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Mr. Hugh Wilson,
Manager – Environmental Affairs
Hope Bay Joint Venture
Miramar Mining Corporation
311 West First Street
North Vancouver, B.C. V7M 1B5

Dear Mr. Wilson:

Re: Review of Past ARD Characterization at the Boston Property

Knight Piésold was requested to conduct a review of two reports that dealt with past ARD characterization work at the Boston Gold Project for rock generated during the development of the exploration decline in 1996 and 1997.

The two reports reviewed are as follows:

a. "Exploration and Bulk Sampling Program Waste Rock Disposal Plan – Boston Gold Project" prepared for the Nunavut Water Board by BHP Diamonds Inc., dated October 1998

b. "Acid Rock Drainage Characterization Boston Property (Waste Rock) – Final Report" prepared for BHP World Minerals by Rescan Environmental Services, dated February 1999.

The Boston Property is part of the Hope Bay Volcanic Belt located in the Kitikmeot Region of Nunavut. The property is located approximately 125 km north of the Arctic Circle and approximately 60 km east of Bathurst Inlet, south of Melville Sound. The project site is located on a small peninsula projecting into Aimaoktak Lake.

In 1996 an underground exploratory program centred around driving 1,000 meters of decline from surface to access the ore body. A further 1,400 meters of underground development was completed in 1997. These programs generated approximately 22,000 tonnes of ore and 114,000 tonnes of development rock that were brought to surface for disposal and/or storage. All non-acid generating development rock produced by this activity was used in the construction of the project site roadways, the ore storage pad and the airstrip once acid base accounting test work confirmed that the rock used was non-acid generating. Development rock with a high net neutralization potential was used to construct a stockpile pad to the north and east of the decline portal. This pad was used to store ore and potentially acid generating waste rock extracted by exploratory mining. This pad serves several purposes:

1. To retain ore and potentially acid generating rock within a confirmed area; and

2. To provide a source of buffering capacity below the stockpiled ore and potentially acid generating rock to neutralize any acid that may be generated by sulphide oxidation over the near future.

A total of 283 samples of decline material were collected by BHP geologists during the 1996 and 1997 exploration seasons and subjected to standard acid-base accounting analysis using the EPA Modified (Modified Sobek, 1989) technique. Random grab samples of the excavated broken rock were taken from every second round during development of the underground exploration decline. The samples were sent to Chemex Laboratories in Vancouver for static acid base accounting analysis. The 1996 grab samples (157 samples) were classified by the BHP geologists into four categories:

- Basalt
- Basalt from the ore horizon
- Basalt – Sediment transition material from the ore horizon
- Basalt – Sediment transition material

The 1997 grab samples (126 samples) were classified by the BHP geologists as all being weakly to moderately altered basalt.

In both cases it should be noted that these were general classifications applied to the majority material constituting the round sampled. It is possible that a particular sample may have included minor components of other rock types. Excavation samples were selected primarily to represent a specific volume of rock rather than a specific type of rock.

The majority (72%) of decline material samples had total sulphur contents below 1%, NP values greater than 250 Kg $CaCO_3$/t and paste pH values greater than 8.0. All of the decline materials had NPR values above 1.1 and nearly 80% had NPR values greater than 5.0. These results indicate that most of the decline material samples had a low acid generating potential (standard testing indicates that most of this material is not likely to become acid generating).

Rescan generated an NPR-S diagram, which plots NPR against total S (Rescan Figure 3.1 attached). This diagram is divided into four quadrants with the dividing lines between quadrants being an NPR of 3 and total sulphur of 0.3% (based on DIAND published ARD guidelines). In terms of relative acid-generating potential, Quadrant 1 has the lowest potential, Quadrants II and III have uncertain potential and Quadrant IV has the highest potential. From this figure it can be seen that the majority (79%) of 1996 decline material samples and all of the 1997 samples fall within Quadrants I and II. Of the thirty-three 1996 samples that occur within Quadrant IV, 30 of them come from the basalt-sediment transition, ore horizon rock type. One sample from each of the other rock types collected in 1996 is also found in Quadrant IV (source – Rescan 1999 report).

The ABA results on the 1996 and 1997 decline material indicate that the majority of samples have a low acid generating potential. Based on the samples tested to date, the only material type with some uncertainty is the Basalt – Sediment Transition material from the ore horizon. It should be noted that the basalt sediment transition material represents only a small proportion of the rock extracted at the Boston Property to date. This rock type is a transition material that is found in the deposit between the volcanics and the sediments and is noted by the site geologists to consistently contain a high percentage of carbonate material (estimated by site geologists to be between 20% and 50% based on visual observations made during sample logging).

In July of 2000, Mr. M.J. Brodie, P.Eng. of Brodie Consulting Limited conducted an inspection of the Boston Gold Project site with members of the Nunavut Water Board. In a subsequent letter dated July 26, 2000, Mr. Brodie noted "During this inspection it appeared that the ARD potential of the ore stockpiles may be of concern". Later in the same letter it was pointed out that: "During the site inspection, it was observed that numerous rock fragments on essentially every ore stockpile contained sulphide mineralization. Many of these rocks are visually estimated to have a total sulphide content in excess of several percent. These observations do not appear to be consistent with the results of the 1998 ARD report and the statement copied above. It does appear that the reported results on the excavation samples is heavily biased towards the non-mineralised rocks" The "statement copied above" refers to a reference drawn from page 6-8 of the ARD Characterization appendix from the 1998 BHP report titled "Exploration and Bulk Sampling Program Waste Rock Disposal Plan". This reference states "All of the excavation samples have total sulphur contents of less than 2% (Figure 6.3-1), NP values greater than 190 Kg $CaCO_3$/t (Figure 6.3-2) and paste pH values that range from 7.8 to 9.6. More than 77% of the excavation samples have total sulphur contents of less than 0.5%, NP values greater than 300 Kg $CaCO_3$/t and paste pH values greater than 8.0." This evident discrepancy between what has been reported and what has been observed has naturally aroused concern. It should be noted that it appears that Mr. Brodie had not had an opportunity to review the February 1999 report entitled "Acid Rock Drainage Characterization Boston Property (Waste Rock) Final Report", at the time his letter was written. Some of the recommendations raised in Mr. Brodie's letter (phased ARD assessment of the stockpiled material, acid base accounting analysis, ICP metal analysis and mineralogical assessment) are addressed in the Feb 1999 Rescan report.

BHP conducted a substantive sampling and ARD characterization program on the rock material removed from the exploration decline in 1996 and 1997. A total of 283 samples were collected during this period to represent the 136,000 tonnes of rock removed by development of the decline, a ratio of 1 sample for every 480 tonnes. The samples were randomly collected on a volumetric basis (one sample for every two rounds mucked out). This technique should have provided a good representation of the material removed.

The data from this program indicates that there is substantial variation in the total sulphur content of the bulk decline samples analysed during the 1996 and 1997 campaign as evidenced below:

For the 1996 decline material samples (157 samples), Total Sulphur values ranged from a minimum of 0.01% to 5.68% with an average of 1.41%. The standard deviation was 1.37%, the 10 Percentile was 0.07%, the median was 0.84% and the 90 Percentile was 3.30%.

For the 1997 decline material samples (126 samples), Total Sulphur values ranged from a minimum of 0.01% to 1.75% with an average of 0.29%. The standard deviation was 0.27%, the 10 Percentile was 0.08%, the median was 0.21% and the 90 Percentile was 0.54%.

Similarly, there is a wide variation in the NPR values as determined using standard Acid Base accounting analysis of the decline materials:

For the 1996 decline material samples (157 samples), the NPR ranged from a minimum of 1.1 to 331 with an average of 43.3. The standard deviation was 63.9, the 10 Percentile was 2.2, the median was 11.0 and the 90 Percentile was 136.

For the 1997 decline material samples (126 samples), the NPR ranged from a minimum of 7.1 to 659.2, with an average of 69.3. The standard deviation was 71.8, the 10 Percentile was 18.0, the median was 52.6 and the 90 Percentile was 142.6.

On this basis Rescan concluded that according to DIAND ARD guidelines, the majority of this material had low acid generating potential, although some of the 1996 decline material was determined to have uncertain acid-generating potential.

A limited program of kinetic testing was subsequently conducted on older drill core samples (1993 and 1994 core). A total of three humidity cell tests were conducted: one on altered basalt (drill hole 93NOD57 – 195 m interval), one on the B2 mineralised zone material (drill hole 94NOD120 – 210 m interval) and the other on the B3 alteration halo material (drill hole 93NOD57 – 170 m interval). Although other rock types exist in the deposit, BHP geologists indicated that only these three rock types have the potential to be exposed on the surface, either as construction material or stockpile material. The kinetic test results indicated that the altered basalt and B3 alteration halo material are unlikely to generate net acidity in the long term but the B2 mineralised zone material will probably become net acid generating (Source: Rescan February 1999 Report).

The three kinetic test results did however suggest that there was potential for the leaching of arsenic, copper and/or nickel from these three samples. The evidence suggests that neutral metal leaching (the release of metal contaminants under neutral pH conditions) may be an issue at the Boston Property, however the body of evidence regarding the potential for metal leaching is small and should not be relied upon at this stage to draw any final conclusions. Some of the data is contradictory and cannot be explained by the current knowledge of ARD potential at this site. The data raises a flag but the prudent approach is to avoid jumping to any conclusions. It is suggested that additional data on neutral metal leaching potential needs to be collected once further U/G development work commences at the Boston Property.

So why the evident discrepancy between Mr. Brodie's visual observations and the data presented in the Rescan report? Several possibilities exist:

1. During the Exploration program between 1996 and 1997, a total of approximately 136,000 tonnes of ore and development rock was brought to surface from the decline. The ARD characterization data represents sampling of this total volume of rock. However the material currently in the stockpiles represents only ore and development rock identified as potentially acid generating. The majority of the material mined has been used as construction material for the airstrip, site roadways and the base for the stockpile laydown area. In other words the stockpile material is likely to contain only that material with the highest sulphide mineral content or the lowest neutralization potential.

2. It is possible that the stockpile material inspected by Mr. Brodie represented the outside perimeter piles, as not all of the material is easily accessible for close visual inspection. Consequently these visual observations may not be representative of all the rock material stored in the surface stockpile.

3. The sulphide mineral presence visually noted by Mr. Brodie (as several percent) is at or above the maximum measured total sulphur values in the 283 samples assayed by Rescan (maximum of 5.68% in 1996 and 1.75% in 1997).

4. Some of the material visually thought to be sulphide may not be sulphide.

5. Sampling of the decline rounds was biased to avoid sulphide mineral presence. This seems unlikely due to the scientific requirements and the professional capabilities of the samplers employed by BHP.

Despite the cause of the observed discrepancy the bottom line remains the same, namely, a small amount of ore materials at this site have potential to be acid generating, specifically:

- Sampling of the decline material indicated that the Basalt-Sediment transition material from the ore horizon demonstrated uncertain acid-generating potential as measured using standard acid base accounting procedures.

- Characterization of diamond drill core indicated that B2 alteration halo and B3 mineralised material may also demonstrate uncertain acid-generating potential as measured by standard acid base accounting procedures.

- Follow up kinetic testing (limited to 3 samples) suggests that the altered basalt and B3 zone alteration halo material from this deposit are non-acid generating while the B2 mineralised zone material may be potentially acid-generating.

The data suggests that only a small proportion of the material mined to date has the potential to be acid generating. The material that has been placed on surface has been stored in a manner appropriate to facilitate monitoring and control of any ARD that may occur over the short term while future mine development plans unfold, i.e. material with uncertain or possible acid generating potential has been placed on top of a layer of waste rock with known high buffering capacity.

It should be noted that geochemical modelling conducted by Rescan (MINTEQA2 – Version 3.11 & PHREEQC) to predict the water quality of seepage coming from material stockpiled at the Boston Property suggests that after minimal dilution, seepage from the three rock types would not significantly affect receiving water quality (Rescan, 1999). The modelling utilized the metal leaching rates obtained from the kinetic testing of the altered basalt; B3 alteration zone halo material and the B2 mineralised zone material as model inputs.

"With respect to ARD generation in northern climates, the following practical and theoretical considerations should be kept in mind (Dawson and Morin, 1996):

- In order for oxidation to start, water must be available. For a large part of the year in northern climates, water is frozen, thereby limiting an ingredient for oxidation and the primary mode of transportation for reaction products to enter the receiving environment;

- Oxidation of one kilogram of pyrite (FeS_2) generates 0.012 kJ of heat and the latent heat of water is 334 kJ/kg. Thus relatively high concentrations of pyrite are needed in order to cause thawing due to oxidation reactions;

- Rates of acid generation and metal leaching are partially dependent on the surface area of sulphide minerals exposed to oxygen and water. Physical breakdown of rock into smaller particles as a result of "frost weathering" can lead to an increase in exposed surface area;

- At low temperatures (below 5^0C), the biological activity of bacteria that catalyse sulphide oxidation reactions (e.g. *Thiobacillus ferooxidans*) is reduced, but not eliminated. In some instances, bacteria can adapt to the cold temperatures; and

- Although offset by dilution, increased surface flow that occurs during snowmelt can have detrimental effects on receiving environments by flushing accumulated oxidation products from rock surfaces." (Source – Rescan ARD Characterization Report – Feb 1999).

While the prevailing cold climate at the Boston Property is not likely to halt the long-term production of ARD from any potentially acid generating material stored on surface at this site, the rate at which ARD may be released is likely to be much slower than would be expected in warmer climates. This provides added time for the issue to be assessed and addressed if found to be necessary. 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 focussed on the spring thaw and during the short summer season.

Based on the evidence in hand, it is prudent to establish sampling protocols to monitor for indications of ARD and/or metal leaching associated with the material currently stored within the stockpile area. However, I do not believe that at this time it is necessary to place a cover over the existing piles of decline material stored on the lay down area as recommended in the February 1999 Rescan report. This issue can be addressed if and when monitoring indicates that these materials are an active source of contaminant release. The predictive water quality modelling conducted by Rescan suggests that after minimal dilution the seepage from the three suspect rock types would not significantly affect receiving water quality (Rescan, 1999).

There has been a substantial amount of static acid base accounting work conducted on the 136,000 tonnes of material mined to date at the Boston Property. If no further underground development work is done at this property, then the existing ARD characterization data should be adequate to plan the closure for this site. If no further development takes place at this site then a potential closure option is 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 proceeds then the stockpiled material will be processed through the milling circuit.

Yours truly,
KNIGHT PIÉSOLD LTD.

Larry Connell

Larry J. Connell, P.Eng.
Environmental Manager

/ljc
Encl: Figure 3

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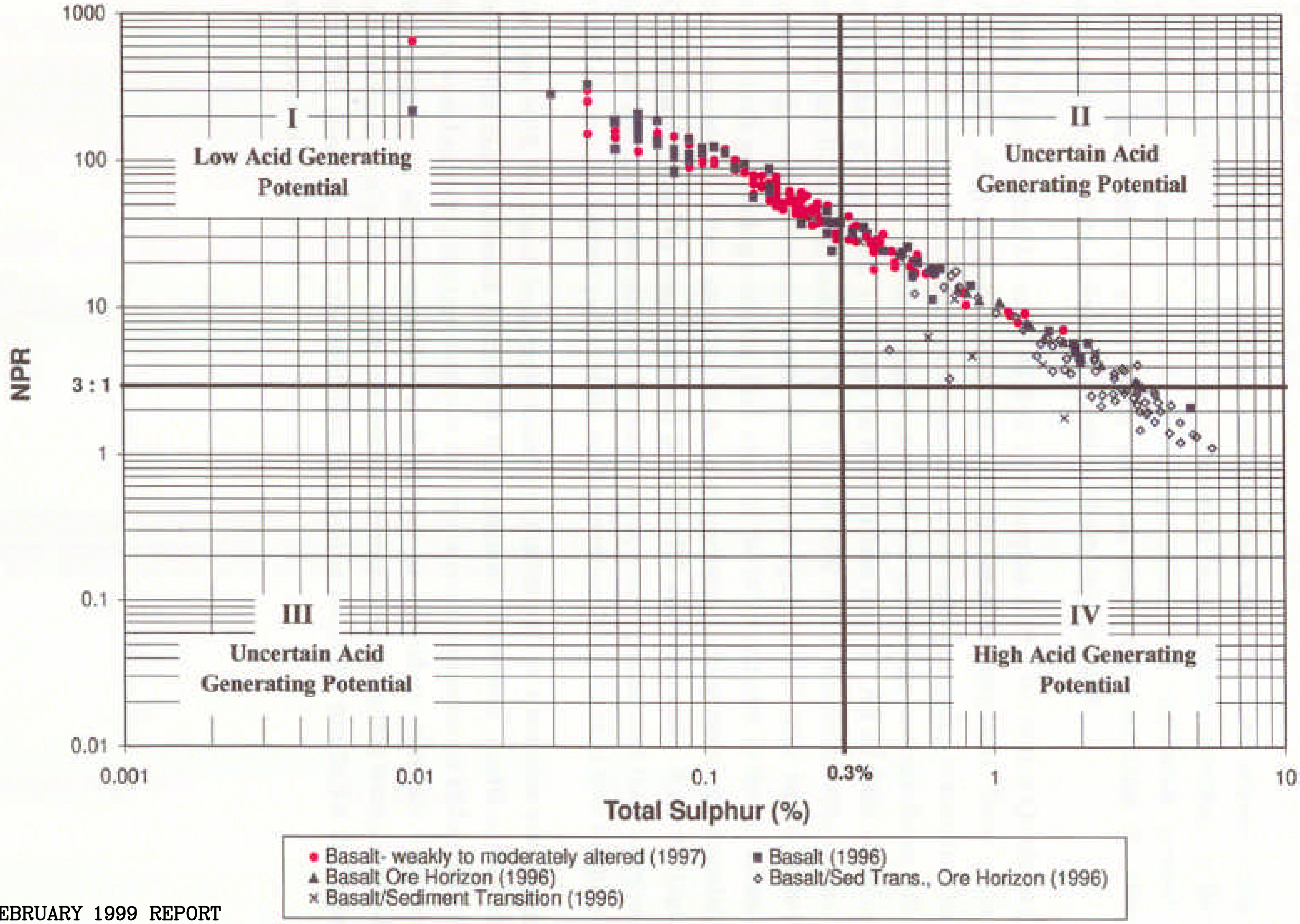

SOURCE:
RESCAN FEBRUARY 1999 REPORT

BHP

FIGURE 3-1

Bulk Sample Data (1996 and 1997)
Neutralization Potential Ratio (NPR) vs Total Sulphur

Rescan