INFO MEMO to LENARD DIDUCK
RE: PINE CREEK PLACER, ATLIN B.C. INNOVATIONS FOR GOLD RECOVERY

The search for new technologies to recover gold from placers and various types of ores has been prompted by the ever increasing need to lower costs of production due to sustained low gold pricing and the increasing global concern over environmental protection.

From a gold extraction viewpoint, most advances have focused on improving hard rock cyanide-based processing (i.e. lessen the impact of toxic cyanide in the effluents). Several non-cyanide leaching options were developed but the economics of operations prevented viable industrial application.

Important to our future Pine Creek Placer development is the mid 1980's patenting of new Non-Leaching Process Technology which in the early 1900's was introduced to placer applications as an environmental and technically viable alternative to conventional gold recovery. This promising technology is known as the COAL-GOLD AGGLOMERATION (CGA) recovery process.

It utilizes coal-oil agglomeration for primary gold recovery for placer and hard rock ores and is especially suited for fine particle gold recovery.

The patents involve the simultaneous agglomeration of coal, oil and gold particles and /or agitated mixing of pre-formed coal-oil agglomerates with the gold -bearing material. The recovery of gold is based upon the natural hydrophobicity / oleophilicty of gold (i.e. gold surface " wetting" and adherence to this agent).

The agglomerates are formed in an aqueous medium whereby a hydrophobic liquid like an oil (i.e. diesel oil) contacts a hydrophobic solid material, like coal particles, to create spherical agglomerates. These become the wetting agent to the gold particles and then carry them or agglomerate together with them because of gold's natural hydrophobic properties. The recovery of the gold particles adhered to or penetrating into the coal-oil agglomerates is achieved by conventional separation methods such as floatation or screening and pyrometallurgy (i.e. burning off the organic carbon and recover melted gold).

BP Australia Ltd. and others first developed the CGA patents in 1986, mainly, with placer gold recovery in mind for their dry climate. Since then the viability of the CGA process has been studied and demonstrated to be a valid technical alternative to mercury amalgamation and even to the cyanide process. Gold recoveries of very fine gold particles by CGA has caused concentrate increases of 20 fold from the gold grades of the ore material.

Due to the simplicity and efficiency and for environmental reasons, the CGA process is being studied, tested and approved by the World Bank, EU Community and the UN as a viable gold recovery process. Their intent is to introduce this technology world-wide to

small-scale gold miners, both placer and hard rock, in third world countries. Therefore, CGA has obvious application to scaled -up placer gold operations in Canada. In particular, it should be used as a final phase of gold recovery after gold separation by more conventional gravity separation equipment placer processing. For example recent tests using a Knelson Model KC-MD3 concentrator using gold jewellery production wastes showed that this method of gravity separation was most suitable as a pretreatment method to recover coarser gold particles. It was only capable of a maximum of 68 % recovery of the total gold particles by weight and size residing in the waste.

Another " GREEN" gold extraction technology has been considered by the UN's Industrial Development Organization ,namely, the HABER GOLD PROCESS (HGP). This process is a mix of proprietary non-toxic chemicals which claims to dissolve gold into water faster and cheaper than cyanide leaching. The mining and engineering firm of Pincock, Allen and Holt and the University of Nevada's famed MacKey School of Mines have both positively evaluated the process in comparison to cyanide leaching. Haber Inc. claims that HGP is applicable to fine gold recovery from placer material and concentrates. Verification of this process and its availability should be further investigated. It too could be an alternative or last phase of the scaled -up operations to recover fine gold hosted in your Pine Creek Placer leases.

Past history of production of placer gold in the Atlin Gold Camp has accounted for at least one million ounces of gold. Most observers understand that this is a minimum figure as only a portion of the gold mined on Atlin's creeks was ever documented in public records. Pine Creek was the site of the initial discovery of placer gold and in the early years after 1898 it was Atlin's foremost producer at about 5000 plus ounces annually. In 1899 a 31ounce nugget was recovered and in 1925 a 48 ounce gold nugget was reported at Pine Creek. These coarse to large nuggets made Atlin the coarse gold capital of British Columbia and Pine Creek was the second largest placer gold producing creek in the camp. Hydraulic mining followed by dragline and bulldozer excavation accounted for most of the production after the discovery years. Most of the Pine Creek past production has come from the area of placer claims now leased to Lenard Diduck. The efficiency of past processing was concentrated upon coarse gold capture and recovery and thousands of yards of historical placer tailings material are readily available for systematic and cost -effective modern processing technology to remove the finer grained placer gold particles.

In 1997 testing of this material by International Separations Systems Inc. (I.S.S.I) showed head ore values of gold of 1.6 grams per tonne and 65 grams per tonne in concentrate recovered from a testing of the minus 80 to plus 150 mesh particle size range. Therefore, gold residing in the minus 180 to about 75 micron range of particle size is significant and probably amenable to modern Knelson concentrator separation. In any event, CGA processing is suitable for recovery of the less than 75 micron fine gold

particles and recovery of any larger rejected concentrator gold particles. It could be assumed that gold values for the minus 150 mesh material would equal or surpass those tested by I.S.S.I for their specific size fraction.

Therefore, I am in agreement with you that in your expanded modern placer operations and processing plans we must address the high percentage recovery of fine placer gold particles as they may well be the greatest placer gold asset remaining on the Pine Creek leases. Implementation of some of the processing technology outlined above has merit in devising a suitable circuit to finally process your material in cost -effective and highly efficient manner.

I look forward to further discussions with you in the near future as your experience and past production performance of mining the Pine Creek Placers is well known. I believe that future production could surpass the 129,181 ounces of placer gold reported to 1945 for Pine Creek.

S .Bruce Ballantyne
Geochemical and Geological Consultant