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August 21 2013

New Prosperity Federal Review Panel
Livain Michaud, Panel Manager
Canadian Environmental Assessment Agency
Place Bell Canada 160 Elgin Street, 22nd Floor
Ottawa, Ontario K1A 0H3

Sent via email: *NewProsperityReview@ceaa-acee.gc.ca.*

Re: Natural Resources Canada's Closing Remark and Technical Memorandum – New Prosperity Federal Review Panel

As outlined in your February 20, 2013 Public Hearing Procedures, Natural Resources Canada (NRCan) would like to summarize our perspective on the hearing record as it relates to areas of scientific and technical information which we brought forward during the course of the environmental assessment for the proposed New Prosperity Gold-Copper Project.

As the Federal Panel is aware, in our July 19, 2013 final written submission (CEAR #648), NRCan made a number of recommendations, which are summarized below:

1. The Federal Review Panel's should consider that the proponent's predictions of groundwater interactions with Fish Lake are not informed by the results of the 1994 pump test, and no follow-up pump testing has been undertaken. The Federal Review Panel could instead consider, as a conservative estimate of the upper limit to induced seepage from Fish Lake, the total pit dewatering rate.

2. In light of NRCan's tailings storage facility modeling results, NRCan recommends that the Federal Review Panel:

    a. Disregard tailings seepage predictions in the Environmental Impact Statement based on the proponent's 3D regional and TRM groundwater flow models, including studies of interception well requirements for the main embankment, and of tailings pore-water migration towards the Big Onion Lake catchment.

    b. Consider that the proponent's 2D seepage model artificially precludes any deep seepage flow beneath the basalt layers underlying the TSF.

    c. Consider that the rate of seepage leaving the tailings storage facility is likely to be in the range of 7000 to 10 000 m^3/d, depending on hydraulic properties and assuming that the water table throughout the TSF can be maintained at the spillway elevation with an excess of inflows.

    d. Consider that rates of seepage from the tailings storage facility will be generally lower and fluctuate when climatic variables such as precipitation and evaporation control the amount of water entering the facility.

e. Consider that there is a strong likelihood that, for average precipitation conditions and without mitigation measures, the proponent will not be able to maintain all tailings submerged beneath the water table thereby establishing local hydrogeological conditions favorable for the generation of acid mine drainage.

3. NRCan recommends that the Federal Review Panel consider the BENCHMK-KP, KP-TAILINGS and BASE CASE scenarios of NRCan's TSF seepage modeling study (CEAR #587) in order to gain a better appreciation of the effects of tailings conductivity estimates on TSF seepage model predictions.

4. The Federal Review Panel should not rely on the proponent's total seepage flux estimate and seepage recovery efficiencies in the Environmental Impact Statement, including as key inputs to the proponent's site water balance and water quality models used in assessments of environmental effects.

5. The Federal review panel should ensure that the proponent is committed to the application of criteria put forward for the separation of potentially from non-potentially acid generating materials and to execute the planned adaptive management measures upon observing unpredicted and adverse monitoring results; timely reporting and analysis of monitoring results to identify deteriorating trends should be required to advance the proposed project.

Since that submission, NRCan officials have participated in the public hearings, and have considered documents added to the public record which specifically reference NRCan's July 19th submission, including:

- Taseko Mines Limited's Response to Undertaking 5 (U-005): Provide information on the seepage collection efficiencies and their locations

- Taseko Mines Limited's Response to Undertaking regarding clarifying the explanation of the variability and permeabilities within the basalt

NRCan has considered this information in view of our July recommendations. We would like to advise the Federal Panel that our July 19 2013 recommendations remain, in our view, valid for the Federal Panel's consideration during its development of its report to the Minister of the Environment.

In addition, we have attached below for your consideration, a technical memorandum that provides further clarification related to the modeling approaches taken by Taseko and NRCan which have been recently referred to Registry documents CEAR #641 and CEAR #787.

Thank-you for the opportunity to participate in this process.

Mark Pearson

<original signed by>

Director General
External Relations - Science and Policy Integration
580 Booth St., Ottawa, Canada, K1A 0E4

cc :
Donna Kirkwood, Director General, Earth Sciences Sector
Scott Jones, Vice President, Engineering, Taseko Mines Ltd.

In relation to estimates of seepage from the TSF, the proponent stated in CEAR #641 that: *"We would like to emphasize that now that we have had the opportunity to review in detail the modeling report submitted to the Panel by NRCan we are pleased that, although the NRCan author utilised different modeling techniques, the results appear to be not materially different or at least within the margin of error for this type of exercise."* Similarly, in CEAR #787, the proponent noted that there is a "*substantial convergence of expert opinions on rate of anticipated seepage from the tailings management facility, such that there is no longer any material disagreement between Taseko and NRCan on these matters…*" Throughout the hearings, the proponent has emphasized this opinion and NRCan was asked by the Panel to provide some clarification (CEAR #781, p.77-79). In response, NRCan indicated it believed that the proponent's assertions were not correct. This memorandum more fully addresses the Panel's request for clarification by contrasting NRCan and Taseko seepage estimates and the numerical methods by which they were obtained.

Referring to CEAR #587 and NRCan's submission (CEAR #648, p.19-21), NRCan's base-case estimate of seepage through the bottom of the TSF is 8650 m^3/d whereas the proponent's comparable estimate, based on their 3D numerical model, is 760m^3/d. Thus, NRCan's estimate is greater than the proponent's by more than an order of magnitude. However, it should be noted that, for the purpose of site water balance and water quality modeling, the proponent does not rely on TSF seepage estimates derived from their 3D model. Instead, the proponent relies on estimates obtained using their 2D cross-sectional numerical model. However, no comparable estimate of seepage through the base of the TSF is available for the proponent's 2D model.

With respect to seepage leaving the impoundment beneath the main and combined south and west embankments, NRCan's base-case estimates are 5087 m^3/d and 2552 m^3/d, respectively. The proponent's corresponding estimates are 2420 m^3/d and 2333 m^3/d, respectively, based on their 2D model. No comparable estimates are provided for the proponent's 3D model. Thus, NRCan's estimate of seepage beneath the main embankment is approximately twice that obtained by the proponent. NRCan and the proponent obtain similar estimates of combined seepage beneath the south and west embankments.

With respect to seepage to the deep groundwater zone beneath the impoundment (greater than 200m below ground surface), NRCan's estimate is 1699 m^3/d whereas the proponent's estimate is 0 m^3/d because their 2D model precludes this flux component. No comparable estimate is provided for the proponent's 3D model.

In order to weigh TSF seepage estimates presented by the proponent and NRCan, the Panel should also be aware of the modeling methodologies with which they were obtained and their relative strengths and weaknesses.

NRCan's estimates of post-closure seepage rates from the TSF (CEAR #587) were based on a three-dimensional (3D) numerical groundwater flow model spatially restricted to the impoundment and underlying geological formations including the shallow and deep groundwater zones (Figure 1). The model was not calibrated to head observations. However, the model was "nested" within the regional groundwater flow system using "General-Head" boundary conditions derived from modeled head values obtained from the proponent's calibrated 3D regional groundwater flow model. This process is similar to that used by the proponent to embed their non-calibrated Telescopically Refined Model (TRM) within the regional groundwater flow system (Appendix 2.7.2.4A-C; sec. 8).

The primary TSF seepage estimates carried forward by the proponent as inputs to site water balance and water quality modeling were based on a two-dimensional (2D) cross-section numerical modeling approach (Appendix 2.2.4-D). This approach involved estimating seepage rates over a number of vertical sections through the main, south and west embankments of the TSF. An overall seepage rate was then obtained by summing seepage contributions from each modeled section prorated according to their respective representative embankment lengths. While not incorrect, such an approach should be considered inferior to a fully 3D approach for seepage prediction purposes. The spatial domains of the proponent's sectional models included a partial representation of the TSF and a representation of underlying geological formations limited to the shallow groundwater zone (Figure 2). Because of this, the proponent's modeling approach could not be used to calculate estimates of seepage through the entire base of the TSF that could be compared to NRCan's. The proponent's approach is suitable only for estimating seepage fluxes in the shallow groundwater zone beneath the TSF embankments (as shown in Figure 2). However, NRCan's 3D modeling results also suggested a significant seepage flux from the shallow to the deep groundwater zone that is precluded by the proponent's assumption of an impermeable boundary below the lower basalt sequence. Like NRCan's model, the proponent's 2D model was not calibrated to head observations. However, unlike NRCan's model, the proponent's 2D model was not "nested" within the regional groundwater flow system. Boundary conditions on the sides and base of the proponent's model of the TSF are purely generic. Because of this, the proponent's model does not account for groundwater interactions with the surrounding region beyond the TSF. Normally, this would be viewed as a limitation of the proponent's 2D modeling approach compared to NRCan's which does allow for such interactions through the use of appropriate boundary conditions.

The proponent has asserted that seepage rate estimates from NRCan's 3D model and Taseko's 2D model are not materially different, being within a factor of two. However, this opinion disregards the different modeling methodologies used by NRCan and Taseko, and the inherent limitations of the proponent's approach relative to NRCan's. It follows that seepage rate estimates from NRCan and the proponent should not be weighed equally by the Panel regardless of their actual values. In NRCan's opinion, the relatively small (factor of two) difference between NRCan and Taseko 2D estimates is fortuitous.

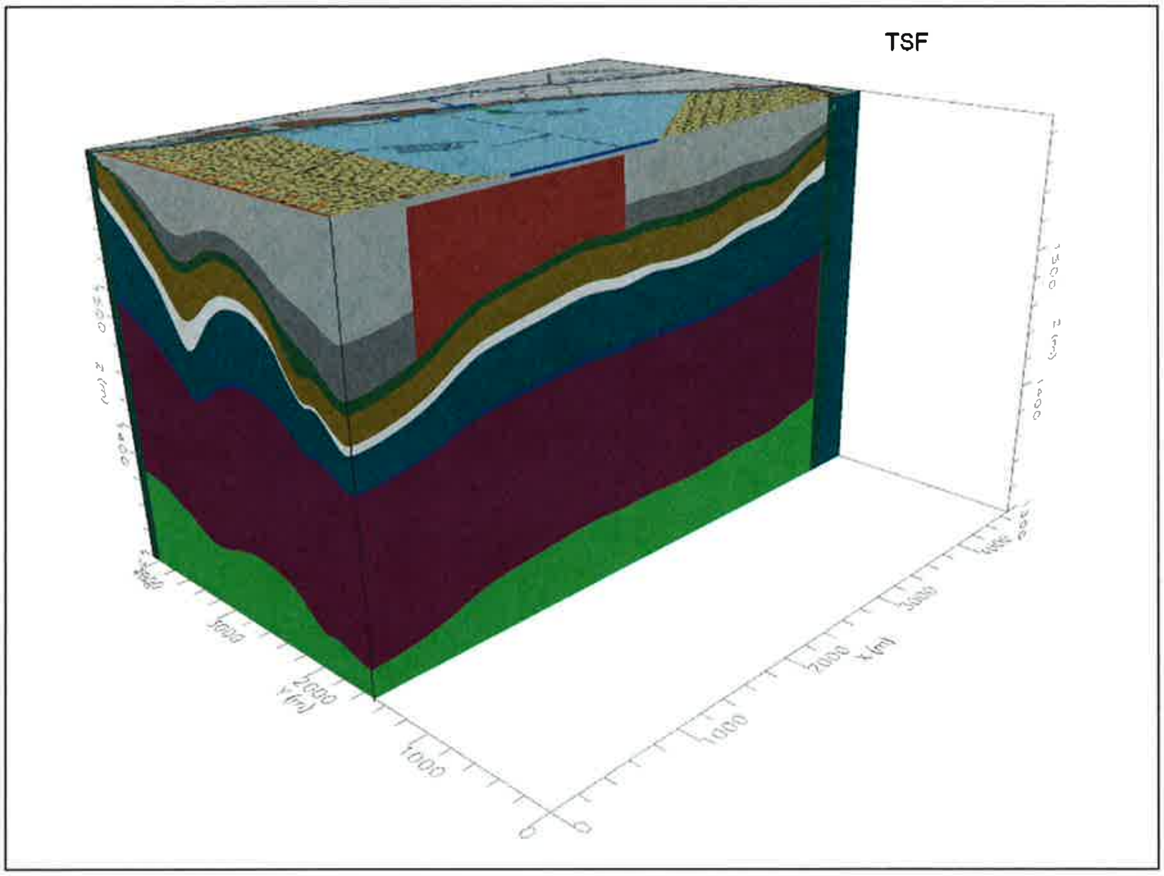

Figure 1: Cut-away view of NRCan's 3D numerical model of TSF seepage showing impounded tailings (grey) and PAG waste rock (red) and underlying geological formations as described in CEAR #587.

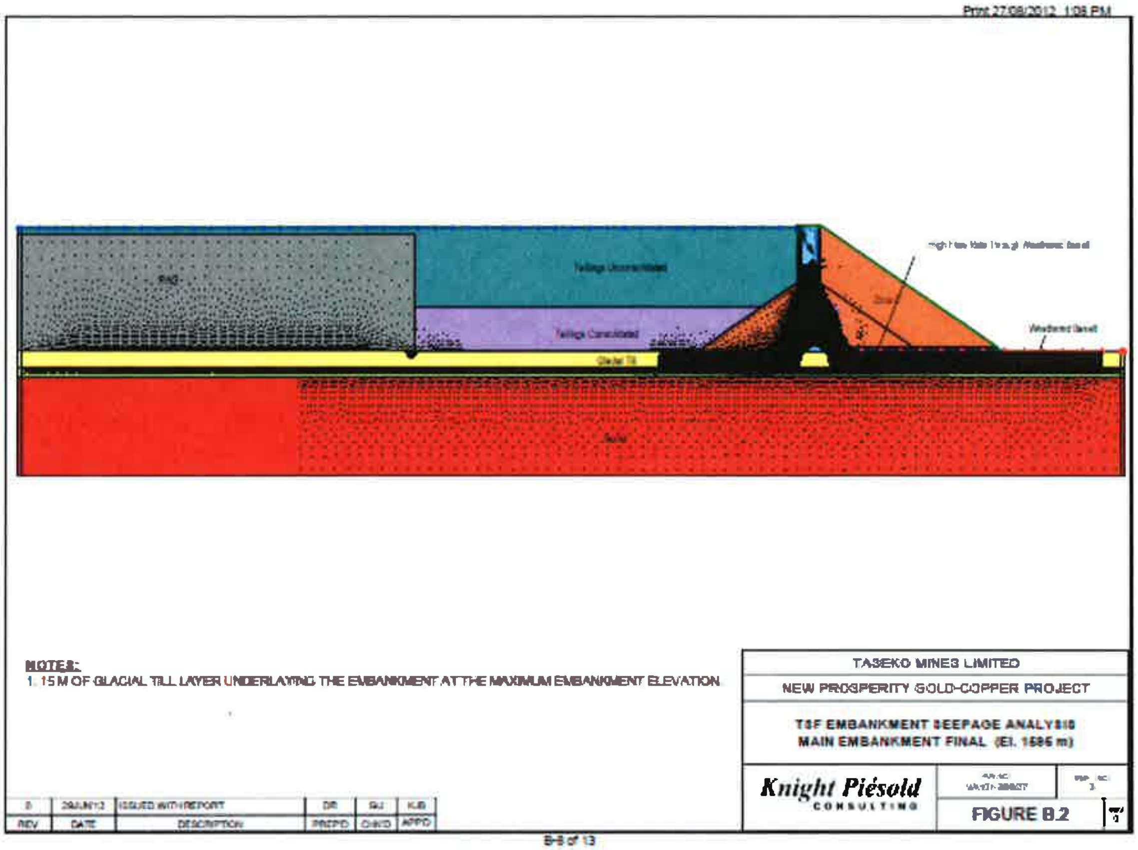

Figure 2: Representation of the proponent's 2D cross-sectional numerical model. From Figure B.2, Appendix B, Appendix 2.2.4-D.