The matter of air-blast is a key issue that should be included in the information requirements for an environmental assessment / environmental impact statement for comprehensive study of the proposed KGHM AJAX mine development. For that reason, we object to the proponent’s proposal to exclude air-blast from the assessment. Some of the supporting considerations and rationale for that opinion are provided below.

**Air-blast is that loud noise or “sonic boom” that is created by large blasts (with a frequency greater than 20 Hz).** At large receptor distances from a large blast, it is normally the air-blast, instead of ground vibration, that can be felt and can potentially cause distress and damage. The air-blast can cause a house to vibrate and could potentially break windows. Air-blast generated from a blast can be disturbing to persons and wildlife. The intensity of air-blast is affected by:

- the size and location of the blast;
- the blast design which includes charge weight per delay and stemming depth;
- the blast shot direction;
- the terrain;
- wind direction and speed;
- cloud cover; and
- temperature inversions.

**The effects of blasting on persons, property and wildlife is of concern to residents.** It is anticipated that air-blast will be one of the first widely noticed and controversial impacts of the proposed development on the City of Kamloops and environs, the residents and wildlife. Residents who have experienced blasts may mistake the sudden noise and shaking of their house to be the result of ground vibration rather than air-blast, but nonetheless many residents have a common concern for the effects of blasting on their persons and houses. Air-blast may be a matter of special concern to sound-sensitive individuals, including persons suffering from Post-Traumatic Stress Disorder (PTSD), who may be adversely affected by air-blast events. Residents may
also be concerned about effects on pets or wildlife. Pets with sensitive hearing, such as dogs, may be disturbed by air-blast. Air-blast can be used to frighten wildlife, particularly birds, and as such air-blast may have effects on nesting.

The effects of blasting on property values is of concern to residents. The nuisance, distress and/or damage from air-blast may have an impact on desirability of affected neighbourhoods, with corresponding impact on property values.

Air-blast will affect a very large area and a large number of people. Modeling by Orica indicates that air-blast from the proposed mine will extend at least 10 km from the mine site with little attenuation with increased distance from the blast source to a receptor location. How much further the air-blast may extend has not been stated. Accordingly, a very large area and a large number of people in Kamloops and its environs will be affected by air-blast.

Air-blast modelling by Orica of the two small production blasts (refer to the blasting report issued by the proponent entitled ‘Multiple Seed Waveform (MSW) Site Vibration Characterization – Signature Holes and Production Blasts, and Air Overpressure Estimate’, by Ruilin Yang and Less Pratt of Orica, dated April 2011) indicates that there is little attenuation of the air-blast intensity over long distances from the small production blasts. This is illustrated by the following graphical plot of the predicted air over pressure levels at 19 locations surrounding the Production Blast No. 2, using the data provided in Table 9 of that blasting report.

As indicated in the above plot, air-blast overpressure results as modeled by Orica show little attenuation at receptor distances of up to almost 10 km from the blast source. The estimated air-blast levels indicate that very large areas including much of the City of Kamloops and environs would be subject to significant, highly noticeable air-blast.

Under normal conditions, air-blast will be very loud (at frequencies greater than 20 Hz) and disturbing to residential receptor locations. The modeled air-blast levels based on two small production blasts were similar. The modeled air-blast overpressure results for Small Production Blast No. 2 ranged from a low of 108.1 dB at a distance of 7.1 km (behind the blast face) to a high of 115.3 dB at 4 km from the blast source. Based on a sound comparison chart (noise are levels above 20 Hz), 110 dB is the noise level equivalent to a power saw at 0.9 m distance from the noise source, while 115 dB is the noise level equivalent of a loud rock concert.
Under some environmental conditions, air-blast levels have the potential to be more elevated than indicated by Orica. The Orica report provides estimates of air-blast levels under normal blast conditions, but does not address common variations in environmental condition which can amplify air-blast levels. Large blast sizes, variations in blast design and hole stemming, wind direction from the blast source to the receptor location, temperature inversions, cloud cover and terrain effects can increase air-blast levels. The City of Kamloops is subject to periods of strong wind from the south, periods of cloud cover, and extended periods of temperature inversions which may increase air-blast levels. For instance, it is understood that wind blowing from a blast source to a receptor location can increase the air-blast levels by more than 20 dB, which can increase the potential to break windows.

In conclusion, air-blast levels produced from the proposed Ajax Mine is an important environmental side effect of the proposed blasting operations. The potential for allegations of blasting damage from the public is high. It is our position that air-blast is a key issue that that should be subject to comprehensive study. Accordingly, we recommend that the matter of air-blast be included in the comprehensive study within the AJAX Environmental Assessment.

GOLDER ASSOCIATES LTD.

ORIGINAL SIGNED

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