



Yellowjacket Joint Venture  
 Suite 200, 16 -11<sup>th</sup> Ave. S.  
 Cranbrook, BC  
 V1C 2P1

Mr. Loren Kelly  
 Chair NWMDRC

**Re: Yellowjacket Gold Mine Project – Surface Erosion Prevention and Sediment Control Plan**

The entire footprint of the Yellowjacket project is estimated to be approximately 18 hectares and will be contained entirely within the extensively disturbed placer mining area. As a result of historical hydraulic mining and sluicing, much of the fine material including silt and soil, as well as any native vegetation, has been removed. The remaining material consists mostly of washed pebbles, cobbles and boulders of local rock types mixed with a small amount of gravely loamy sand to sand. The disturbed area is characterized by a lack of vegetation with the exception of sparse clumps of willow (silax).

Pine Creek runs through the entire length of the proposed mine plan area and is entirely contained within the disturbed placer workings. It is classified as a deregulated stream and does not have any riparian values associated with it. It is anticipated that there will be minimal, if any, additional sediment discharged into Pine Creek from the Yellowjacket operation.

In general, the material remaining in the placer channel is highly permeable. Hydrogeological investigations by BGC Engineering in relation to the bulk sample excavation( Appendix 5) indicate the following hydraulic conductivity (K) values within the placer material :

- 10-6 m/s in an upper coarse-grained unit (surface to about 5 metres below surface);
- 10-6 m/s to 10-8 m/s in a lower fine-grained unit (5 metres to around 10 metres below surface);

Any surface water related to snowmelt or intense or prolonged rain events will continue to be dispersed through infiltration which serves as a means of reducing flow as well as providing excellent filtration.

The terrain in the placer channel is generally flat to gently sloping with the exception of steeper banks on either side of the diversion channel. The diversion channel was constructed using an engineered design provided by BGC Engineering (Appendix 4). BGC noted that Pine Creek has been severely impacted by placer mining activities in the area of the proposed Yellowjacket mine and the creek is continually shifting its



banks due to a lack of vegetation and abundant bedload supply. Given these conditions, the creek remains in a highly disturbed condition. The diversion channel was constructed using containment berms, control structures and rip rap erosion protection specifically to reduce any sediment or erosion from the stream channel flows.

In general, the Total Suspended Solids (TSS) levels in Pine Creek are high. Work done by Lorax (Appendix 6) indicates :

#### Total Suspended Solids ("TSS") Levels

- TSS levels exceed both 30-day and maximum provincial guidelines for the protection of aquatic life during June 2007 freshet.
- TSS concentrations are highest for stations located furthest downstream.
- High TSS concentrations at station PC-5 are attributable in part to the influence of placer operations on Spruce Creek, which enters Pine Creek below station PC-3 but above PC-5.

#### Turbidity

- Values closely parallel the seasonal distribution of TSS.
- Turbidity values exceed both the 30-day and maximum provincial guidelines for the protection of aquatic life during freshet.

**Note:** Turbidity and TSS levels in de-regulated placer mining creeks (i.e. Pine Creek) can range from 500 to over 4,000 mg/l.

Although it is anticipated that the permeability of the surface gravels will act to absorb any surface runoff, Best Management Practices will be employed for sediment control which will mainly be related to digging diversion ditches for surface water and during pit dewatering. Silt fencing, rock check dams, containment ponds, and overflow weirs, will be used as required, although use of the latter is not anticipated.

Silt fences are permeable barriers intended to intercept and detain small amounts of sediment generated from disturbed areas in order to prevent sediment from leaving the site, but are not intended for use in areas of concentrated flow. As the flow rates within any diversion ditches are anticipated to be very low and the ditches will be very shallow the silt fencing will be anchored using rip rap or boulders.

Rock check dams will be installed at appropriate locations in ditches to reduce flow velocities as well as filter concentrated flows, if required. Under low-flow conditions, runoff is detained behind the dam structure and either seeps slowly through the dam, infiltrates or evaporates. Under high-flow conditions, water flows over and/or through



the structure. This provides relatively good removal of coarse and medium-sized sediment. The proposed rock check dams will be constructed of well-graded stone consisting of a mixture of rock sizes < 100 mm and will be installed in series such that the bottom of the upstream check matches the elevation of the top of the downstream check.

As the proposed mining operation is partially located below the Pine Creek water table, it will be necessary to dewater the existing pit in advance of the 2009 mining operation. In addition, the water table will need to be maintained at a drawdown in the area of the next pit during pre stripping and mapping of the stripped bed rock. It is estimated that dewatering pumps will be running for a period of approximately 6 weeks during 2009 (3-5 days to dewater the existing pit, 3 weeks for mining, 2.5 weeks for stripping and mapping). Water generated through the pit dewatering will be pumped to the existing settling pond for exfiltration.

Installation of any culverts will occur at grade, and a rock splash pad or straw bale check dams will be placed below the outlet of the culvert as required.

During operations all ditches and settling ponds will be monitored on a daily basis with additional inspections after significant precipitation events. Monitoring will include a visual check of the diversion ditch embankment along the water mark for sediment discharge. Plugged culverts or ditches and areas of excessive erosion will be promptly repaired. Annual evaluations of water quality compliance and surveys of the sediment level in the ponds will be performed to determine the need for cleaning. It is anticipated that the dewatering will generate very little sediment and the settling ponds will be able to be used multiple times. Documentation related to the monitoring and inspections, as well as required maintenance, will be recorded in a logbook.

Regards,

Charles "Chuck" Downie  
Yellowjacket Joint Venture