



June 25, 2007

**MVEIRB's Preliminary Questions for the Technical Sessions
on Water Issues - Tamerlane Ventures Inc's Pine Point Pilot Project**

MVEIRB File: EA0607-002

Introduction

On June 19, 2007, the Mackenzie Valley Environmental Impact Review Board (the “*Review Board*”) determined that Technical Sessions were required for EA0607-002. These sessions are scheduled to be held at the Ptarmigan Inn in Hay River on July 17-18, 2007, and will focus on water issues. For more specifics, please consult the file “*Announcement of Technical Sessions in Hay River*” on the Review Board’s website -

http://www.mveirb.nt.ca/upload/project_document/1182379709_technical%20sessions%20with%20tip%20sheet.pdf.

Four main topics were identified for the Technical Sessions by the Review Board. Other parties (GNWT, INAC, and Environment Canada) have identified topics and specific questions they would like to see addressed on water issues; their comments are available on the Review Board website Public Registry as well.

The developer has made some effort to address the topics identified by those three parties with a supplemental response document, and is pursuing meetings outside the EA process to deal face to face on the outstanding issues. The Review Board encourages continued efforts by the developer and parties to meet and discuss technical concerns. Parties will be asked at the Pre-Technical Sessions Meeting, planned for Wednesday, June 27 (2pm MST), to identify which Technical Session issues they feel still need to be addressed. They are also requested to pose the questions they feel the developer should answer in the Technical Sessions. Participants are also expected to identify the information they intend to bring with them.

The Review Board, with assistance from its expert advisors, has also posed several questions under each of the four main topics that it feels need to be addressed before the Review Board can make proper determinations of any potential impacts, their significance, and the ability of proposed mitigation to manage those impacts. The developer is invited to address these questions with written replies on the Public Record prior to the Technical Sessions. The more information that is available prior to the Technical Sessions, the more effective the sessions will be. If any parties and/or the developer feel any of the following issues have already been addressed adequately, note should be made of this in the Pre-Technical Sessions Meeting or in a note to the Public Record of the EA.

Review Board Proposed Technical Session Topics and Specific Questions

Topic 1: Confidence in predicting water discharge characteristics.

GENERAL CONSIDERATIONS: Overall, concerns have been identified about the limited amount of on-site baseline data. In particular, there is a lack of information about the likely characteristics of deep groundwater versus that used in preliminary desktop studies, or in shallow well samples.

In addition, the developer has stated in its IR responses that it cannot make predictions of likely amounts of nutrients, sediment, and metals that will be deposited in the infiltration basin. Experts at the Technical Sessions will be asked to provide evidence and opinion both on likely discharge characteristics, and what would be the prudent course of action if discharge characteristics cannot be identified with an acceptable level of confidence (e.g., whether additional work needs to be done, either prior to the completion of the EA or in a follow-up water monitoring and management program).

The issue remains that a realistic estimate of effluent quality needs to be prepared and some form of contaminant transport fate and effects analysis of this discharge on ground and surface water quality should be considered.

SPECIFIC QUESTIONS:

- a) The Brown, Erdman & Associates Ltd report from 1981 contains data concerning a well test study at R190. The parameters reported upon appear more extensive than those provided in the 2006 study conducted by Tamerlane. Is there any reason why this data was not included in the DAR and considered? Is Tamerlane aware of this data, is the depth at which the water quality sample was taken known?
- b) In the DAR, Tamerlane has developed its annual ammonia loading from the estimate of using 240m³ of excess ground water. It does not however consider the other 585 m³ that will be sent through the DMS circuit. What is the fate of ammonia passing through the DMS? Should its contribution be included in an overall loading estimation?
- c) Is it possible that ammonia concentrations reporting to the surface may be higher in the PPPP than in the Giant Mine, given the predicted smaller amount of water passing through the mine workings?
- d) Concerning the metal leach testing; is a single test statistically sufficient to estimate the degree of leaching expected from the ore? Is the use of Ontario tap water acceptable as a proxy for deep minewater from this specific location?
- e) Will recycling of water in the DMS lead to concentration of leached metals? What is the fate of such metals if the concentration does indeed occur? Will they report to the infiltration basin, or will they be sorbed onto separated concentrates?
- f) What percentage of metal content moving through the DMS circuit is lost to the receiving environment rather than captured in the concentrate? Of these metals lost, what proportion would likely be in solution and what portion would be in suspension?
- g) What is the principle aquifer at depth that is being intercepted by underground workings? Is it the sulfate-bicarbonate containing aquifer, or is it the aquifer that contains sodium chloride brines? Are highly saline waters expected to be discharged to surface? If so, what chemical properties are they likely to possess? i.e conductivity, chloride content, TDS content

Topic 2: Potential impacts of different water components on the immediate (gravel pit) and surrounding receiving environment, with an emphasis on potential impacts of salts, ammonia, nitrates, and metals.

GENERAL CONSIDERATIONS: At its core, an Environmental Assessment is focused on developing confidence that we understand likely changes to the environment from proposed developments. The developer has stated in IR responses that if any impacts occur from process water inflows, they will be *“extremely localized and likely non-detectable within 10-20 metres downgradient of the infiltration basin”*. The developer has also stated, in relation to discharge of nutrients, *“nutrients that exfiltrate into the shallow groundwater table would be rapidly assimilated by the natural biological processes operating in the surface and shallow subsurface overburden of the area.”*

Technical experts will be invited to provide comments on the veracity of such predictions at the Technical Sessions. Participants will be encouraged to consider whether and how specific chemical constituents in the discharge water might impact on the environment and if any of these constituents should be the focus of water monitoring and management programs. The Review Board recognizes that this is a dryland infiltration basin rather than a waterbody receiving environment – expert technical input on probable impacts in this type of environment will be valuable to the Review Board’s decision making process.

In addition, the concerns of the GNWT, particularly those of its Department of Transportation, regarding the potential spiking of metals and other potential contaminants in the infiltration basin merit further discussion by experts.

SPECIFIC QUESTIONS:

- a) Nitrites and Nitrates are not discussed in pg 271 of the DAR. Are they also byproduct of ANFO blasting? Are there any implications regarding such compounds entering the surrounding environment?
- b) What are the implications of discharging highly saline waters to surface on surrounding vegetation, if such waters are expected to be discharged?
- c) Are waters discharged to surface likely to be within the rooting zone of vegetation adjacent to the infiltration basin?
- d) Can Tamerlane better explain how the subsurface composition of the infiltration basin will affect the rate of infiltration as it seems plausible that the clay content within the till material could restrict infiltration rates in the overburden profile.

Topic 3: Analysis of different scenarios of water inflows to the mine, and what potential increases in water quantity might mean for impacts on the environment.

GENERAL CONSIDERATIONS: Although the developer has expressed a high degree of confidence in its ability to minimize water inflows to the mine through freezeway technology, specific discussions of the groundwater conditions in the R-190 area by experts are required before previously stated concerns of a variety of parties are put to rest. At present, there are questions of whether the conditions have been adequately characterized.

In addition, one of the goals of Environmental Assessment is to consider “worst case” scenarios and have

contingency planning in place for such situations, even if they are considered unlikely. In particular, the potential for significant inflows from the base of the frozen wall seem to merit more consideration.

SPECIFIC QUESTIONS:

- a) There appears to be lack of information provided to date by Tamerlane regarding the potential for upwelling of water from below the base of the mine workings into the mine. Given the properties of the lithology at the base of the workings, it seems very plausible that this rock formation could be an aquifer. Can Tamerlane, given its limited data, confidently assert that water inflow into the bottom of the workings is to be manageable and not significant?
- b) Can Tamerlane justify its use of the Beak 1981 study as the main input for its desk-top inflow study? This study was apparently conducted for the purpose of a pump-out mining system, not a freezeway system as is currently proposed.
- c) What is the relationship between an operational failing (not failure) of the freezeway and water inflow? For example, if the wall proves 5%-10% percent less effective than predicted, how much water will have to report to the surface? What are the implications of this? Is there a margin of error for the effectiveness of such freezeway systems? What has the margin of error been in other locales?

Topic 4: Water quality management planning.

GENERAL CONSIDERATIONS: The level of detail on monitoring, management and contingency plans in the developer's submissions merit further investigation. Water quality management and monitoring should include discussion of Best Available Technologies for treatment, containment and monitoring, and how they apply to direct release into an infiltration basin. Experts in the Technical Sessions will be invited to identify whether the monitoring and management systems the developer has proposed correspond appropriately to the level of confidence in the prediction of potential impacts.

SPECIFIC QUESTIONS:

- a) Is Tamerlane planning to implement the BIODISK system at the mine site? What is the background context to the sewage treatment plant data provided in the IR responses given no information appeared to be available regarding at what capacity the RBC was operating at, or other factors that might be of consideration.
- b) Has Tamerlane given consideration to what conditions would lead to the implementation of adaptive management procedures for discharge of mine and process water? Notwithstanding any water quality/quantity criteria required by the MVLWB in a licence, what would Tamerlane consider to be unacceptable in terms of discharge water characteristics? In other words, what are the cutoff lines?
- c) Discussion is required, at least at a conceptual stage, regarding the installation of site specific water quality and baseline data and monitoring points for long term monitoring of the basin area.

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