



Yellowjacket Joint Venture
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MEMPR

Re: Yellowjacket Gold Mine Project Permit Application
Letter from Ted Fuller May 13 2009

The following geotechnical information and/or clarification request were received by the Yellowjacket JV on May 13, 2009. The responses to the questions are highlighted in blue below the specific question.

COMMENT FROM TED FULLER: Drainage ditches and collection of seepage water is important. Also divert good water away from waste.

YELLOWJACKET REPLY : Under the proposed mine plan, the eastern and southern perimeter of the pit area will be ringed by drainage, collection and seepage ditches which will either report to the main Pine Creek channel or discharge through exfiltration into the placer channel gravels(Figure 3.1, 4.2, 5.1, 5.2). The northern perimeter is along the southern boundary of the stockpile storage pad, and this is where the proposed pit ramps and drainage ditch are located.

If required, rock check dams will be installed at appropriate locations in ditches to reduce flow velocities as well as filter concentrated flows. For operations under low-flow conditions, runoff will be detained behind the dam structure and either seeps slowly through the dam, infiltrates or evaporate. Under high-flow conditions, water flow will be 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.



In general, the upper five (5) metres of surficial material remaining in the placer channel has a relative permeability rating of at least “medium” or 10^{-1} to 10^{-3} cm/sec. Hydrogeological investigations by BGC Engineering in relation to the bulk sample excavation (Appendix 5 Hydrogeological Investigation and Analyses Report – Proposed Excavation,

BGC Engineering Inc. 2006) indicated that the top 0 - 5 meters of the placer channel consists of sands and gravels/cobbles as noted in the conceptual hydrogeological model of Pine Creek. (Figure 4-13). Appendix 1 of the above document as well contains the borehole logs from the hydrogeological investigation, which indicates the surficial materials are composed of coarse cobble, gravel and sand, and well graded to fine sand with minor amounts of silt in some sections.

Any surface water related to snowmelt or intense or prolonged rain events will continue to be dispersed through infiltration into the upper layer of surficial material having a projected permeability coefficient of 10^{-1} to 10^{-3} cm/sec, which serves as a means of reducing flow as well as providing excellent filtration.

COMMENT FROM TED FULLER : Does Pine Creek have bedload transport issues and avulsions which may impact drainage and erosion?

YELLOWJACKET REPLY : Pine Creek has been severely impacted by placer mining activities over the last 100 years, so much so that the creek has been continually shifting its banks due to a lack of vegetation and potential bedload supply coming from the placer operations. Bedload sediment from the placer operations consists mainly of sand or silt. Given these conditions, it was necessary in 2006 to construct an engineered diversion channel through the project area to ensure that Pine Creek would remain within a single channel. As well, there are currently no extensive placer mining activities occurring upstream on Pine Creek, thus eliminating the potential bedload supply to the creek.

As well, the Atlin Hydro Project controls the volume and timing of water discharge into the main Pine Creek channel by a dam at Surprise Lake, located approximately 10 kilometers upstream from the Yellowjacket mine area. As well, as providing high water flood control, the dam is used to regulate the volume of water flowing to the Atlin Hydro Project intake, approximately 2 kilometers downstream from the Yellowjacket area. The dam also provides a trap for coarser sediments entering Surprise Lake. Below the lake, there is only a single drainage entering Pine Creek from the north and it has a relatively shallow bed angle and does not contribute a significant amount of either sediment or water to the main channel.

BGC Engineering carried out a technical study as part of the Pine Creek Diversion channel (Appendix 4 Pine Creek Diversion Report; BGC Engineering Inc., 2006). The channel was constructed to allow for the collection of a bulk sample from the Yellow Jacket Zone during fall 2006. Sigma Engineering 2006 calculated maximum instantaneous



peak flows for various return periods for the Atlin Hydro Project. BGC then recalculated the maximum daily flows using the Pine Creek watershed at the project site (a reduced watershed area) as compared to Sigma. The design flood selected from the recalculation for the diversion was the 10-year return period flood of 21 m³/s. (see Appendix 4). This flood was selected based the on typical creek properties, the existing disturbance within the floodplain, the current dimensions of Pine Creek and the need for safety in the bulk sample excavation. Additionally, the channel section and elements were selected to allow easy upgrading to accommodate larger floods, if necessary.

The Pine Creek diversion channel was designed to match the length and grade of the characteristics of the existing configuration prior to construction of the diversion channel. This has resulted in the diversion having similar performance to the former creek, with improvements due to placement of rip-rap in selected locations. This rip-rap helps to limit potential erosion in key areas along the diversion channel.

It is our opinion that the 2006 diversion channel and the Atlin Hydro Project have dramatically reduced the opportunities for bedload transfer and avulsions of the Pine Creek through the project area. In the two years that the diversion ditch has been in use, there have been no issues related to bedload transport or accelerated erosion.

Regards,

Charles “Chuck” Downie
Yellowjacket Joint Venture