



**Western Copper
Corporation**

Project Proposal

**Carmacks Copper Project
Yukon Territory**

Appendix D6

**EBA Engineering Consultants
Responses to Environmental Assessment
Review Questions (re Heap) (March 2006)**

March 20, 2006

EBA File: 1200133

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Attention: Mr. Dan Cornett

Subject:**Responses to Environmental Assessment Review Questions
Carmacks Copper Project, near Williams Creek, YT**

EBA Engineering Consultants Ltd. (EBA) has reviewed the “Proposed Carmacks Copper Mining Project: Yukon Environmental Assessment Act (EAA) Additional Information Requirements” for the Carmacks Copper Project as outlined in the December 16, 2005 letter from the Yukon Government (YTG). This review has focused on the geotechnical aspects of the previous design work on the heap leach pad foundation, liner, and confining embankment design. The Waste Rock Dump design review will be presented in a separate letter.

Review of available materials on the Carmacks Copper Project included;

- Project Description and Environmental Assessment Report, Carmacks Copper Project, Yukon Territory, June 2005
- Detailed Project Design Drawings, various dates
- Western Silver Corporation Safety and Environmental Policy
- Carmacks Copper Project Performance Standards and Design Criteria Parameters
- Knight Piesold – Report on Updated Detailed Design of the Heap Leach Pad and Events Pond (Ref. No. 1785/1), April 23, 1997
- EBA Engineering Consultants Carmacks Copper Mine Heap Leach Pad Liner Design Report, May 2005
- Beattie Consulting Ltd. Report on Leaching and Decommissioning of Samples from Carmacks Oxide Copper Project
- Conceptual Closure and reclamation Plan
- Summary of Results from the Waste Rock Characterization Program
- Baseline Water Quality Data 1989 – 1999
- Public Consultation 1991 –1994
- Summary of Potential Environmental Effect and Associated Mitigation Plans
- Spill Contingencies and Emergency Response Plan
- Qualitative Risk Assessment Worksheets
- Knight Piesold Ltd., *Western Copper Holdings Limited, Carmacks Copper Project, Report on 1996 Geotechnical and Hydrogeological site Investigations* (Ref. No. 1784/1); June 1996
- Knight Piesold Ltd., *Western Copper Holdings Limited, Carmacks Copper Project; Report on 1992 Surficial Geotechnical Investigation* (Ref. No. 1782/2); May 1993
- Knight Piesold Ltd., *Western Copper Holdings Limited, Carmacks Copper Project; Report on 1992 Surficial Geotechnical Investigation* (Ref. No. 1782/2); May 1993

- Hallam Knight Piesold Ltd., *Western Copper Holdings Limited, Carmacks Copper Project, Detailed Report on Initial Leach Pad Settlement Assessment (Ref. No. 1783/6)*; IEE Addendum No. 3, October 1995
- Hallam Knight Piesold Ltd., *Western Copper Holdings Limited, Carmacks Copper Project, Detailed Report on Hydrogeological Summary and Preliminary Impact Assessment (Ref. No. 1783/3)*; IEE Addendum No. 3, October 1995

1.0 HEAP GEOTECHNICAL CONDITIONS – REVIEW COMMENTS

Generally, geotechnical site conditions beneath the heap leach pad have been investigated to acceptable standards and are adequate for current design purposes. However, with subsequent overburden stripping from the leach pad area, site conditions will have changed (and likely been improved) and will require additional site characterization work prior to detailed design. This work would include the evaluation of potential insitu impervious materials, as well as the distribution and ground ice content of any remaining permafrost. In general, it can be stated that overburden stripping in the heap leach pad area has improved foundation conditions over what was previously reported and used for design. However, a review of the design using updated loads and foundation conditions will still be required at the final design stage.

Foundation data collected and analysis from several site investigations by both KP and EBA suggest that areas of high risk for potential liner settlement can be identified and mitigated to minimize settlement before construction. The placement of a redundant liner system along with LDRS and subgrade drainage will help detect and minimize leakage risk to acceptable levels.

For environmental assessment purposes, there is sufficient geotechnical data available at the present time. Additional selective boreholes and/or testpits are recommended before construction to examine the potential benefits from removing organics and overburden within the proposed leach pad footprint. The collection of additional data will determine the general location of remaining permafrost (if any) and potential for decreased risk of impact on the liner system. Additional data will also provide the company with further review of potential volumetrics for removal of potentially high-risk materials.

2.0 HEAP LINER DESIGN – REVIEW COMMENTS

As presented in EBA May 2005 report, the primary criterion for liner design is based on YTG guidelines. These guidelines for design have been met and exceeded with respect to liner criterion and acceptable potential leak rates. EBA has proposed a “double liner” system that exceeds the Government of Yukon Guidelines for “...permeability at least equivalent to a synthetic liner over a 12 inch soil liner with a permeability of $10E-06$ cm/s”. In addition, the lower portion of the heap leach pad liner will contain a “compacted soil liner with a target permeability of $10E-06$ cm/s” beneath the double liner system.

Please refer to EBA May 2005 report for details of the liner design, and the rationale for recommending a “double synthetic liner” system.

3.0 HEAP EMBANKMENT DESIGN – REVIEW COMMENTS

General site location, footprint and design of the embankment are appropriate for the site, and Knight-Piesold's design is considered acceptable for the current design configuration. For environmental assessment purposes, there is sufficient geotechnical data presently available. At the next stage of design, some additional geotechnical testholes will be completed (to verify the assumed foundation improvements created by the previous site clearing) and an updated review will be completed using current seismic and other design criteria as detailed in the most recent version of the Canadian Dam Safety Guidelines.

The review of the Waste Rock Dump is presently in progress, and will be submitted as soon as it is completed.

We trust that you will find this report satisfactory for your purposes. If you have any questions, or require additional information, please contact the undersigned.

Yours truly,
EBA Engineering Consultants Ltd.



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