated that several aspects of the project (construction of the road to Stickleback Lake; operation of settling ponds; expansion of the ore storage pad and potential for acid rock drainage) might negatively impact fish habitat. DFO points out that during the summer of 2000 both the

[27] Acid Rock Drainage Characterization Boston Property (Waste Rock) Final Report. Rescan Environmental Services Ltd. February 1999. Prepared for BHP World Minerals.
[28] Review of Past ARD Characterization at the Boston Property. Knight Piesold Ltd. May 2001. Prepared for Hope Bay Joint Venture.

DFO and the DIAND inspectors found that the minewater ponds were being used to dispose of both liquid and solid waste, and that these were insufficiently bermed to retain sediments. In this respect, DFO recommends that the NWB consider asking HBJV specifically to submit a report showing that the condition of the settling ponds is satisfactory. Additionally, DFO asks the HBJV to perform ARD testing of existing ore stockpiles before the NWB approves their extension. DFO also made a number of general recommendations with respect to drilling operations, stream crossings, and the conduct of activities near water bodies.

In their final submission of July 24, 2001, DFO endorsed the recommendations put forward by DIAND regarding ARD, particularly with respect to the inclusion in the SNP of stations to monitor runoff water, including monitoring of TSS. Furthermore, DFO requested the NWB to consider requiring the HBJV to perform ARD testing of the existing ore stockpiles before expansion of the ore storage pad is permitted.

Environment Canada

In their submission of February 25, 2001, Environment Canada (EC) makes recommendations to the NWB with respect to drilling activities, spills, reporting requirements, ARD, and the proposed extension of the underground decline.

Regarding drilling activities, EC told the NWB that the maintenance of a 30 metres undisturbed area adjacent to the high water mark of any water body is intended to prevent shoreline disturbance and subsequent erosion into the shallow productive areas of the lakes. These littoral areas are important for the life stages of fish and their food sources and warrant protection. EC also points out that calcium chloride is being assessed as a toxic substance under the *Canadian Environmental Protection Act*, and recommends that this additive not be used with on-ice drilling unless all return water is recirculated and disposed such that it does not enter any water body. Because of the

[29] Letter from BCL to the NWB dated May 14, 2001.

potential toxicity of calcium chloride, EC recommends to add chlorides in the parameters measured at SNP Station 1652-2.

On the subject of spills and the proposed threshold for reporting suggested by HBJV, EC notes that the Agreement on Spills does not provide a threshold for reporting spills, and consequently asks the NWB to make reporting all spills mandatory, regardless of volume. In addition, EC would like the NWB to maintain the current wording of conditions requiring HBJV to submit plans such as the Spill Contingency Plan, A & R Plan, and QA/QC Plan. Finally, EC is concerned that the extension of the underground decline may produce minewater, and recommends that HBJV be required by the NWB to ensure the integrity and maintenance of the two minewater ponds presently on site, and that a contingency plan be in place in the event that water quantities are encountered which exceed pond capacity.

On the issue of ARD, EC recommended acid base accounting be done for the ore stockpile and that a SNP Station be added to monitor runoff from the pile for pH and metals, as well as periodic testing of waste rock.

Government of Nunavut

The Government of Nunavut (GN) submitted two interventions through the Department of Sustainable Development (DSD) and the Department of Community Government and Transportation (CG&T).

In their February 26, 2001 submission, CG&T recognizes that the licensee has demonstrated good operation and maintenance practices at the Boston site and has achieved required levels of compliance with regulatory requirements. Although CG&T does not note any specific problem, they recommend that particular care and attention be given to aircraft re-fueling operations. CG&T supports the issuance of a five-year license as requested by HBJV.

In an electronic message dated July 12, 2001, DSD's Resident Geologist indicates that ARD is not a large problem at the Boston site at this time, but that he concurs with BCL's assessment that there is ARD potential in the long term with the B2 mineralized zone. DSD's Geologist goes on to recommend that HBJV be asked to test some new drill core from time to time for ARD potential as the production decision approaches. The Resident Geologist goes on to suggest that some mineralogical/petrographic studies may be useful in determining the exact sulphide minerals present and in identifying those most likely to contribute to significant ARD. A review of other projects with similar styles of mineralization was also suggested, such as the Campbell Red Lake Mine in Northwestern Ontario.

Nunavut Wildlife Management Board

In their submission to the NWB dated March 14, 2001, the Nunavut Wildlife Management Board (NWMB) generally had no concerns with the renewal of the Boston water license, except with respect to fuel storage in proximity of water bodies in which case they recommend to the NWB that the 30-metre limit for storage of fuel near water bodies should not be changed in the license, contrary to what HBJV is suggesting in their Application.

Hamlet of Cambridge Bay

The Hamlet of Cambridge Bay told the NWB in a letter dated March 14, 2001 that they generally support HBJV's Application for license renewal, with the following specific recommendations:

1) That the project site be inspected annually to ensure that all waste disposal and fuel storage requirements are strictly adhered to;

2) That traditional land use not be impeded or discouraged;

3) That all archeological sites and all artifacts be identified, documented and preserved at their original site and in their original state;

4) That at the completion of the project a summary of the project along with photographs wherever and whenever possible be provided to the Elders and the Mayor and Council of the Hamlet of Cambridge Bay in order that the paper work may be archived;

5) Employees to be hired should be from within the Kitikmeot Region and wherever possible, be beneficiaries of the NLCA.

## IV. ANALYSIS

The NWB is seized with jurisdiction to consider this Application pursuant to Article 13 of the NCLA. According to Article 13.7.1, no person may use water or dispose of waste into water without the approval of the NWB.

Under section 13.8.1 of the NCLA, the NWB has the authority to request a broad range of information from an applicant for an approval, including information regarding steps to avoid and mitigate adverse impacts and any other matters that the NWB considers relevant.

The burden of proof in this hearing rests with the applicant. The NWB Rules of Practice state: "In cases in which the Board accepts evidence, any party offering such evidence shall have the burden of introducing appropriate evidence to support its position. Where there is conflicting evidence, the Board will decide which evidence to accept and will generally act on a balancing of the evidence".[30] Where a party presents no evidence supporting or rejecting the applicant's evidence, the NWB will base its decision on its own assessment of the applicant's request.

### A. Matters currently regulated under License NWB1BOS9801

Water Use

On the issue of water use, HBJV asks the NWB to maintain daily quantity of water used for all purposes at 150 cubic meters per day, to be drawn from Aimaoktak (Spyder) Lake at SNP Station 1652-1(a) as regulated under the current water license. HBJV points out in their Application that water requirements at this stage of the Boston project are minimal and will have insignificant impacts on the drawdown of Aimaoktak (Spyder) Lake, as the lake is large and continuously fed. No other party contradicted HBJV's

[30] *Rules of Practice and Procedure for Public Hearing*, Section 8.13.

request for the volume and source of water requested, and **the NWB accepts HBJV's request for a volume of 150 cubic metres of water per day.**

Sewage and Sludge Disposal

HBJV is not seeking any changes to the approved method for sewage disposal. Accordingly, and in the absence of evidence to the contrary, **the NWB decides to maintain the requirement to direct all sewage to the current sewage disposal facility and to continue implementing proper erosion control measure for any treated effluent discharged from the sewage treatment facility.** The NWB accepts DIAND's recommendation to **add the sampling / analysis of Nutrients to the SNP at Stations 1652-4 and 1652-5.** However, in the absence of site-specific data on Nutrients at Station 1652-4 and 1652-5 the NWB decides not to include Nutrients as a *regulated parametre* until such time as new data demonstrates the need to regulate maximum levels for these parametres. In this regard, the NWB also accepts DIAND's recommendation to **add Nutrients to the SNP at Station 1652-3.**

On the issue of sludge disposal, HBJV asked the NWB to approve the use of sewage sludge as a possible additive to impacted areas as a growth medium. DIAND responded that what HBJV was asking had not been proven yet, and asked the NWB to request additional information. The NWB notes that **the current KIA land use permit does not authorize on-land disposal of sludge**, and furthermore agrees with DIAND that should HBJV decide to carry out this proposal, it should simultaneously **submit an application for water license amendment** to the NWB, as well as obtain the necessary approval from the KIA. In view of that, supporting information for an application for on-land sludge disposal should include, but not be limited to:

1) Quantity of sludge;
2) Composition of sludge;
3) Location of test plots;
4) Sampling and analysis program;

5) Measures to control potential runoff and restrict access;

6) A schedule of implementation.

Meanwhile, **the NWB maintains the requirement to dispose of all sludge in a sump located at least thirty metres from the normal high water mark of any water body and such that they do not enter water.**

Minewater

DFO and DIAND submitted evidence from their respective inspectors that the Minewater ponds were being used to dispose of both liquid and solid waste, and were insufficiently bermed to retain sediments. The NWB accepts this evidence and confirms that **License NWB1BOS9801 authorizes HBJV to discharge Minewater, but no other types of waste, to these ponds.** The NWB maintains this condition in this approval. Alternatively, **the NWB instructs HBJV to operate and maintain the Minewater ponds, in particular with respect to the adequacy and integrity of their berms, to the satisfaction of the DIAND inspector**, so that any Minewater discharged in the ponds is contained and cannot be released directly or indirectly into the aquatic environment except during controlled discharge where **the effluent shall not exceed specific quality limits** at SNP Station 1652-2 for specific parameters[31] **and be discharged in such a way as to minimize surface erosion**.

Solid Waste Disposal

License NWB1BOS9801 allows for solid waste disposal in accordance with the terms and conditions of any approval by the KIA. It appears from evidence presented by the KIA that the establishment of a solid waste disposal site at Boston has not been authorized under a land use permit or lease. Consequently, the NWB concurs with the KIA that **the establishment of a solid waste facility on site as proposed by HBJV**

[31] Total Arsenic, Total Copper, Total Lead, Total Nickel, Total Zinc, Total Suspended Solids, pH, and Oil and Grease.

**cannot be envisaged in the new license** until proper applications are filed with both the NWB and the KIA, which applications shall be screened under Article 12 of the NLCA before they can be processed.

In view of that, supporting information for an application for licence amendment for the establishment of a Solid Waste Disposal site should include, but not be limited to:

1) Discussion of the proposed disposal method in relation to current or other waste disposal practices, and design of the facility;
2) Characteristics of the environment of the proposed site, in particular in relation to water resources;
3) Economic, legal and regulatory considerations;
4) Operation and maintenance of the proposed facility;
5) Monitoring program; and
6) Abandonment and Restoration.

Drilling Activities

HBJV points out in their Application and subsequent submission that current KIA land authorizations allow drilling from lake ice as well as on land within the 30-metres zone whereas license NWB1BOS9801 prohibits land-based drilling within 30 metres of the high water mark of any water body or watercourse. The NWB does not find any specific evidence in HBJV's Application to justify a relaxation of this requirement at this time and **decides to prohibit drilling within 30 metres of any water body** as the NWB agrees with EC that the maintenance of a distance of 30 metres provides a minimum buffer zone for the protection of water and aquatic life. Should HBJV propose to conduct land-based drilling within that buffer zone at a particular location or locations, an application for amendment shall be filed with the NWB. Likewise, the NWB agrees with EC recommendation **that chlorides be included in the parameters measured for SNP Station 1652-2.**

Fuel Storage and Spills

On the location of fuel storage areas, the NWB does not find any evidence in HBJV's Application and supporting documents to substantiate a relaxation of the 30-metre distance from water bodies as suggested by HBJV. The NWB agrees with both DIAND and the NWMB who recommend this minimum safeguard in the renewed license. **The NWB therefore decides that a distance of 30 metres between a fuel storage facility and a water body is a minimum buffer to protect water from potential spills. The NWB sees no substantiation in HBJV's Application to justify a reduction of that distance.** The NWB agrees with DIAND that if the Licensee wishes to construct a fuel storage facility within 30 metres of a water body, then HBJV will have to file an application with the NWB and the license shall be amended at that time *if the application is approved*.

Additionally, HBJV asked the NWB to set a threshold of 150 litres for mandatory spill reporting. Under that proposal, spills under 150 litres would be recorded by the Licensee but not reported to the Spill Line. The NWB agrees with DIAND and EC that the authority to modify the Agreement on Spills rests with the Government of Nunavut and the other signatories, and consequently cannot agree with HBJV's request to have spill over a certain quantity reported to the Spill Line, and **instructs, that the Licensee report all spills to the Spill Line**.

## B. Potential acid rock drainage and metal leachate from ore and waste rock piles

The NWB accepts what appears to be a general consensus among the interveners and HBJV that there is an overall lack of understanding of the ARD potential of the material stored on surface and that the stored rock is leaching metals under neutral conditions. The neutralization potential of the ore is decreased by the presence of iron carbonates and because of that, a correction factor (as recommended by KIA) should be applied to

the acid-base accounting results to provide a greater understanding of the actual neutralization potential.

The present renewed license will only authorize advanced exploration activities. Knowing that, a key component of future licensing terms and conditions is the long term ARD potential at the site. HBJV thus needs to develop effective monitoring and site management plans. The main objective of any future license conditions would be to ensure that the receiving waters are protected from metal leachate and ARD. HBJV must have suitable monitors located to detect metal leaching and an appropriate surface water management and contingency plans in place to contain and treat runoff water should metal leaching occur.

The NWB concurs with HBJV that further ARD/metal leaching studies need not be included as a license condition because HBJV is actively studying the waste characterization aspects as part of their overall exploration and development activities on this project. This will be a key requirement for future aquatic assessment of this project if it proceeds to the development phase. HBJV is aware of the issues that need to be addressed in future work, as presented in the above submissions.

The NWB agrees that, at least for now, the general concerns about ARD/metal leaching can be addressed through a **modification in the SNP** and a requirement to **prepare an ore and waste rock stockpile management plan** which includes the establishment of protocols to monitor for indications of ARD and/or metal leaching associated with the material currently stored within the stockpile areas.

HBJV will be required **to submit for approval a revised SNP, which will take into account the following considerations:**

1) The updated SNP will incorporate data on site topography, hydrology, current and future waste rock/ore pile storage pad locations and configurations and site drainage, ditching and runoff conditions. This

information will be used by the NWB to select the location or locations for additional SNP Station(s) such that runoff and leachate can be collected and regularly monitored. At least one SNP Station will be located below the waste/ore storage pad;

2) The SNP Stations shall be sampled during periods of flow, and focus on the spring thaw;
3) Opportunistic sampling of seepage from existing and identified piles of waste rock/ore shall be carried out whenever seeps are observed to verify the results from laboratory kinetic testing;
4) Water samples shall be tested in accordance with a protocol that can be related to the kinetic testing. The following minimum parameters are required:
    a) PH;
    b) Sulphate;
    c) Total metals (particularly heavy metals of environmental concern, including arsenic, nickel, cobalt, copper, chromium, lead and zinc);
    d) Total Suspended Solids;
    e) Total Ammonia.

In general, the above parameters are equivalent to those currently required at SNP Station 1652-2. The NWB does not agree with the HBJV request to carry out SNP sampling only when the camp is operational. **Sampling must be carried out during periods of flow. The frequency of sampling shall be adjusted to suit the need to carry out opportunistic sampling during the short period of flow. The above protocol should be carried out at least once during the initial spring thaw to capture the flushing of metals from the stockpiles. Subsequent sampling intervals can be adjusted to meet the requirements of the SNP.**

Further to the above requirements, the NWB decides, due to the ARD potential, that an additional condition be inserted in the License, under Part E (Conditions Applying to the Undertaking). This condition requires **HBJV submit a water and ore/waste rock**

**management plan that addresses the current lack of knowledge on the ARD and metal leaching potential of the materials at the site.**

**HBJV shall also submit to the NWB, within twelve months of issuance of the License, as-built plans and drawings showing the existing and proposed method of controlling infiltration and runoff from the waste rock/ore stockpiles, including short-term and long-term contingency plans for treating or mitigating runoff that exceeds minimum concentrations.** The waste rock/ore management plan should include a re-evaluation of the criteria for the selection of site construction materials and the need for tighter containment of waste rock and ore stockpile runoff and leachate. Details should include provisions to prevent seepage from the stockpiles from entering the seasonally active zone within the pad foundation, where it may flow undetected.

**Surface rinse extraction tests on uncrushed samples of materials currently stored on surface, including representative ore, waste rock and underlying pad material shall be carried out and the results be presented to the NWB. Any newly excavated materials should be regularly sampled and analyzed, and the results shall be presented to the NWB.**

### C. Abandonment and restoration of the undertaking

As KIA points out in their reply to submissions, the May 2001 A & R plans assumes, among other assumptions, that solid waste disposal during reclamation can be carried out on site, above and underground. Similarly, the August 2001 revised plan for Boston only is based on this assumption. As KIA highlights, the current KIA land use permits and NWB licenses only allow for off-site disposal of solid waste at Boston. DIAND also outlines deficiencies[32] with the A&R plan and the Board agrees with DIAND that HBJV shall address these issues in a revised plan. The NWB also agrees with KIA that the plan cannot be approved as presented because it is based on unapproved assumptions for solid waste disposal. **The NWB instructs HBJV to resubmit its A & R plan taking**

[32] See p. DIAND's submission dated July 17, 2001 and p. 27 above.

**into consideration the deficiencies identified by DIAND and based, among other things, on off-site solid waste disposal**, unless and until such disposal is approved by KIA and subsequently by NWB. The NWB acknowledges that off-site solid waste disposal, both during current operations and future reclamation, may represent a tedious and somewhat unrealistic method for HBJV, and strongly encourages HBJV and KIA to discuss this issue and agree on the best alternative before an application for amendment is filed with the NWB.

## D. Assessment of the cost to carry out the abandonment and restoration of the undertaking

As indicated in the preceding section, both plans submitted by HBJV are based on an unlicensed method for the disposal of solid waste during reclamation, and consequently the cost presented in either the May 2001 or the August 2001 plans do not accurately present the real cost of reclamation. In the absence of an adequate and more precise estimate, and until a proper plan is submitted by HBJV and approved by the NWB, and out of an abundance of caution to protect Nunavut's fragile aquatic environment, **the NWB maintains the current amount of security of $1.7 million.**

## E. Terms and conditions for the financial assurance.

Interconnectedness of Land and Water

DIAND and the KIA present the NWB with strong diverging positions regarding whether land and water should be assessed separately or together when determining security costs and the payee. In two of the NWB's previous decisions,[33] the NWB reached the conclusion that there is a clear connectedness between land and water. In the 1999 Boston License Renewal, the NWB decided that the security should be made to both DIAND and the KIA. For the reasons given in the Boston 1999 decision, we agree that these principles continue to apply to the Application and we adopt them entirely in the

[33] *Re BHP Diamonds Inc*. (1999), 29 C.E.L.R. (N.S.) 248, and Lupin Licence Renewal 2000

case of this Application as suggested by the KIA. The NWB takes a holistic but also practical approach to reclamation: on the one hand, the NWB believes that the elements of the environment, including land and water, are interconnected; what affects one part of the environment can ultimately have an impact on other environmental elements (water and vegetation, for example). By altering the natural elements of the environment, traditional Inuit culture and use of the water can be directly affected; on the other hand, the NWB believes, where possible, that a proponent should be required to submit one single reclamation plan, without segregating land-related reclamation and water-related reclamation because reclamation activities upon abandonment will likely be more efficient and undoubtedly less onerous if conducted at the same time by the same person

The NWB finds it difficult to separate many land reclamation procedures from water reclamation procedures. For example:

1) roads are generally considered as land disturbance, but can act as a dyke. Also, culverts affect the flow of water;
2) revegetation may be conducted to restore land productivity for wildlife, however, it could also be necessary at the same location for prevention of sediment release due to erosion or thawing of permafrost;
3) the balance of land and water related costs may change due to events such as a fuel spill or exposure of acid generating rock;
4) some reclamation activities may have both land and water benefits, however, reclamation costs would rise unnecessarily if the land and water tasks were conducted separately.

The Board did not receive any persuasive evidence from DIAND or other interveners that would suggest that an accurate distinction between land and water components could in this case be made in the assessment of abandonment and restoration costs. The line is hard to draw. Therefore, consistent with its analysis contained in previous decisions and its precautionary approach to Nunavut's fragile aquatic ecosystems, the

Board has decided not to separate land and water related components of the overall abandonment and reclamation plan, and consequently decides that **the financial security shall continue to name DIAND and the KIA as joint payees.** Nevertheless, if possible, the NWB recommends that the management of all land and water reclamation activities at Boston be under the direction of a single party, and the managing party either be one of the joint security holders, as decided by mutual consent, or a third-party jointly selected by the security holders. Again, this latter point is a recommendation.

Form of Security

KIA agrees with DIAND on the issue of the pledge of assets and since HBJV appears to have no objection, the Board **decides to eliminate the pledge of assets from the list of options available to HBJV for the financial assurance.** Consequently, the only alternatives now available for the HBJV security instrument would be those currently codified in the *NWT Waters Act Regulations*, which are:

i. a promissory note guaranteed by a bank in Canada payable to the Receiver General;
ii. a certified cheque drawn on a bank in Canada payable to the Receiver General;
iii. a performance bond approved by the Treasury Board of Canada;
iv. an irrevocable letter of credit from a bank in Canada; and
v. cash.

The NWB also notes that other forms of security, for example a reclamation trust fund, may be attractive to both the Licensee and the security holders. In any case, the NWB decides that **the final determination with respect to the most appropriate form of security shall be left to the DIAND Minister, in consultation with the KIA and HBJV.**

Periodic Review

Recognizing the fact that security should always be commensurate with the actual costs to conduct A & R, which are ongoing, the NWB does believe the security should be synchronized with the development of the project, and has decided that the security issue should be regularly visited. We therefore put all parties in this hearing on notice that **there shall be annual A & R reporting and security updating by HBJV.** For example, if on the annual anniversary date the licence holder believes the security formerly established should be reduced due to evidence not previously available, then the applicant should apply to have the amount and/or payments curtailed. Conversely, if any party including HBJV sees new circumstances that would require elevating the security, then an application can be filed to increase that adjustment.

## V. **CONCLUSION**

For the reasons listed above and pursuant to Article 13 of the Nunavut Agreement, the NWB approves the Application to renew HBJV's Boston license subject to the conditions herein and the details provided in the license attached in Appendix B.

Dated October 5th, 2001 at Gjoa Haven, Nunavut

***Original signed by:***

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Thomas Kudloo, Chairperson

## APPENDIX A – LIST OF SUBMISSIONS AND CORRESPONDENCE

Application for water license renewal for HBJV's Boston Gold Project, received February 6, 2001.

**Initial Submissions:**

1. Letter dated March 8, 2001. NIRB Screening Decision and Attached Screening Forms. Elizabeth Copland, A/Chairperson. Nunavut Impact Review Board, Cambridge Bay.

2. Letter dated February 20, 2001. "Application for Renewal of Water License No: NWB1BOS9801 Advanced Exploration – Hope Bay Joint Venture." Jordan de Groot, Area Habitat Biologist. Department of Fisheries, Iqaluit.

3. Letter dated February 25, 2001. "Hope Bay Joint Venture – Water License Renewal – NWB1BOS9801 NIRB File 01WR008-Mineral Exploration – Boston Gold Project." Anne Wilson, Water Pollution Specialist. Environment Canada, Yellowknife.

4. Letter dated February 26, 2001. "Water License Renewal – Boston Mine." Doug Crossley, Special Advisor. Community Government and Transportation, Cambridge Bay.

5. Letter dated March 2, 2001. "Water License #NWB1BOS9801-renewal of the Hope Bay Joint Venture license for the Boston Gold project – advanced exploration." Greg Cook, Environmental Assessment Coordinator. Indian and Northern Affairs Canada, Yellowknife.

6. Letter dated March 12, 2001. " Water License Renewal Application Hope Bay Joint Venture – NWB1BOS9801." John Donihee, Legal Counsel for KIA. Gullberg, Wiest, MacPherson & Kay, Yellowknife.

7. Letter dated March 14, 2001. "Hope Bay Joint Venture #NWB1BOS9801." Ruth Niptanatiak-Wilcox, Asst. Senior Administrative Officer. Municipality of Cambridge Bay, Cambridge Bay.

8. Letter dated March 14, 2001. "File No: NWB1BOS9801." Michelle Wheatley, Director of Wildlife Management. Nunavut Wildlife Management Board, Iqaluit.

**Submissions re: Pre-Hearing**

1. Letter dated March 26, 2001. " Application for the renewal of License NWB1BOS9801." Rita Becker, Licensing Administrator. Nunavut Water Board, Gjoa Haven.

2. Letter dated March 28, 2001. “Change of Date-Pre-Hearing.” Rita Becker, Licensing Administrator. Nunavut Water Board, Gjoa Haven.

3. E-mail dated April 2, 2001. “Hope Bay JV License Application NWB File # NWB1BOS9801.” John Donihee, Legal Counsel for KIA. Gullberg, Wiest, MacPherson & Kay, Yellowknife.

4. Letter dated April 8, 2001. “NWB1BOS9801 License Renewal.” Jack Kaniak, KIA Lands Manager. Kitikmeot Inuit Association, Kugluktuk.

5. Letter dated April 11, 2001. “Date of Pre-Hearing Conference for Boston Project.” Philippe di Pizzo, Executive Director. Nunavut Water Board, Gjoa Haven.

6. Letter dated April 17, 2001. “Pre-Hearing Conference.” Rita Becker, Licensing Administrator. Nunavut Water Board, Gjoa Haven.

7. Letter dated April 25, 2001. “April 24, 2001 Pre-Hearing Conference.” Philippe di Pizzo, Executive Director. Nunavut Water Board, Gjoa Haven.

8. Letter dated May 3, 2001 with CDs. “Pre-Hearing Conference Action List – ARD Reports.” Hugh Wilson, Manager, Environmental Affairs. Hope Bay Joint Venture, North Vancouver.

9. Letter dated May 14, 2001. “Hope Bay Joint Venture ARD Potential – Ore Stockpiles.” John Brodie, Brodie Consulting Ltd., West Vancouver.

10. Letter dated May 16, 2001. “Hope Bay Joint Venture-Application for Renewal – License NWB1BOS9801.” Philippe di Pizzo, Executive Director. Nunavut Water Board, Gjoa Haven.

11. Letter dated June 15, 2001. “Water License Renewal Hearing.” Michelle Johnson, Kivalliq/Kitikmeot Regional Coordinator. Indian and Northern Affairs Canada, Iqaluit.

12. Letter dated June 15, 2001. “KIA Submissions on Hearing Process.” John Donihee, Legal Counsel for KIA. Gullberg, Wiest, MacPherson & Kay, Yellowknife.

13. Letter dated June 25, 2001. “Application for Renewal of License NWB1BOS9801.” Andrea Carter, A/Licensing Administrator. Nunavut Water Board, Gjoa Haven.

**Submissions re: Public Hearing**

1. Letter dated June 26, 2001. “Location of Solid Waste Disposal – HBJV Boston Site.” Jack Kaniak, KIA Lands Manager, Kitikmeot Inuit Association, Kugluktuk.

2. Letter dated July 5, 2001. “Application for Renewal Hope Bay Joint Venture #NWB1BOS9801.” Ruth Niptanatiak-Wilcox. Asst. Senior Administrative Officer, Municipality of Cambridge Bay, Cambridge Bay.

3. E-mail dated July 12, 2001. “Hope Bay ARD Situation.” Neil Willoughby, Resident Geologist, Kitikmeot Region, Department of Sustainable Development, Government of Nunavut, Kugluktuk.

4. Intervention statement dated July 17, 2001. “Renewal of License Number NWB1BOS9801.” Indian and Northern Affairs Canada.

5. Letters dated July 17, 2001. “Hope Bay Joint Venture – Renewal.” And “Hope Bay Joint Venture – Updated A&R Plan.” Michelle Johnson, Kivalliq/Kitikmeot Regional Coordinator. Indian and Northern Affairs Canada, Iqaluit.

6. Letter dated July 17, 2001. “Hope Bay Joint Venture License Renewal NWB1BOS9801.” John Donihee, Legal Counsel for KIA. Gullberg, Wiest, MacPherson & Kay, Yellowknife.

7. KIA Attachment dated June 6, 2001. “Review of ARD CD Documents.” Ron Kent, Head, Environmental Department. Ferguson, Simek Clark, Yellowknife.

8. KIA attachment dated June 6, 2001. “Review of the Acid Rock Drainage Characterization Studies Conducted at the Boston Property.” Bruce Mattson, Acid Rock Drainage Specialist, Lorax Environmental Services Ltd.

9. KIA Appendix B dated December 17, 1999. “Assumption Agreement for Inuit Land Use Permit – Kitikmeot Inuit Association, BHP Diamonds, and Cambiex Exploration Inc.”

10. Letter dated July 18, 2001. “Application for Renewal of License NWB1BOS9801.” Philippe di Pizzo, Executive Director, Nunavut Water Board, Gjoa Haven.

**Replies to Submissions re: Public Hearing**

1. KIA Submission dated July 20, 2001. “Boston Gold Project Acid Rock Drainage Sampling.” Prepared by Ferguson Simek Clark, Yellowknife and Lorax Environmental Services, Vancouver.

2. Letter dated July 23, 2001. “KIA Reply HBJV Water License Renewal Application NWB1BOS9801.” John Donihee, Legal Counsel for KIA. Gullberg, Wiest, MacPherson & Kay, Yellowknife.

3. Letter dated July 24, 2001. “NWB File #NWB1BOS9801, Application for Renewal, Hope Bay Joint Venture, Advanced Exploration at Boston Gold Project, Nunavut.” Jordan de Groot, Habitat Management Biologist. Fisheries and Oceans, Iqaluit.

4. Letter dated July 24, 2001. “Hope Bay Joint Venture – Renewal.” Michelle Johnson, Kivalliq / Kitikmeot Regional Coordinator. Indian and Northern Affairs Canada, Iqaluit.

**Final Submissions re: Public Hearing**

1. Letter dated July 30, 2001. “Advanced Exploration – Hope Bay Joint Venture (HBJV) – Final Submission.” Hugh Wilson, Manager, Environmental Affairs. Hope Bay Joint Venture, West Vancouver.

**Other**

1. Letter dated August 17, 2001. “Decision on Renewal of License NWB1BOS9801” asking HBJV to submit a revised Boston-only A & R Plan. Philippe di Pizzo, Executive Director. Nunavut Water Board, Gjoa Haven.

2. Letter and Plan dated August 30, 2001. “Revised Abandonment and Restoration Plan – ‘Boston Only Scenario’.” Hugh Wilson, Manager, Environmental Affairs. Hope Bay Joint Venture, West Vancouver.