
KGHM AJAX'S MINE ENVIRONMENTAL REVIEW (KAMLOOPS, BC)

AIR QUALITY AND HEALTH IMPACTS ISSUES



The following summary is based on the analysis of qualified, independent consultants and experts, as well as some federal agencies' staff, that have recently reviewed and reported on KGHM's AJAX open pit mine environmental application (as of April 2016). The full references of these reports can be found on BCEAO or CEAA websites, or upon request: uqo@miningwatch.ca.

Summary:

**AJAX's impact assessment to air quality and health is deficient, incorrect, not realistic, and not prudent*

**AJAX's mine would significantly increase fine dust particles (PM2.5, PM10) in Kamloops's airshed*

**Any increase in fine dust particles (PM2.5, PM10) is known to negatively impact health (respiratory system, hospital admissions, mortality rates, etc.)*

**Air quality is already problematic in Kamloops, with long term annual average pollution levels of PM2.5 above both BC's Air Quality "Objective" (8ug/m3) and "Goal" (6ug/m3)*

**AJAX's "90%" dust suppression objective is not realistic*

**Despite poor quality data and assessment, there are indications of potential air contamination in arsenic, lead, manganese, and thallium above the recommended Health Canada "0.2" factor for risk "HQ"*

Main Quotes:

"...there are many aspects of the assessment that are deficient, potentially misleading, or incorrect and that undermine the overall assertion that the health of local populations will not be meaningfully impacted" (Froese et al. 2016: 4)

"The principle pathway of concern for public health exposures to hazardous substances for this project appears to be from potential airborne dust and particulate matter (PM)... Any increase in PM2.5 [fine dust] is known to negatively impact health... The generation [by the project] of some additional PM2.5 is unavoidable... The [environmental] application suggests that 90% of all emissions will be absorbed at the operation site; this is seen as extremely optimistic and a performance level not likely to be attained" (BC Interior Health Authority 2016: section 2)

"The dustfall estimates were based on a 90% control efficiency for dust from unpaved roads. This value is... unreasonably high for the method proposed and... unrealistic" (Health Canada, in CEAA 2016: 9)

"[Air quality is already problematic in Kamloops with] long-term average for downtown Kamloops of 8.7 µg/m3... above the British Columbia Air Quality Objective (AQO) of 8 µg/m3... [and] above the British Columbia Goal of 6 µg/m3" (Tsigaris and Schemenauer 2016b: 1)

"Lepeulle et al (2012) reported that concentration-response for annual average PM2.5 and mortality is linear down to 8ug/m3. Elliot and Copes (2011) state that mortality effects of PM2.5 have been demonstrated down to 5ug/m3. Health Canada considers PM2.5 to

have no lower threshold of effect. There is sufficient data available for [AJAX] to perform an attributable mortality risk calculation for annual PM_{2.5}" (Froese et al. 2016: 6)

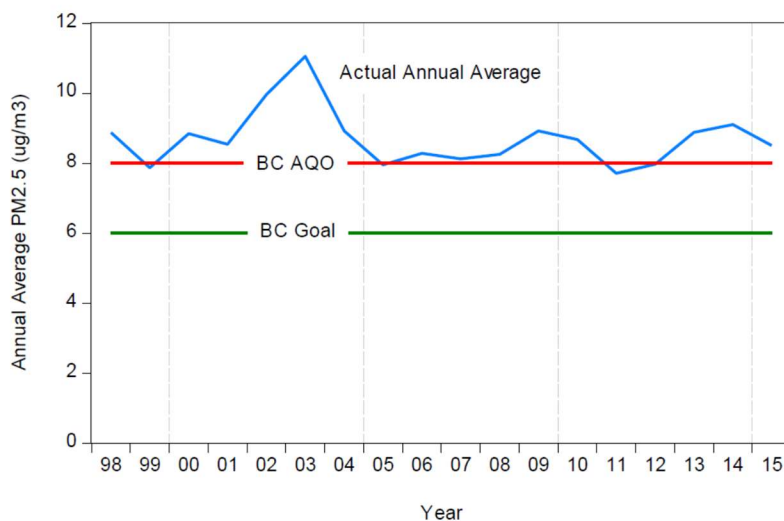
"In such a situation it makes no sense at all to allow a new industrial source of the pollutant in question (PM_{2.5}) no matter how small its incremental effect" (Steyn 2016: conclusion)

Air Quality Already Problematic in Kamloops:

"[Air quality is already problematic in Kamloops with] long-term average for downtown Kamloops of 8.7 µg/m³... Fourteen of the 18 years of record have had PM 2.5 values above the British Columbia Air Quality Objective (AQO) of 8 µg/m³. All 18 years of record have had PM_{2.5} values above the British Columbia Goal of 6 µg/m³" (Tsigaris and Schemenauer 2016b: 1)

"[In 2015], out of 365 days, PM_{2.5} exceeded the value assigned to the annual AQO average (8 µg/m³) on 151 days. This was 41 percent of the time. The PM_{2.5} maximum hourly value, which was 188 µg/m³, occurred on August 23rd" (Tsigaris and Schemenauer 2016b: 1)

Figure 1: Historical Annual Average PM_{2.5} in Downtown Kamloops, 1998-2015. S and Schemenauer (2014b) for a discussion of the data analysis.



Note: The vertical lines are at the start of the bins for years 2000, 2005, 2010, and 2015

Predominant Winds Towards the City of Kamloops:

"...the wind direction data show that 74% of the time winds were from the southern half of the terrain [where the mine would be] and 26% from the northern half..." (Tsigaris and Schemenauer 2016a: 1)

"[Fine dust particles] PM_{2.5} could increase by up to 62% in Aberdeen and Upper Aberdeen areas, and PM₁₀ by up to 170%..." (Froese et al. 2016: 4)

Health Effects & Risks

"The proposed ... open pit mine site is perched on a plateau above and adjacent to Kamloops (pop 90,000). It would be within 6 kilometers of 8 elementary schools, 4 high schools, 4 senior residences, 1 hospital and the Thompson Rivers University. There are homes in close proximity to the site, and the closest Kamloops neighbourhood and elementary school is within 2 km of the proposed mine" (Kamloops Physicians for a Healthy Environment Society 2015: 1)

"Any increase in in PM2.5 [fine dust] is known to negatively impact health... The generation [by the project] of some additional PM2.5 is unavoidable..." (BC Interior Health Authority 2016: section 2)

"For each 10ug/m3 increase of fine dust particles in the airshed, acute exposure (hours or days) results in 1% increase in hospital admission [...] Chronic exposure (long term) results in 4% increase in mortality rate, and up to 22-32% for vulnerable people already affected by health problems (e.g. diabetes, respiratory problems, cardiac issues, etc.)" (Canadian Association of Physicians for the Environment, 2014: 4)

"Lepeulle et al (2012) reported that concentration-response for annual average PM2.5 and mortality is linear down to 8ug/m3. Elliot and Copes (2011) state that mortality effects of PM2.5 have been demonstrated down to 5ug/m3. Health Canada considers PM2.5 to have no lower threshold of effect. There is sufficient data available for [AJAX] to perform an attributable mortality risk calculation for annual PM2.5" (Froese et al. 2016: 6)

"[AJAX's health indicator] HQ exceeds the recommended Health Canada 0.2 factor for risk exposure pathway related to arsenic, lead, manganese, and thallium... including arsenic for toddlers' drinking water in Knutsford [--all known to be potentially toxic metals]" (Froese et al. 2016: 4)

"[AJAX's health indicator] HQ exceeds the recommended Health Canada 0.2 factor for risk exposure pathway related to arsenic, lead, manganese, and thallium" (Froese et al. 2016: 4)

[Risks of bio-accumulation of toxic metals has not been assessed] (Froese et al. 2016, paraphrased)

"[Another] major shortcoming of the EIS is [the lack to] address the role and influence of psycho-social factors in health... such as stress, mental health... well-being [...] Blasting and noise effects at sites near mine location are not discussed in the context of community well-being [...] examination of health effects on vulnerable populations is [also] missing from the assessment" (Froese et al. 2016: 4)

AJAX's Poor Air Quality Modelling & Health Assessments:

"...there are many aspects of the assessment that are deficient, potentially misleading, or incorrect and that undermine the overall assertion that the health of local populations will not be meaningfully impacted" (Froese et al. 2016: 4)

"Some emissions and modeling parameters in the air quality assessment may be unduly biased..., [particularly] of dust and particulate matter" (Froese et al. 2016: 4)

"The greatest uncertainty and greatest risks are associated with the particulate matter modeling and [health] effects evaluation" (Froese et al. 2016: 4)

"Air quality assessment[s]... need to be confirmed and the models rerun... [The proponent] could provide a mortality risk calculation for the areas most affected by the project" (Froese et al. 2016: 6)

"I have considerable concern about some of the input data used to drive the models, and some of the more general modelling approaches taken [related to air quality impacts]" (Steyn 2016: section 1.0)

"I have been very critical of the almost complete lack of [air pollution] model evaluation... This is a severe weakness that undermines the confidence one can have in overall conclusions [drawn by AJAX about air quality impacts]" (Steyn 2016: conclusion)

"Given the smoothing inherent in the MM5 model runs (because of the 12 km grid resolution)..., temperature inversions are underrepresented [...] This will result in the model underestimating the severity of air pollution at the most polluted times [...] These specific deficiencies are in direct contradiction of the claim that the model is operated in a conservative way" (Steyn 2016: 2.1)

"[AJAX] presents a largely inadequate attempt to justify the veracity of meteorological data input to [the air quality model]... these include (but are not limited to) light wind conditions in the presence of temperature inversions that are responsible for limited pollutant dilution in the Kamloops Valley, high wind conditions at the proposed mine site that will be responsible for elevated levels of particulate matter suspension from the various tailings sites, and meteorological conditions that result in wind trajectories that will

carry pollutants from the mine site towards the city of Kamloops [...] The lack of even rudimentary evaluation of modelled CALMET wind fields introduces considerable uncertainty into the veracity of modelled pollutant distributions" (Steyn, 2016: 2.2)

AJAX's Assessment Not Prudent Enough:

"I see no indication that [air pollution] emissions considered are anything but the most optimistic bestcase" (Steyn 2016: 2.7)

"...the significant underestimation of contamination at the source in the Ajax [environmental assessment] automatically underestimates the amount of contamination travelling along all pathways... including non-aqueous pathways like windblown dust" (Morin 2016: vi)

"The [environmental] application suggests that 90% of all emissions will be absorbed at the operation site; this is seen as extremely optimistic and a performance level not likely to be attained [...] The proponent is unable to supply an example of a mine functioning to [90% dust suppression] level..." (BC Interior Health Authority, March 2016: section 2)

"[AJAX] employs only a single [air pollution] emissions scenario, and that is the most optimistic one, which assumes full intentional and natural mitigation of emissions from all sources within the proposed development... Aspects of this mitigation are extremely ambitious... It would therefore appear prudent to conduct the modelling with at least three emissions scenarios: Full mitigation; reasonable partial mitigation...; and "failed" mitigation." (Steyn 2016: 2.7)

"The dustfall estimates were based on a 90% control efficiency for dust from unpaved roads. This value is: (i) unreasonably high for the method proposed; and, (ii) unrealistic to be applied to all days of operation for entire life cycle of Project (construction and operations cases). The Environment Canada calculator tool for unpaved industrial road dust lists a CE value of 55% for watering twice a day and 70% for watering more than twice a day, with an upper limit of 80% for application of chemical treatments." (Health Canada, in CEAA 2016: 9)

[AJAX uses 'mean concentrations of metals' instead of the more prudent 'maximum concentrations' as suggested by Health Canada] (Froese et al. 2016, paraphrased)

"Ajax does not appear to have a mitigation plan or emergency response plan in case a blast plume (NOx) is blown into [neighborhood] areas... NO2 in blast residues can have acute toxic effects..." (Froese et al. 2016: 8)

Malartic's Mine Cautionary Tale:

"In 2015, the Quebec health authorities published two reports highlighting that impacts [from the Canadian Malartic open pit mine] on our community of 3,200 were greater than assessed and anticipated at the outset... the Regional Public Health Authority is concerned about the proportion of people claiming to be 'affected' (A) or 'highly affected' (HA) by various mine disturbances and impacts... In neighborhoods furthest from the mine (up to 2.0-2.5km), the proportion of people A or HA is still significant with 15-26% (noise), 17-41% (ground tremors), and 27-48% (dust)... Over a third of the population want to move or be relocated due to the mine's impacts..." (Malartic Resident Letter to City Council of Kamloops, revised in March 2016)

"Despite claiming to use best available practices and technologies, the mine is incapable of meeting regulated levels of dust emissions, ground tremors, air blasts, and noise. This open pit mine holds the record in the province, across all industries, with 171 environmental infractions for over 2000 non-compliances since construction started in 2009... In the years leading to the permitting of the mine, we were again-and-again told by the company's experts... that there would be 'no significant negative impacts;' that 'all laws and regulations' would be respected"... I can now tell you that those claims were simply not true..." (Malartic Resident Letter to Kamloops City Council, revised in March 2016)