

LIABILITY, SECURITY, WELLNESS, COLLABORATION, EVIDENCE-BASED AND ETHICAL RISK MANAGEMENT, DUE DILIGENCE, AND AJAX MINE SWISS CHEESE:

October 12, 2017

Dear Honourable Ministers, Honourable Deputy-Ministers, and entrusted EAO and Agency Public Servants:

My children and I do not have a Kamloops family doctor, nor do many thousands of other Kamloops residents.

Lack of family physicians and specialists to serve the Kamloops' community directly impacts on the overall health and wellness of our city, and on the health and wellness of individuals who reside here. Please consider this topic further as one of the many key issues pertaining to your review of value components of the proposed Ajax Mine Project (Ajax) such as community well-being, air quality, water quality, and health potential risks weighed against questionable economic benefits. As will be outlined below, eventually, please also consider that there are alternative employment opportunities around the corner that could provide benefits to regional tradespeople and associated businesses without posing such risk to our community at large, risk to our shared environment, and risk to the established collaborative relationship the City of Kamloops has with the Stk'emlupsemc te Secwepemc Nation (SSN).

When I learned from my family doctor about their decision to no longer operate a family practice office in Kamloops, I also learned that they did not want to commit to another several-year office lease in case the Ajax Mine was approved by government.

The doctor continues to see patients in Kamloops, but in work settings that are contractual rather than self-funded.

The doctor is married to another doctor who also contributes to the care of many Kamloops residents.

I know that the couple has many physician friends and colleagues who are also concerned about the potential negative impacts of the Ajax Mine project on the wellness of their patients, their community, and themselves.

As a side note, Kamloops Physicians for a Healthy Environment Society (KPHEs) counted over 100 physicians, 40 allied health professionals, concerned citizens, and PhD members as of November 2015.

I respect my former family physician's and their spouse's informed choice to move to another community if the Ajax Mine Project is approved by government, since respect of autonomy to make decisions for oneself is a key ethical principle underlying informed consent in the practice of medicine and law.

I am a medical specialist myself, married to emergency physician Dr. Anders Ganstal. We are not unusual. In fact, it's hard to count the number of doctors in Kamloops who are married to one another, since there are so many.

We will likely move permanently away from Kamloops to finish raising our children if the Ajax Mine Project proceeds ahead to construction phase, based on our own informed decision-making. Anders has posted a succinct public comment to the EAO website already. His comment focuses on the Swiss Cheese Model of Hazard Causation, which will be expanded upon later.

I have been committed to learning as much as possible about this Project, from different perspectives and from various sources, to ensure an informed decision-making process for myself. I recognize how many individuals hope to benefit from the Ajax Mine if it is approved by the federal and BC levels of government. Like many individuals who are employed in the resource industry, we, too, have been apart for extended periods of time training and working as physicians. It's not easy. I also recognize the potential negative impacts that working in another city might have on our patients, on our colleagues, and on our community. Such deliberations over the last 5 years about our future have not been taken lightly. Frankly, it has been distressing.

As public servants and as elected officials, I ask that you fully recognize the weight of your own decision-making and your duty to be as informed as possible about even nuanced aspects of this Ajax Mine Project.

I realize that much of what I write in this public comment might not fit with in a “Value Component” framework to be judged and forwarded for consideration. Still, I hope that you find some of what I share here valuable in your own review and deliberations; hence, the long title of this essay.

Given that the Citizens of Kamloops have no personal agency to consent or not to consent to the Ajax Project proceeding ahead, within the framework of the Mineral Tenure Act and the former and current Environmental Assessment Acts, you are acting as “Substitute Decision-Makers” for our city and for the Stk’emlupsemc te Secwepemc Nation.

With regards to determining “What is an acceptable level of risk a population can be subjected to?” - You are the “pilots”, who must work well with the SSN “co-pilot”, to fly the plane filled with Kamloops region passengers in a safe and responsible fashion.

I was encouraged by the federal government’s stated pursuit of evidence-based, effective, collaborative, and ethical governance upon being elected, and by the Ministers’ mandate letters. At that time, I noted that our Prime Minister Justin Trudeau instructed the Honourable Dr. Carolyn Bennett to “Work with the Minister of Justice to implement the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) in full partnership with Indigenous Peoples”:

<http://pm.gc.ca/eng/minister-crown-indigenous-relations-and-northern-affairs-mandate-letter>

The Honourable Minister of Crown – Indigenous Relations and Northern Affairs has since declared the federal government’s commitment to adopting and implementing the UNDRIP at a UN Forum, to a standing ovation, as per the May 12, 2016 article by Bruce Cheadle (published in the Toronto Star):

<https://www.thestar.com/news/canada/2016/05/12/canada-now-full-supporter-of-un-declaration-on-rights-of-indigenous-peoples-bennett-says.html>

In the context of my respect for the initiative and personal agency demonstrated by the SSN in conducting their own, values- and law-based review of the Ajax EIS/Application, I further noted the federal government’s recent completion of the Expert Panel Report “Building Common Ground: A New Vision for Impact Assessment in Canada”:

https://www.canada.ca/en/services/environment/conservation/assessments/environmental-reviews/environmental-assessment-processes/building-common-ground.html#_Toc019

Of relevance to the Ajax decision-making tasked before you, please be mindful of the Panel's attention to the importance of the UNDRIP - "Reflecting the principles of UNDRIP will advance the goal of reconciliation" - and how the Panel thinks this declaration should be considered in the context of Impact Assessments (IA), as per Section 2.3.1 of the report:

"Although UNDRIP is meant to be read as a whole, several articles of UNDRIP relate directly to the field of IA. These include:

Right to self-determination (Articles 3, 4, and 5)

Right to participate in decision making and maintain institutions (Articles 18, 19, 34, and 40)

Right to set own priorities and strategies (Article 23)

Right to make decisions over traditional territory (Articles 26 and 29)

Right to free, prior and informed consent (Article 32)

Right to culture (Articles 8, 11, and 25)

Right to maintain and protect Indigenous knowledge (Article 31)

Right to financial assistance (Article 39)"

Kudos to both the federal and BC governments in your stated commitments to work together with Indigenous Peoples – i.e. your "co-pilots".

Premier John Horgan, in partnership with Green Party Leader Andrew Weaver, has shown integrity, in my view, by including in his mandate letters to his new Ministers the following instructions:

"As part of our commitment to true, lasting reconciliation with First Nations in British Columbia our government will be fully adopting and implementing the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), and the Calls to Action of the Truth and Reconciliation Commission. As minister, you are responsible for moving forward on the calls to action and reviewing policies, programs, and legislation to determine how to bring the principles of the declaration into action in British Columbia."

<https://www.bcndp.ca/latest/read-premier-john-horgans-mandate-letters-new-bc-ndp-government-ministers>

Which leads to stating the fact that the SSN rejected the Ajax Mine Project, with no accepted conditions, based on their fulsome review of the EIS/Application.

In reading the SSN's published statement as to why they have rejected this investment opportunity for their people, I am mindful of the Canadian government's Impact Assessment aspirations pertaining to adoption of the UNDRIP, as listed in Section 2.3.1 of the expert panel report cited above.

Although the Honourable Minister of the Environment and Climate Change Catherine McKenna does not have a mandate letter instructing commitment to the UNDRIP, the recent federal expert panel review of the Canadian environmental assessment process was done under the auspices of her Ministry as part of her mandate. Therefore, integrity would be demonstrated as a key representative of her government if she, too, considered with weight SSN's opposition to the Ajax Mine Project in the context of the UNDRIP.

Furthermore, although the Honourable Minister of the Environment and Climate Change does not have direct instruction in the Prime Minister's mandate letter to incorporate the UNDRIP into her stewardship of the Ministry, she was instructed explicitly to be a steward of Canadian fresh water resources:

“Treat our freshwater as a precious resource that deserves protection and careful stewardship, including by working with other orders of government to protect Canada's freshwater using education, geo-mapping, watershed protection, and investments in the best wastewater treatment technologies.”

<http://pm.gc.ca/eng/minister-environment-and-climate-change-mandate-letter>

As outlined in the SSN decision summary report for the public, the SSN has significant concerns about many of the Ajax Mine Project's potential negative impacts, including risk to water quality and quantity in Pipsell, the Peterson Creek watershed, and the South Thompson River with pathway concerns about their health eating the fish that they catch. The Honourable Minister

would further demonstrate integrity through her actions by judging whether the Ajax Mine Project should be approved through the lens of her mandate letter instructions.

As per the SSN report “Ten Reasons We Said Me7e Pipsell Ta7a Ajax (Yes Pipsell No Ajax)”:

1. The Stk’emlupsemc te Secwepemc Nation has an irreplaceable historical, cultural and spiritual connection to Pipsell.
2. Stk’emlupsemc te Secwepemc Nation has always been caretakers of these lands and we want to ensure the future enjoyment of Pipsell as it is uniquely situated to serve as a place of sharing between Indigenous and non-Indigenous people.
3. Federally – The current government admitted to the inadequacy of the current federal assessment process and conducted their own expert review and BC is following suit.
4. Experts express serious concerns about KGHM-Ajax possible effects on our air, water, and health.
5. Biodiversity & sustainability of sensitive and endangered species & ecosystems.
6. Water withdrawal on an Endangered River in perpetuity?
7. BC Auditor General Carol Bellringer Reports that BC government management of mining industry is failing to protect the environment against significant risk.
8. Net Benefits to SSN, British Columbians and Canadians?
9. Experts Conclude that KGHM-Ajax Represents an Unconscionable Risk to Investors, Governments and the Public.
10. SSN Employment Benefits Reality Check.

The discussions and associated linked supporting documents for each of the ten-point headings listed above are available for review on the posted summary:

https://miningwatch.ca/sites/default/files/ssn_10_reasons_to_stop_ajax.pdf

Note, the SSN is not against mining. As an example of how the SSN collaborates with resource industries to the benefit of both parties when their consent to each step of the process is brought to the table, or “airplane”, please be aware of this recent press release by WestKam Gold Corp., dated August 11, 2017:

http://www.westkamgold.com/s/NewsReleases.asp?ReportID=799893&_Type=News-Releases&_Title=Stkemplupsemc-te-Secwepemc-Nation-Signs-Cooperation-Agreement-With-WestKam-Gol...

As per the company's website, "WestKam Gold Corp. (TSX VENTURE:WKG) is a Vancouver-based gold exploration company focused on developing the Bonaparte Gold Project property approximately 50 km northwest of Kamloops, B.C., announces the recent signing of a Cooperation Agreement (the "Agreement") with the Stk'emlupsemc te Secwepemc Nation. The Agreement formalizes a process for ongoing dialogue and cooperation between the Stk'emlupsemc te Secwepemc Nation and the Company regarding future exploration and bulk sampling activities planned for the Bonaparte Gold Project, which lies within the Stk'emlupsemc te Secwepemc Nation traditional territory, recognizing their cultural, traditional heritage and environmental interest." ... "The Bonaparte Gold Project is a high grade, bulk tonnage, copper gold target with significant potential. Subject to financing and other considerations, the Company plans to resume a 10,000 tonne bulk sample program in 2017 that will focus on veins that have produced multi-ounce values of gold."

The Bonaparte Gold Project is a potential underground high-grade gold copper mine. This project is not at an urban-rural interface nor is it within an important watershed of cultural, traditional, and spiritual significance to the SSN. In contrast, the Ajax Mine Project is a large low-grade copper gold open-pit mine proposal that has been deemed unacceptable to the SSN.

Imagine the "Building of Common Ground" possible with such consensual collaboration between the SSN and WestKam Gold Corp? I could foresee an environmental/impact assessment process proceeding with more efficiency and with greater likelihood of approval by the SSN, compared to what we have witnessed over the last seven years with the Ajax Mine proposal. Furthermore, there is the potential for numerous well-paying jobs becoming available to individuals residing in the SSN-Kamloops-North Thompson Region, thereby helping to address issues around traveling to other jurisdictions to work in the resource industry. Given that Kamloops is a regional mining service and supply centre, success of the SSN-WestKam Gold Corp collaboration could lead to many indirect benefits to the local economy.

I ask that the EAO, the Agency, and the decision-making Ministers deliberate on the above questions around alternative potential opportunities for win-win economic benefits with less inherent risks, in a similar fashion that the Appendix B of the Ajax Report considers potential adverse effects when deciding on preferred alternatives for project components.

Like the SSN, I am not against mining either. As I stated as part of a blog debate with other online posters, "All mines can't be painted with the same brush." I also attempted to describe my concern to the pro-Ajax debaters about KGHM International's recent economic history resulting in permitted projects not going ahead, contracts being cancelled, and employees being

laid off. Unfortunately, many economic eggs in the Ajax Mine benefit hope basket have already been broken, including that of the former Ajax Mine Project Manager, Clyde Gillespie (as per the August 9, 2016 InfoTel News article by Ashley Legassic and Brendan Kergin):

<http://infotel.ca/newsitem/former-ajax-project-manager-sues-kghm-for-wrongful-dismissal/it33478>

My official correspondence to Kamloops City Council was posted by Thompson-Nicola Regional District Director Mel Rothenburger as a LTE on July 16, 2017 on his Armchair Mayor News blogsite. In this letter, in its attached website link to my colleague Dr. Jill Calder's LTE published on May 18, 2017 in Kamloops This Week, and in the comments section debate there is outlined in a more succinct fashion many of the issues I will further elaborate upon in the remainder of this Public Comment. Such issues are part of why my spouse and I will likely choose to live and work in another community if the Ajax Mine Project is approved by your levels of government.

<https://armchairmayor.ca/2017/07/16/letter-independent-monitor-cant-provide-the-oversight-needed-on-ajax/>

As a side note, with regards to the blogpost made by one commenter - "How many "unneeded" prescriptions do you write a day... Dr. Science?" – I acknowledge that I am not a mining engineer nor an expert in climate modelling. I am someone who wants to take responsibility for a personal risk versus benefit decision through self-learning. I have been trying to apply what I learned during my undergraduate degree, medical school, and post-graduate work about medical ethics and the scientific method to how I approach this dilemma.

Beyond my curriculum vitae identifiers (National Ballet School Alumnus 1988, Queen's University Medallist in Medicine 1998, Canadian Institute of Health and Research Brain Star Award recipient 2004, and Parkinson Society Canada Fellowship Award recipient 2004-2005), I view myself as a practitioner of patient-centred "narrative medicine" where I respect the values of other people. Such practice is at the core of who I am as a person and how I express my personal agency and support the agency of others. Respect of autonomy and actions guided by informed consent are the basis of my day-to-day professional life.

Through such learning, I share concerns about the Kamloops Ajax Mining (KAM) project air quality modeling as outlined in information posted to the BC Environmental Assessment Office's website by Health Canada (HC), the Ministry of the Environment (MOE), Environment and Climate Change Canada (ECC), the SSN, the City of Kamloops, independent reviewers such

as SLR Consulting, the Interior Health Authority (IHA), other members of the public, e.g. Kamloops Moms for Clean Air, and my own Public Comment from March 30, 2016.

As per the second paragraph on page 151 of the August 2017 Federal Comprehensive Study Report/BC Provincial Assessment Report (the Report):

“The Agency and EAO consider there to be substantial uncertainty associated with the air quality effects assessment, which affects the confidence in the estimated frequency of 24-hour average PM10 exceedances in Upper Aberdeen. The Agency and EAO are of the view that 90% mitigation of dust from haul roads is unlikely to be achieved on a continuous basis at Ajax. The Agency and the EAO also note that haul roads are the dominant source of emissions from Ajax, and find that effective dust management would be critical to managing air quality, should Ajax proceed.”

As stated by the EAO and the Agency in the last paragraph on page 151 of their Report:

“The results of the air quality assessment inform other valued component assessments, including water quality and human health. There are numerous sources of uncertainty in the air quality assessment, when used as inputs to related value component assessments, affect the level of confidence in those assessments... The CALPUFF air dispersion model is the best regulatory dispersion model available for estimating ground-level concentrations of air pollutants for Ajax; however, the uncertainty in the model output is still greater than a factor of two.”

Such assessment uncertainties leading to a lower confidence in conclusions made about whether Ajax will have significant negative effects on different value components or not in the real world, not just with theoretically applied mitigation and monitoring, are akin to relatively large holes in slices of the Swiss cheese model of hazard causation.

The British Medical Journal published Dr. James Reason’s article about his Swiss cheese model of how defenses, barriers, and safeguards may be penetrated by accident trajectory 17 years ago (BMJ 2000;320:768-770):

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1117770/>

This highly cited model has been applied to various situations such as the development of system barriers to minimize the occurrence of medical error (the context in which I first learned about it) and to the minimization of the occurrence of harmful effects to the environment through

environmental risk assessments (See “Environmental Hazards: Assessing Risk and Reducing Disaster” by Keith Smith published by Routledge, 2013):

https://books.google.ca/books?hl=en&lr=&id=hOTfCgAAQBAJ&oi=fnd&pg=PP1&dq=swiss+cheese+model+environmental+risk+assessment&ots=CTRMuxTa8V&sig=LoNycls0vI_2_QmzoN0hAMeIDh0#v=onepage&q=swiss%20cheese%20model%20environmental%20risk%20assessment&f=false

Application of mitigation/monitoring measures and improved certainty about conclusions of low risk of harm are akin to thicker slices of cheese with smaller holes. If too many holes line up between the slices of Swiss cheese, then negative consequences are more likely to result by allowing the hazard to pass through purported lines of defense.

This Swiss cheese model is relevant to the BC and Federal Government’s risk management decision-making on the Ajax Mine Project, in my view.

Use of the Precautionary Principle in conducting environmental/impact assessments, followed by adjudication of the quality of such assessments, is like ensuring that the Swiss cheese is thick with holes of small number and size.

In filing their EIS/Application in January 2016, KGHM Ajax Mining demonstrated numerous examples of not using the ethical Precautionary Principle in their scientific assessment of potential air quality impacts. For example:

Only a 90% mitigation of haul road dust was modeled.

Only constant emission factors were applied to the modeling of dust generation from the tailings storage facility (TSF) and the haul roads, without consideration of Kamloops’ tendency to many days of warm, dry, and windy weather each Spring and Summer.

The original EIS/Application’s particulate matter air quality modeling used the former wet TSF plan, rather than the new thickened TSF plan (as of 2015) associated with a much larger dust generating effective beach area; thereby, systematically underestimating the degree of potential TSF dust generation.

And, as per the third paragraph on page 150 of the Report:

“MOE, SSN, and the Kamloops Area Preservation Association raised the issue that haul roads were estimated to have a 5% silt content in the EIS/Application and that 5% may not be a conservative value for estimating emissions from haul roads. Reviewers noted that 5% was at the lowest end of the range specified by guidance from the United States Environmental Protection Agency. MOE and SSN noted that doubling the silt content of haul roads has the effect of doubling the emission rate.”

If the EAO and the Agency were to have judged the merits of the Ajax Mine EIS/Application as it stood when it was submitted in January 2016, would they have been able to accept KAM’s conclusions of no significant risk of negative effects on the assessed value components (such as air quality and downstream VCs) in the context of proposed mitigation measures?

In my view, the substandard quality of the scientific approach demonstrated by KAM in their original application and the lack of use of the ethical Precautionary Principle in multiple instances, have poked numerous holes in my trust that the same company can effectively monitor and mitigate the many risks that their Project poses, despite their commitments to do so and despite the proposed Schedule B: Table of Conditions for an Environmental Assessment Certificate.

An example of a Schedule B Condition for an Environmental Assessment Certificate is the formation of a “Community Liaison Group” (CLG), as outlined in section 17 on page 15:

“The Holder must establish and maintain a community liaison group for the Construction, Operations and Closure phases of the Project. The purpose of the community liaison group is to provide a mechanism for communication and engagement between the Holder, local governments and local stakeholder groups, as identified in the terms of reference.

The Holder must develop a terms of reference for the community liaison group that must include: a) The purpose and objectives of the group; b) The scope of topics and issues to be addressed by the group; c) The proposed frequency, timing and location of meetings; d) Group membership; e) The roles and responsibilities of the group members; f) The initiatives the Holder will undertake, including technical, logistical and financial support, including access to independent technical expertise, to give effect to the group’s purpose and objectives; g) The means by which the group will be consulted on the plans, documents and programs required by the conditions of this Certificate; h) The process by which the group will identify issues related

to Construction, Operations and Closure and the means by which mitigation measures proposed by the group to address identified issues will be considered; and i) The means by which the group will communicate its progress, the issues identified, and any associated actions taken, to the public.

The Holder may review the need for the community liaison group every year, in consultation with the EAO and the City of Kamloops. Following that consultation, the EAO may determine that the Holder need no longer maintain the community liaison group.”

As much as such an oversight and communications group sounds ideal, I do not think that the Community Liaison Group would be able to function to the satisfaction of everyone involved. Also, who would pay the members, without risk of “buying favour”? How would members be selected? Would members have the mandate to relay public concerns, or just assist with adjudicating donations to various Kamloops groups? How would members be retained over several years? Would CLG feedback be taken seriously and addressed fully in a timely fashion? Would criticism of KAM need to be filtered first by KAM or could the CLG report to MEM and the EAO? Who would be the responsible mediator for such issues? Has this been done before? I see such issues and questions as more potential holes in the KGHM Ajax Swiss cheese Project under review.

Recent history would suggest that community groups that provide formal feedback to mining companies can be challenged to an unacceptable degree, as was the case for Timmins City Councilor Rick Dubeau who resigned earlier this year from the Timmins’ Hollinger Project Community Advisory Committee (May 9, 2017 Letter to the Editor of TimminsToday.com). Mr. Dubeau’s letter also highlights the many potential real and tangible impacts on communities that are adjacent to open pit mine operations:

<https://www.timminstoday.com/local-news/letter-rick-dubeau-tells-us-why-he-resigned-609929>

“TimminsToday received the following letter to the editor from Coun. Rick Dubeau, regarding his decision to step down from the Hollinger Project Community Advisory Committee:

This letter is to advise that I have resigned from the Hollinger Project Community Advisory Committee - HPCAC.

Whereas I support the Pit operations and what it brings to the City of Timmins, I am of the opinion that operations can and should be adjusted so as to provide less impact to the citizens

living in close proximity to the pit and the haul road. By voicing concerns about noise, dust and vibrations that I and many residents experience, I thought that I could effect change.

Proof from Goldcorp's online monitoring system and subsequent reports showed the adverse effects to be real but no real change came about.

Although Goldcorp has indicated that haul-truck operations have been optimized to lessen the noise, it has not resulted in a lessening of impact to residents.

The HPCAC's mandate is to liaise with the community and, as such, questionnaires were hand delivered to homes closest to the Hollinger open pit and/or haul road.

As discussed at the HPCAC meeting which is open to the public.

It was found that of the 226 of respondents, well over 60 per cent were bothered by noise and dust while 56 per cent said they were bothered by the vibrations from blasting at the site.

Over half of the respondents provided more detailed comments on the impacts from the operation.

All 12 residents who responded from Vipond Road in Schumacher on the eastern boundary of the open pit said they were bothered by vibrations and noise from the mine and the haul road.

This area also reported the adverse effect of dust as well with 11/12 being affected.

Analysis of specific locations was done and, with respect to vibration, two areas seemed to be most affected. At Fairway Village, 30/35 of respondents indicated that their homes and/or contents shook from nearby blasting with seven of them feeling scared or anxious when blasting occurred.

In the area of Timmins on the western side of the pit, 20/29 reported shaking from blasting with nine of these individuals feeling scared or anxious because of it.

Several members of the committee suggested that the HPCAC host an open house to present the information from the survey to the public.

I stated that whereas Goldcorp had held many open houses before operations began, none have been held since operations began.

Goldcorp said they would consider this, I have not been advised of any planned open house or release of the information collected.

The amount of dust in people's backyards and homes has risen dramatically since operations began.

This is true of those living closest to the pit and to the haul road which is situated just south of Schumacher.

Many residents have told us that they have to wash their, homes, windows and vehicles on a daily or weekly basis.

Goldcorp's Hollinger Pit Project has been tough on many homeowners in certain neighbourhoods according to Rick Dubeau.

This is not only an inconvenience but a serious concern in regards to the health of the citizens.

Many residents have also told us that they are often wakened by the noise from the trucks leaving the pit and traveling on the haul road.

Many have resorted to sleeping with ear plugs and in their basements, this is not reasonable.

We know that Goldcorp is in regular contact with the Canadian Mine in Malartic which has also developed a mine in close proximity to the town.

They look at their best practices to lessen the impact on the citizens from operations. In response to complaints from the citizens, Canadian Malartic developed a Good Neighbour Guide.

The guide's development stems from a collaborative approach launched with the community in the spring of 2015.

The guide sets out viable, real-life solutions for living together better.

It provides: Impact mitigation measures, financial compensation for all citizens of Malartic and Guidelines on the acquisition of properties available to all owners of a principal residence in the southern sector.

I provided Goldcorp with a copy of this guide as we have been told that all options to lessen adverse effects would be considered.

To date, there has been no further dialogue on the matter. Some citizens of Malartic have rejected the compensation package and filed a \$40+ million class action lawsuit which was just authorized by Quebec Superior Court on May 5/17.

Many of us are being dramatically affected by the Hollinger project and are of the opinion that changes can and should be made. In addition to me, two others have also resigned from the HPCAC due to frustrations.

As HPCAC meetings are open to the public, we will continue to attend as citizens to keep voicing our concerns. We will be forming another citizens' committee to operate independently of the HPCAC and Goldcorp in a further attempt to bring forth the concerns of the residents of Timmins.

More information will be provided soon.

Sincerely,

Rick Dubeau”

Ministers, the Agency, and the EAO – What do you think of Rick Dubeau’s advocacy for the citizen’s he represents, and the mining company’s lack of timely and effective responses to his and the residents’ negative feedback? Reading between the lines of Mr. Dubeau’s letter of disclosure to the public, the only way to “mitigate” the public’s concerns adequately would be to relocate where the individuals reside or to shut down the mine. What has happened to the adjacent property values?

Also in “real-time”, you can view how such CLG-like interactions with KAM and its qualified professionals might play out in the future by clicking on the YouTube link below and advancing to minute 30:17. This is the point at which KAM-contracted Stantec Consulting’s Air Quality expert Peter Reid starts to take questions from the public, such as from myself and from Kamloops Area Preservation Association representative Don Barz. Although I found Mr. Reid to be respectful in attempting to provide us with answers, I noted how the questions were not addressed to a satisfactory degree. Our air quality modeling concerns were later validated by being shared by many others such as SLR, the MOE, and ECC:

<https://www.youtube.com/watch?v=z06dyQ2dIDU>

Stated clearly, EAO and Agency reliance on a CLG to help “mitigate” or manage public concerns is akin to a large hole in the Swiss cheese model of hazards causation.

Furthermore, the EAO and the Agency still have low to moderate levels of confidence (in other words – moderate to large Swiss cheese holes) in many of their conclusions outlined in the Report, reflecting the assessment uncertainties despite KAM having had 18 months to address deficiencies detected in the EIS/Application submitted in January 2016. For example, as per page 393 of Appendix A of the Report, the EAO and the Agency have indicated only a low level of confidence that there will not be significant human health residual effects after (presumed effective) mitigation. The Report states clearly:

“The Agency and EAO have a low level of confidence in the effects assessment based on the uncertainties identified during the review. There are uncertainties associated with the efficacy of dust mitigation, which has implications for health. Uncertainties resulting from HHRA are

linked to uncertainties in toxicological information, sensitive populations, exposure assessment, and receptor characteristics. There is also uncertainty related to reliance on modeling to characterize the baseline environment. The overall level of confidence in the health assessment is low based on the multiple sources of uncertainty identified during the review.

Rigorous monitoring during all phases of Ajax will be important to verify predictions and enable pre-determined adaptive management actions if required.”

It is very concerning to me that the updated Ajax EIS/Application still has examples of additional important Swiss cheese “holes” pertaining to value components (e.g. HEALTH) in it despite KAM having had hawk eyes on their actions to perform tasks such as completion of additional recommended baseline studies and predictive modeling over the last 18 months. Also, it worries me that multiple agencies and consultants had to recommend these actions to KAM, rather than the EIS/Application having been submitted as a complete reviewable document in the first place.

The detailed contracted independent review by SLR Consulting (June 9, 2017) posted on the City of Kamloops website and submitted to the EAO and the Agency also raises many questions for me about the scientific quality of the re-submitted Ajax EIA/Application. To illustrate, please note some of the dark sky assessment concerns listed by SLR on page 28 of their report that led to their disagreement with KAM’s conclusions of no significant effect. SLR states in their summary:

“Based on the lack of detail and the methodologies used, and not used, in establishing the existing dark sky conditions, the lack of detail in the amount and types of light to be generated during Construction and Operations phases, and the impact assessment performed based on this lack of detail, it is not possible to conclude that the impact of ALAN from the project will be Not Significant. Our conclusion is based on the following peer review findings:

- The baseline information presented is too vague to permit a proper assessment of the Project’s impact on the ecosystem and the southern suburbs of the City. To assess the impact of ALAN, the total lumen-output from mine lighting, the vertical angles at which this light is emitted, and the spectrum that will be used is required.
- The impact assessment conclusions are based on contours for illumination beyond the local study area but there is no quantitative information as to how they were determined. The isophot calculation did not use an industry standard model for atmospheric scattering, which is the

primary cause of sky glow. Sky glow will extend the visible impact of the Project across the region even with the Project situated below the hill tops, as viewed from the City. This undermines the shielding-effectiveness of topological features leading to underestimating the extent of the luminance as seen from the City, and the illuminance the Project creates across the region. Predictive modelling programs and primary literature are commonly used to determine the impact of the designed lighting at a distance from a new project. These models and primary source literature were not used in the dark sky impact analysis for the Project.

- The dark sky analysis uses Worksafe BC illumination levels which are based on asphalt surfaces. These surfaces have an albedo (a measure of reflectance or optical brightness) of approximately 2-8%. However, the ground cover for the mine site will have a minimal area of paved surfaces, the predominant disturbed surfaces being more likely aggregates, which has an albedo range of 30-70% (about 50% average). The resulting ground luminance from applying the proper albedo will create greater surface glare in the vicinity of the sources and it will also increase sky glow levels by greater than 500% over asphalt-coated surfaces.
- The more representative measurement of luminance for the Project is the illumination on the vertical plane measured at the property boundary. This illumination is the result of light that is perceived as glare, light trespass and sky glow. This glare will have different intensities depending on the brightness of the source and the distance to the light and is measured as luminance.
- The impact assessment correctly identifies that dark sky impacts interact with other Valued Components including Health, Wildlife, Vegetation and Terrestrial Ecosystems. Although the impact of ALAN on the ecosystem is mentioned in Chapters 6 and 8 there is no quantitative assessment of its impact on the various species. The Environmental Assessment Application refers to qualitative information and concludes that light from the Project may impact the environment to various degrees, however the Environmental Assessment Application does not present quantitative limits (glare due to luminance, light spill due to illuminance or due to sky glow) to compare the emitted light to the ecological thresholds. The literature sources used are not primary sources and they underestimate the sensitivity of animal species to ALAN. The primary literature contains the threshold light levels above which ALAN can affect the biochemistry and behaviour of animals and is a more accurate assessment of impacts. The approach used is neither conservative nor precautionary.
- The Highland Valley Mine cannot be used to demonstrate the benignity of mine-site lighting. This mine impacts approximately 300 Km² of countryside and comparisons add no demonstrative value to assessing the Project-specific impacts. The scattering properties of the atmosphere for the Highland Valley Mine regional sky glow readings were not characterized.

The more appropriate use of comparison to the Highland Valley Mine however is as a case study of how far reaching typical mine-site lighting affects the region.

- The Bortle scale is a general classification for the limiting sky conditions at a site (best night, or as good as it gets). It classifies a site based on past sky glow and air transparency conditions. Taking measurements within a limited time frame amounts to a restricted number of sampled nights, which generally yields poorer readings than "the best nights". As a result, the Bortle value of 4 for the Observatory assigned in the Environmental Assessment Application is lower than the accepted Bortle scale for the Observatory. A more appropriate Bortle class for the KAS Observatory is 2-3, not 4. This is a more accurate characterization of the sensitivity of the Observatory to sky glow.
- KGHM's assertion that mitigation strategies may limit the cumulative effects of ALAN is not sufficient. Without clear commitments to engineered mitigation strategies, limiting of the cumulative effects of ALAN is not ensured and there is no mechanism to ensure these strategies will be effectively implemented to minimize the impact of ALAN.
- Changes to the lighted environment in urban neighbourhoods is a key stressor on property values. Given that the Environmental Assessment Application indicates that there is a low certainty of the potential Project effects on property value, it places more importance on ensuring that a proper impact assessment is completed and that required information required to conduct a fulsome assessment is available at the EA phase."

I have decided not to edit this section of Paul Draycott's SLR Report since I think the entire section is important and illustrative. It "shines light" on many concerns. The SLR report reveals more large holes in the Ajax Swiss cheese to ponder as you deliberate on your decision.

Embedded within the above paragraphs, it is apparent that loss of dark sky could have important pathway effects on human health, animal health and behaviors, and property values that have not been accounted for fulsomely in the KAM EIS/Application. I also find it very concerning that KAM did not use the Precautionary Principle nor an evidence-based approach of primary source data despite direct feedback by SLR to do so. If this is how KGHM Ajax Mining conducts themselves, then how effective would a hired Independent Environmental Monitor or a Community Liaison Group be in swaying the actions of KGHM Ajax Mine operations in a timely manner?

Stated differently, how can I or concerned members of the SSN and the City of Kamloops trust that KGHM Ajax Mining will live up to its stated mitigation and monitoring commitments in an effective and time-sensitive fashion if they were not able to satisfy their SLR engineering consultant colleagues in how they performed the Dark Sky Value Component Assessment despite having had over a year to do so. SLR's negative evaluation of the merits of KAM's dark sky revised EIS/application highlights how different potential adverse effects conclusions can be arrived at by corporate versus civic scientists. Which conclusions would you rather trust?

Consider this - What if an objective, independent-like approach demonstrated by SLR Consulting had been used from the outset to bring the Project forward to the application submission stage? Would there have been less financial and time burden placed on the EAO, the Agency, HC, MOE, ECC, the SSN, the City of Kamloops (ad nauseum meetings and contracting independent reviewer SLR Consulting), IHA, and volunteer advocacy members of groups such as KPHEs, Kamloops Code Blue, Kamloops Moms for Clean Air, Kamloops Area Preservation Society, Thompson Rivers University Faculty Association Human Rights Committee, Thompson Watershed Coalition, Sagebrush Neighbourhood Association, and the Aberdeen Neighbourhood Association?

I commend the aspirations outlined in the federal government's expert panel report on environmental assessments and the new provincial government's NDP-Green Party partnership commitment to review of the environmental assessment process and of the professional reliance model "to ensure public interest is protected":

<https://news.gov.bc.ca/releases/2017ENV0055-001673>

I think that such initiatives could help "mitigate" such delays and burdens in environmental or impact assessment processes. In the end, the conclusions of the final assessment reports might be met with more acceptance - the so called getting to "Yes," or clearer understanding of why the decision is "No".

Another mitigation question to consider, as outlined in my March 30, 2016 Public Comment posted on the EAO website, pertains to the differences between theoretically modelling versus the real-world reporting of adverse effects:

"For the City of Kamloops base case modelling of pm2.5 air quality, Stantec Consulting used a combination of industrial emissions data and National Pollutant Release Inventory (NPRI)

reported numbers for local industrial emission inputs into CALPUFF. I found this use of NPRI reported numbers interesting. I went on to check the 2014 Teck Highland Valley Copper (HVC) NPRI reported annual release to air of pm2.5 and noted their number of 2,912 metric tonnes. This 2014 reported annual release of pm2.5 by the open pit HVC mine in the same region as the Ajax Project, compares to 352 metric tonnes of pm2.5 modelled to be emitted during the worst-case year of Ajax Project operation, in terms of dust emissions. Although the operational size and through put of the Ajax Project is estimated to be about a half to one third the size of HVC, the degree of annual pm2.5 emissions is estimated to be about one-eighth the amount, based on these numbers. Such a comparison has led me to wonder if the commitment to mitigate to 90% at the Ajax Project is an achievable goal in the real world, just down the highway. Just on a size and through put comparison using HVC NPRI numbers, I would have expected the Ajax Project's estimated annual pm2.5 emissions to air to be in the range of about 1,000 to 1,400 metric tonnes as an actual operating mine."

What do you think of the discrepancy in the relative number of tonnes of PM2.5 emissions to air, comparing HVC's reporting of emissions to the NPRI versus the results of KGHM Ajax Mining's air quality modelling?

Do the decision-making Federal and BC Provincial Ministers and Deputy Ministers think that the EAO, the City of Kamloops, the SSN, hired Qualified Professionals such as an Independent Monitor, and a Community Liaison Group can effectively and economically watchdog Ajax operations from start of construction to past closure?

What legal liability is transferred to these same groups and individuals if their watchdog efforts fail, resulting in harm to individuals residing in the Local Study Area and additional harm (on top of that already predicted in the Report) to the SSN's Value Components? Note that it could be argued that security of person was breached.

As outlined in my April 13, 2016 official correspondence to Mayor Peter Milobar and City of Kamloops Councilors:

“Section Seven of the Canadian Charter of Rights and Freedoms protects an individual's autonomy and personal legal rights from actions of the government, in a constitutional provision:

“Everyone has the right to life, liberty, and security of the person and the right not to be deprived thereof except in accordance with the principles of fundamental justice.”

In my view, security of person, needs to be considered as you approach this important decision-making ahead of you as elected officials.”

Dear Ministers - It could also be argued that you and your associated governmental regulatory bodies have an ethical and/or legal fiduciary relationship with the people of Kamloops, particularly with individuals who reside within the Local Study Area of the Ajax Mine Project, and with the SSN.

As a precautionary illustration of such legal liability, note that the Quebec Superior Court recently authorized a class-action lawsuit by residents affected by the Malartic Gold Mine, as reported by the Canadian Press and published by the Montreal Gazette on May 5, 2017:

<http://montrealgazette.com/business/malartic-mine-class-action-lawsuit-authorized>

“The Comité citoyens de la zone sud de Malartic notes that the suit against Canadian Malartic could grow to more than \$40 million.

The residents living near the largest open sky mine in an inhabited area in Canada also want to be compensated for damages related to dust, noise and explosions that they have been exposed to for many years.

The representative of the class, Louis Trottier, who lives less than 800 metres from the mine, said he was happy with the ruling, which “gives me hope that there might still be a bit of justice in this world.”

The decision comes two weeks after the Quebec government authorized the mining company to enlarge the mine, a project that will increase its life span by six years, until 2028.

The decision from Judge Robert Dufresne notes that the class action “seeks damages of \$9,000 per year per person for all the nuisances related to dust, noise and blasting since Aug. 1, 2013.”

The judge also authorized the inclusion of exemplary damages of \$20 million for denying citizens the right “to the enjoyment of their goods and a quality environment guaranteed by the Charter of Human Rights and Freedoms.”

As taken from my written March 30, 2016 Ajax Public Comment posted on the EAO website:

“It is compelling that Malartic, Quebec mining heavy equipment executive Diane Gagnon currently represents 700 households in the “Comite Citoyens de la Zone Sud de Malartic” after this open pit mine went into production in 2011. At present, a third of the population from her local community wants to be relocated. Similarly, a quarter of the population furthest from the mine site at about 2.0-2.5 km where the residential area ends, wants to be relocated as well. This population at 2.0-2.5 km from the mine site has reported either being affected or highly affected at a proportion of 15-26% for noise, 17-41% for ground tremors, and 27-48% for dust. These numbers, as reported in the Public Health study she cited as part of her submitted letter to the City of Kamloops March 15, 2016, are particularly relevant for individuals living 2-2.5 km from the Ajax Mine site.

Please note, the prevailing winds in Malartic move away from the town of 3,200 inhabitants towards the mine site; the mine’s operational size is about half that proposed for the Ajax Project, and the landscape is relatively flat without a tendency to inversions of air masses. Still, a proportion of the town’s population has been negatively impacted by the operation of an adjacent open pit mine. This community has also had outmigration of all physicians since the mine went into production.”

Further analogous to potential liability risks pertaining to the Kamloops Ajax Mine decision by different levels of government, the May 5, 2017 Montreal Gazette article about the Malartic Mine in Quebec stated that:

“The court excluded, however, the possibility of landowners claiming real-estate losses in the class-action suit. Those claims must be done on an individual basis, the judge ruled.”

In view of now bringing up comments on the value component of risks to property values while expanding on issues of professional reliance in environmental stewardship; civic versus corporate science; potential for willful blindness creation of Swiss cheese holes in assessments; professional advocacy by politicians for the people who elected them; and lack of timely reporting of monitored data that could be of concern to the SSN and other anglers on Jacko Lake, I copy here most of the main body of my April 13, 2016 official letter to the City of Kamloops:

April 13, 2016

“Dear Mayor Milobar and City of Kamloops Councillors:

I watched with interest the presentations and discussions that unfolded during Kamloops City Council’s April 12, 2016 meeting. At this meeting, Aberdeen Neighbourhood Association (ANA) representatives and retired miner Richard Boyce presented their views and concerns with regards to KGHM Ajax Mining’s (KAM) Project Application that is currently under review by the BC Environmental Assessment Office and by the Canadian Environmental Assessment Agency.

The key points of the presentations and subsequent discussions are well laid-out by News Kamloops reporter Mike Youds in his April 12, 2016 posted article,

“City has legal duty to protect, group says. Aberdeen Neighbourhood Association retains legal counsel, warns City of liability”:

<http://www.newskamloops.com/news/post/city-has-legal-duty-to-protect-group-says>

As the meeting’s conversation unfolded, Councillor Arjun Singh asked (paraphrased) about the reliability of scientific reports on the Project given that different consultants, such as SLR Consulting and Stantec Consulting, have come to different conclusions.

In response to Councillor Singh’s query, I move that you each listen to the CBC Radio *Ideas* “Mining Science” interview between Host Paul Kennedy and University of Michigan Social Anthropologist Dr. Stuart Kirsch aired on March 24, 2016. In this documentary, Dr. Kirsch outlines the differences between “corporate science” and “civic science” (in other words, science unbiased towards corporations and conducted, instead, in the interest of the communities that might be impacted). He illustrates the “Politics of Time” used by some mining companies to strategically extend the latency period between the onset of mining and the time of the public’s recognition of the mining company’s long-term impacts. An example of a technique employed is to limit the collection of background data. “This results in a honeymoon period upon which environmental impacts cannot be measured.” This issue is directly relevant to Councillor Tina Lange’s question to KGHM Ajax at the Thompson Nicola Regional District meeting last week,

the answer she paraphrased having received from KAM representative Clyde Gillespie at that time, and the response by ANA representative and social economist Randy Sunderman, as outlined in Mr. Youd's April 12th article cited:

“Coun. Tina Lange noted that she asked Ajax project manager Clyde Gillespie, when he appeared before TNRD last week, about potential compensation if residents’ properties were damaged.

“He stated very clearly “absolutely not because it couldn’t be proven.””

Sunderman pointed out that if baseline assessment of property values is not done, it won’t be possible to establish cause.

“That’s what I mean when I say risk is being deliberately shifted onto residents.””

I have been in communication with Dr. Kirsch subsequent to the “Mining Science” documentary having been aired on CBC Radio last month. Dr. Kirsch recommended the peer- and reference-reviewed study by Jim Kuipers, P.E and Ann Maest, PhD:

“Comparison of Predicted and Actual Water Quality at Hardrock Mines: The reliability of predictions in Environmental Impact Statements” (EIS) published by *EarthWorks* as an open-access document on December 7, 2006:

https://www.earthworksaction.org/library/detail/comparison_of_predicted_and_actual_water_quality_at_hardrock_mines/#.Vw4vfYfmqUI

This greater than 200-page document includes a readable executive summary at the beginning of the report. Ultimately, through inclusive and detailed data review and case study analyses, the paper concluded that the EISs systematically underestimated the actual environmental impacts, and furthermore, that mitigation strategies were not as effective as predicted.

Richard Boyce, a retired miner and former United Steelworkers’ Union President for the local representing Highland Valley Copper, followed as the next delegation that presented to

yesterday's Council meeting. As per the April 12, 2016 article by Mr. Youds, Mr. Boyce "...said he was "blown away" when he read a news report [in Kamloops this Week] of mercury found in trout in Jacko Lake by the assessment. That data was gathered two years ago, he noted. "All of those people in that office knew that those fish in Jacko Lake had so much mercury that if people ate too much they would get sick, but they never felt the need to notify the public.""

<http://www.kamloopsthisweek.com/mercury-count-in-jacko-lake-trout-above-recommended-levels/>

To learn more about the health risks of mercury exposure, especially of that to youth, please refer to the open-access review article attached as a link, by physician and public health epidemiologist Dr. Stephan Bose-O'Reilly and colleagues: "Mercury Exposure and Children's Health" *Current Problems in Pediatric and Adolescent Health Care*, Author Manuscript, with final version 2010 September;40(8): 186-215.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3096006/pdf/nihms-294964.pdf>

The final stated conclusion in the summary, is "Mercury is ubiquitous and persistent. Mercury is a global pollutant, bio-accumulating, mainly through the aquatic food chain, resulting in a serious health hazard for children." Such scientific research reviews are relevant to different levels of government assessment of the public health risks that the KGHM Ajax Project application poses, particularly when taking into consideration some of the Proponent's own submitted data. What do members of Stk'emlupsemc te Secwepemc Nation (SSN) think about the KAM measured mercury levels in the trout of Jacko Lake, the site of their traditional trout fishery? This lake is adjacent to a historic mine's open pit that is only a small fraction of the open pit size of the KGHM Ajax Mine proposed.

As representatives of your constituents and as representatives of yourselves, each one of you has an important opportunity to submit a "Public Comment" - In your case, the deadline is May 9th. Your individual vote as to whether you support or do not support the KGHM Ajax Mining Environmental Impact Statement, as it stands at that moment, will be "your comment".

Although the City does not have official agency in the framework of the current environmental assessment or mineral tenure acts to consent or not to consent to the Ajax Project, the review process allows for such "public comments" by ANYONE, including you. Your voices will be heard and considered with weight, by the different levels of government and by constituent voters, no matter what you decide. If you do not think you are adequately informed by May 9th,

can you move to formally request an extension? What requested information has KGHM Ajax given back to SLR Consulting, to the City of Kamloops, and to the Technical Working Group to date?

With regards to being as fully-informed as possible, heed the potential **“Dangers of “willful blindness”**”, as illustrated by author and entrepreneur Margaret Heffernan in her March 2013 Ted Talk viewed over 1,370,000 times to date. She describes a number of examples of willful blindness at multiple levels, including the public health mining disaster that occurred in Libby, Montana. She explains, starting at minute 5:55 of the talk:

https://www.ted.com/talks/margaret_heffernan_the_dangers_of_willful_blindness?language=en#t-1189

“This wasn’t ignorance, it was willful blindness. Willful blindness is a legal concept which means if there is information that you could know and should know, but you somehow manage not to know, the law deems that you are willfully blind – you have chosen not to know.”

This warning by Margaret Heffernan is relevant in how you choose to approach your stance with the ~7000 households within the Local Study Area (LSA) of the KGHM Ajax EIS, including the Aberdeen Neighbourhood Association residents. Will you become as fully informed as possible and advocate for your LSA citizens, the “soft infrastructure” and their homes, while you also advocate for the hard infrastructure of our community? I note that you have re-entered into negotiations with KGHM Ajax with regards to the latter as recently as yesterday.

Heed semi-retired Crown prosecutor Don Mann's recommendation that the City of Kamloops take a protective stance on behalf of your citizens (with whom you could be shown to have an ethical and/or legal fiduciary relationship) and to seek legal advice, given the well-publicized critical findings by bodies such as Health Canada and your own contracted SLR Consultants, to name a few. If the City does not demand completion of comprehensive and sound baseline studies for the Local Study Area, the City could be considered as displaying willful blindness, thereby putting resident citizens in the Local Study Area at risk of no compensation by KGHM Ajax should damage to property, and/or property values occur. What, too, of the potential health impacts that may become evident as the “Politics of Time” unfold?”

To best understand my line of argument and concerns outlined in the above letter, please consider reviewing the information in the links provided.

As a side note, our family's home is in Kamloops, but it is in a community that is not in line with the prevailing winds from the South West coming down off the Ajax Mine site. In other words, my advocacy actions for the wellness of our shared region comes from my above stated sense of professional duty as a physician, not as a person that some pro-Ajax blog posters have labelled as a "NIMBY". I have tried to be detached and unbiased learning about the potential risks versus benefits of this mine proposal over the last 4.5 years, as part of an informed decision-making process for myself, in consultation with Anders.

My husband and I are both substitute decision makers for our children, just as you are substitute decision makers for us.

I appeal to you now to reflect on why you have committed your own professional lives as public servants and elected politicians.

As high level "Project Managers" overseeing government mandate implementation and management of ministerial departments, I move that you consider abiding by the Project Management Institute's (PMI) Code of Ethics and Professional Conduct. As per their website, PMI describes why following such a code of conduct is important:

"Ethics is about making the best possible decisions concerning people, resources and the environment. Ethical choices diminish risk, advance positive results, increase trust, determine long term success and build reputations. Leadership is absolutely dependent upon ethical choices."

<https://www.pmi.org/about/ethics/code>

In your pursuit of effective, ethical, and evidence-based governance, I also encourage you to consider employing an ethical risk management decision-making framework, as put forward by Dr. C. Jardine, Dr. Daniel Krewski of Risk Sciences International, and their colleagues:

Jardine C, Hrudey S, Shortreed J, Craig L, Krewski D, Furgal C, McColl S. Risk Management Frameworks for Human Health and Environmental Risks. *J Toxicol Environ Health B Crit Rev.* 2003 Nov-Dec;6(6):569-720.

An abstract summary of this article is available through PubMed (US National Library of Medicine National Institutes of Health's website):

<https://www.ncbi.nlm.nih.gov/pubmed/14698953>

Jardine and Krewski outline ten guiding ethical principles for risk management decision-making at provincial/state, territorial, national, and international levels.

In addition to listing these ten guiding ethical principles in their own words (underlined/bolded), I have added related points to consider as they pertain to the Ajax Mine Project under review.

Fair process of decision making (fairness, natural justice). - Risk management must be just, equitable, impartial, unbiased, dispassionate, and objective as far as possible given the circumstances of each situation.

The current substituted provincial and federal environmental assessment process mainly uses studies and modelling funded and conducted by the proponents, thereby potentially challenging the practice of these ethical principles. These potential ethical challenges have been part of the reason for request by various parties that the Ajax Mine Proposal undergo a Federal Review Panel, or at least Independent Health and Economic Impact Assessments.

Such ethical challenges posed are also the reason why I suggested in my last Public Comment that the EAO/CEAA contract Dr. Krewski's Risk Sciences International company to provide a third-party review of this urban-interface open pit mine unprecedented in its size and location upwind and upstream of a large valley population and confluence of rivers.

A medical analogy would be the pitfalls professionally, medically, and ethically if a physician relied on pharmaceutical industry funded research and marketing to guide patient care, especially if doing so would result in some type of financial gain; In this analogy - tax income at a governmental level or the political party formerly leading BC's government having accepted large donations from the proponent KGHM.

As per the Elections BC website:

[http://contributions.electionsbc.gov.bc.ca/pcs/SA1SearchResults.aspx?FilerSK=\(ALL\)&EDSK=0&FilerTypeSK=0&Contributor=KGHM&PartySK=5&ED=\(ALL\)&FilerType=\(ALL\)&Filer=\(ALL\)&Party=BC+Liberal+Party&DateTo=2016%2f12%2f31&DateFrom=2005%2f01%2f01&DFYear=2005&DFMonth=01&DFDay=01&DTYear=2016&DTMonth=12&DTDay=31](http://contributions.electionsbc.gov.bc.ca/pcs/SA1SearchResults.aspx?FilerSK=(ALL)&EDSK=0&FilerTypeSK=0&Contributor=KGHM&PartySK=5&ED=(ALL)&FilerType=(ALL)&Filer=(ALL)&Party=BC+Liberal+Party&DateTo=2016%2f12%2f31&DateFrom=2005%2f01%2f01&DFYear=2005&DFMonth=01&DFDay=01&DTYear=2016&DTMonth=12&DTDay=31)

I note that the new BC provincial government is trying to address this issue of some companies using generous donations to decision-making parties as a type of lobby tool.

Such challenges posed for mining and pharmaceutical companies when corporate science faces off against the standards of civic science, in some instances, were well outlined by Dr. Stuart Kirsch in the CBC Ideas' radio interview documentary with Paul Kennedy originally aired on March 24, 2016 (March 2016 – Episode 300243818):

<http://www.cbc.ca/radio/ideas/mining-science-1.3502958>

Dr. Kirsch is a Social Anthropology Professor at the University of Michigan. Using the example of the Ok Tedi River mining disaster in Papua New Guinea (BHP Billiton and Ok Tedi Mining Limited) that evolved over about 25 years, he illustrates in his radio interview examples of measurement errors and omissions in how some mining companies and consultants collect and report data, with the effect of minimizing and/or obscuring environmental (human and ecological) impacts predicted and monitored.

I think that KAM's EIA/Application, even in its revised form, demonstrates such corporate science behaviors, as illustrated by SLR's criticism of KAM's dark sky and air quality assessments.

As commended above, the new provincial government's NDP-Green Party partnership is taking steps to review the resource industry professional reliance model in view to improve public trust in environmental assessments and decision-making.

Ensure an equitable distribution of risk (equity). - An equitable process of risk management would ensure fair outcomes and equal treatment of all concerned through an equal distribution of benefits and burdens (includes the concept of distributive justice, i.e., equal opportunities for all individuals).

An equal distribution of benefits and burdens should be ensured.

In the case of the Ajax Mine proposal, the benefits are mainly for those poised to make a direct or indirect profit from the mine, while potential burdens are carried by residents of Kamloops, particularly those living close to the mine site, and by the SSN.

Ambient air pollution is pervasive – and involuntarily inhaled. In other words, ambient air pollution has regional POPULATION impacts with involuntary exposures, whereas the proposed operation of the mine would have financial benefits limited to employees and to those businesses serving the mine and mine employees.

There are no safe levels of air pollution. In fact, air pollution is “A concern at levels currently accepted as “safe”,” as per the recent news report by the American Thoracic Society’s Science Daily. This report summarizes the *New England Journal of Medicine* article by Qian Di et al (NEJM 2017.376(26):2513) and the research results’ public health implications:

<https://www.sciencedaily.com/releases/2017/06/170630124346.htm>

One could argue that there are potential economic benefits to proactively lowering and/or minimizing potential increases air pollution levels in a population’s airshed – otherwise known as air quality MANAGEMENT. This point will be expanded upon in another section below.

There are other potential burdens to consider such as indirect financial subsidization (e.g. hydro) of mine operation by tax-paying citizens; security of person threats given the example of the proposed Tailings Storage Facility (TSF) positioned upwind of mine workers and residents of Kamloops; the potential impacts upon regional water quality and fish habitat security; and the burden to the SSN lands and traditional practices.

Keeping these ethical concerns in mind, together with the precarious prices of gold and copper over time and the anticipated costs of mitigating multiple potential effects on Value Components (let alone ensuring KAM’s financial soundness in case an accident occurred), I had hoped that a **Full Economic Assessment** of this open pit mine proposal would have been performed.

According to posted comments on the EAO website, the City of Kamloops has concerns pertaining to things such as the risk to adjacent properties values, competition for affordable housing by financially vulnerable citizens, the possibility of out-migration of skilled workers

such as healthcare professionals, and infrastructure concerns for the City and landowners if the slope stability in the Aberdeen neighbourhood is impacted.

Upon learning more about the “Community Benefits Agreement” with KAM, it appears that this document could be more aptly titled “Community Compensations Agreement” for the costs imposed on the City of Kamloops if the Ajax Project were to proceed to construction.

Seek optimal use of limited risk management resources (utility). - Optimal risk management demands using limited resources where they will achieve the most risk reduction of overall benefit.

Question – If the provincial and federal governments approve the Ajax Mine Project followed by investing tax payer-funded resources into the permitting and operating phases so that KAM’s certificate conditions can be met (e.g. the contracting of an Independent Environmental Monitor, a Community Liaison Group, an Air Quality Reviewer, and other qualified professionals in addition to other oversight actions by the EAO), then what assessment system resources (e.g. personnel) and financial resources will the provincial government have leftover to address other proposed and in progress industrial projects?

Promise no more risk management that can be delivered (honesty).- Unrealistic expectations of risk management can be avoided with honest and candid public accounting of what we know and don't know, and what we can and can't do using risk assessment and risk management.

I think there are ethical challenges in KGHM Ajax Mining’s bold commitment to 90% mitigation of haul road dust emissions, 24/7, for 20 plus years of projected mine operations.

As outlined in the Report’s air quality analysis, KAM did not provide clear examples of comparable mine sites which have been able to achieve such levels of mitigation.

Also, as per Kamloops Physicians for a Healthy Environment Society’s (KPHES) representative on the Community Advisory Group, Dr. Jill Calder’s EAO submitted Public Comment:

“There is no mine we have searched that meets this unrealistic (90%) standard. The baseline of where we are now, i.e. our current “zero” is not measured. The SLR consultant was asked this

question at the report out meeting in June 2017, and could only say “I think maybe there is some mine in, ... South America, ... somewhere... that gets close to these figures.” Not a confident response in the area of dust modeling. The Interior Health representative confirmed that the dust would travel much farther than the KGHM models indicated. Yet KGHM Ajax did not change their approach between applications.”

In my view, there was a breach of trust with the public by KGHM Ajax not using the Precautionary Principle in an “upstream” VC assessment as important as air quality.

KAM should have done sensitivity analyses such as modeling of 0% and 70% mitigation from the outset, rather than needing to be told to do so by the EAO/CEAA Technical Working Group; hence, I think that KAM/Stantec Consulting showed actions that were sub-standard professionally and ethically in their submission of a January 2016 EIS/Application with air quality modeling for only the 90% mitigation level.

It is unclear what level of dust control KGHM International can achieve in the real-world, not just with modeling. Relevant to this question, KGHM International was reported to be at risk of facing fines and having the licence for its Sierra Gorda mine revoked by the Chilean Superintendence of the Environment for breaches that included “not implementing measures to control emissions, altering the natural habitat for native wildlife, and operating a tailings dam in an unauthorized fashion” (Information taken from Mining.com March 9, 2016 posted article by Cecilia Jamasmie):

<http://www.mining.com/polish-kghm-faces-29m-fine-licence-withdrawal-over-environmental-breaches-in-chile/>

Before deciding whether to approve the Ajax Mine Project, it would be due diligence for the EAO, the Agency, and the Ministers to know to what degree KGHM International exceeded the Sierra Gorda Mine’s permitted allowance for dust emissions, and, if so, at what level of mitigation had been achieved in operation?

What level of mitigation and monitoring can KGHM Ajax really afford?

What can KGHM really commit to in paying employees?

A Bloomberg article posted by Maciej Martewicz on February 8th, and updated on February 9th, 2016 indicated that **“KGHM slumps as dividend at risk on \$494 million impairment.”** The article also indicated that “KGHM Polska Miedz SA fell the most in three weeks after Poland’s sole copper miner wrote down the value of its flagship international investment in Chile and other foreign projects as copper prices tumbled to a six-year low:

<https://www.bloomberg.com/news/articles/2016-02-08/kgmh-takes-494-million-copper-asset-charge-keeps-dividend-plan>

I note that KGHM International cut 20 positions and cancelled contracts at the nickel and copper Victoria Mine Project in Sudbury due to challenging commodity prices, as per NorthernLife’s Sudbury.com article by Jonathon Migneault posted March 22, 2016.

<https://www.sudbury.com/local-news/update-kgmh-cuts-20-positions-at-victoria-mine-276637>

As per Cecilia Jamasmie’s May 11, 2017 Mining.com article pertaining to KGHM International’s statement that Phase 2 of the Sierra Gorda Mine in Chile will never happen:

“The Polish company, Europe’s second largest copper producer, said that given current macro conditions, the plan had lost sense”

<http://www.mining.com/kgmh-says-phase-two-of-sierra-gorda-copper-mine-in-chile-will-never-happen/>

With the fluctuating nature of commodity markets, what if KGHM International eventually says that the Ajax Project has “lost sense”? Where does that leave us? It is compelling to note that the small Afton open pit mine on the Ajax site shut down after only a few years of production due to economic challenges in the 1990s.

Examples of KGHM International pulling out of financial commitments have already occurred in Kamloops. Anecdotally, an individual I know was laid off from working with KAM on December 31, 2015, together with other individuals. These lay offs were not reported to the public, as far as I’m aware.

As mentioned in the August 9, 2016 InfoTel News article by Ashley Legassic and Brendan Kergin cited above, former KGHM Ajax Project Manager Clyde Gillespie was fired by KGHM

International in May 2016, two days after he had let go eight colleagues at the Ajax office in Kamloops (eventually the lawsuit for wrongful dismissal was settled out of court):

<http://infotel.ca/newsitem/former-ajax-project-manager-sues-kghm-for-wrongful-dismissal/it33478>

With such company economic news and history of the company's actions, do you believe that KGHM International is in the financial position to promise such positive economic benefits to our citizens and to our governments? As well, do you believe that KGHM International has adequate financial health required to construct, operate, close safely, bond post/insure against possible acute or slow-moving disaster(s), and to mitigate to their promised levels over the lifespan of the project?

What could the potential collective financial liability be to the citizens of Kamloops, to the SSN, to the City of Kamloops, and to other levels of government by proceeding with this project?

Please hypothetically consider the additional economy-related environmental risks posed to our region if the company was permitted to proceed to production followed by another downturn in commodity prices. I don't see that it would be defensible ethically or legally for KGHM Ajax to cut any corners in the monitoring and mitigation programs based on the high requirement for both programs to ensure the Report's "no significant environmental effects." At what threshold would KGHM Ajax's Certificate be revoked? Realistically, could such a large project be stopped once it is in production?

Another hypothetical consideration - If operations were ceased for a matter of days due to pollution exceedances or other factors, what risks would be posed to the financial health of the employees who are not working? Would they still be paid the same? I tend to think there could be more financial benefit hope eggs broken in the Ajax open pit mine basket.

Such downstream financial and environmental hazards could be avoided by factoring in UPFRONT what promises can realistically be made and kept by KGHM Ajax and by the BC government and associated bodies such as the EAO. In other words, if it is not certain that the commitments in Schedule B can be honoured by all parties over the anticipated 25 years of mine operation, then rejection of the Project would be the ethically correct thing to do now. This discussion then leads to pointing out that there already are recent published concerns by the BC Auditor General pertaining to the EAO's performance of post-certificate evaluations of whether environmental assessments are avoiding or mitigating the potentially significant adverse effects of certified projects.

The BC Auditor General, Carol Bellringer, found in her 2015 follow-up report on the EAO's performance that the EAO has only partially implemented Recommendations 5 and 6, whereas the EAO self-assessed that they had fully or substantially implemented these recommendations. Since I think the BC Auditor General's evaluation is so important and relevant to the discussion in this Public Comment, I am copying the related sections from her report posted on the Auditor's website:

<http://www.bcauditor.com/pubs/2015/follow-report-environmental-assessment-office>

RECOMMENDATION 5: We recommended that the Environmental Assessment Office conduct post-certificate evaluations to determine whether environmental assessments are avoiding or mitigating the potentially significant adverse effects of certified projects.

OAG Assessment: Partially implemented

Observations: The EAO self-assessed that they had fully or substantially implemented this recommendation. We found that the recommendation was partially implemented. In our 2011 audit, we noted that the EAO did not conduct effectiveness evaluations. This meant that they could not say with certainty whether the environmental assessment process ensured that certified projects avoided or mitigated potential adverse environmental, economic, social, heritage and health effects, or if each project achieved the anticipated benefits.

We recognize the long-term nature of this recommendation. Before the EAO can assess whether the certificate conditions are effective, and ensure the proponent achieves project outcomes, they require a rigorous compliance and enforcement framework. The EAO is working on their compliance program, as indicated in Recommendation 4.

In response to our recommendation, the EAO is beginning to work with stakeholders to identify effective conditions and is developing a library of these conditions. Currently, the majority of the EAO's effectiveness initiatives pertain to environmental Mitigation. To fully implement this recommendation, the EAO will also need to evaluate the outcomes of health, social, economic and heritage conditions.

RECOMMENDATION 6: We recommended that the Environmental Assessment Office provide appropriate accountability information for projects certified through the environmental assessment process.

OAG Assessment: Partially implemented

Observations: The EAO self-assessed that they had fully or substantially implemented this recommendation. We found that the recommendation was partially implemented. In our 2011 audit, we noted that accountability information reported on the EAO’s website and in their service plan did not provide adequate information on certified projects. At that time, the EAO did not have a comprehensive compliance and enforcement program, so information of this nature was not available.

The 2015/2016 – 2017/2018 service plan for the Ministry of Environment includes one compliance and enforcement related performance measure: the number of inspections completed on certified projects annually. The EAO also posts some compliance and enforcement information on their website. However, these actions are not comprehensive enough to provide sufficient accountability information for certified projects. To fully implement this recommendation, we would expect, for example, that the EAO would make warnings, advisories and results from field inspections publicly available.

Of concern, there was a discrepancy between how the BC EAO and the BC Auditor General viewed the work performance of the BC EAO. Is it possible, then, that the BC EAO could have challenges that are not fully self-recognize in its current operational model?

The BC Auditor General also made many recommendations in her May 2016 “Audit of Compliance and Enforcement of the Mining Sector” report:

<https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC%20Mining%20Report%20FINAL.pdf>

The stated purpose of this audit was “to determine whether the regulatory compliance and enforcement activities of the Ministry of Energy and Mines (MEM) and the Ministry of Environment (MoE), pertaining to mining, are protecting the province from significant environmental risks.”

As per the Auditor General's May 2016 summary:

“We found almost every one of our expectations for a robust compliance and enforcement program within the MEM and the MoE were not met.”

“We found major gaps in resources, planning and tools. As a result, monitoring and inspections of mines were inadequate to ensure mine operators complied with requirements. The ministries have not publicly disclosed the limitations with their compliance and enforcement programs, increasing environmental risks, and government’s ability to protect the environment.”

“After the failure at Mount Polley and during our audit, we felt it necessary to review MEM’s performance as regulator for this site. We noted the same issues in the Mount Polley file as we did throughout the audit – that is, too few resources, infrequent inspections, and lack of enforcement.”

Unfortunately, the former provincial government disagreed with implementing the most important recommendation, in my view:

“Our advice, to reduce the risk that unfortunate and preventable incidents like Mount Polley don’t happen again, is for government to remove its compliance and enforcement program for mining from MEM. MEM’s role to promote mining development is diametrically opposed to compliance and enforcement. This framework, of having both activities within MEM, creates an irreconcilable conflict. Because compliance and enforcement is the last line of defence against environmental degradation, business as usual cannot continue.”

In other words, compliance and enforcement are the last slices of Swiss Cheese protecting against hazard occurrences. The Auditor General’s conclusions suggest that the current MEM’s and MoE’s project management systems have big Swiss cheese holes. Until the new BC government addresses such Auditor General concerns about mining sector compliance and enforcement on mine sites and the EAO, there are systems-based risks posed to the people and the environment adjacent to mine sites in our province.

As per the Project Management Institute’s Code of Ethical and Professional Conduct, project managers should have insight into their own limitations. I think that such insight, and disclosure of such, is an essential ingredient for trustworthiness.

In terms of a medical analogy, it would be an indefensible breach of professional conduct if a surgeon tried to obtain consent from a patient for a procedure the surgeon was not certain they could perform safely. The surgeon would need to disclose such lack of confidence, at least, akin to how teaching hospital consent forms ask patients if they consent to services provided by medical trainees. In this analogy, imagine the potential hazards of an over-confident surgeon or student lacking insight into their limited capabilities performing a procedure?

I greatly respect that the Interior Health Authority acknowledged their own limitations in overseeing the human health risk assessment of this “unprecedented” project. I think that this was the ethical stance to take, akin to “Do not promise more than you can deliver.”

Unfortunately, organizations such as KPHE and the Community Advisory Group did not learn of our health authority’s disengagement from the Health Sub-Working Group meetings pertaining to design and methodology for human health risk assessment until after obtaining a July 18, 2012 letter by IHA Environmental Health Officer Misty Palm to the EAO through an access to information request.

As per Misty Palm’s July 18, 2012 letter posted on the KPHE website www.kphe.ca (under the Resources and KPHE Press Releases & Reports tabs that have other freedom of information requested documents posted that may be of interest to you):

“The proposed AJAX project is unprecedented in respect of the potential noise and air quality impacts on an urban centre. We have been unable to identify recognized better management practices including pre-assessment and monitoring methods and associated benchmarks against which IH Health Protection staff can objectively gauge that the proposed project is reasonably assured to not constitute a public health hazard. It is beyond the scope of our regional health agency to guide the creation of defensible better practices for the construction, operation, and decommissioning of major industrial projects. We strongly recommend that qualified third-party consultants experienced in human health risk assessment be engaged to participate in the review of study design and methodology plans and associated sub working groups.”

<http://www.kphe.ca/Full-Text-MistyPalm-email-July182012.pdf>

Note in the letter that IHA strongly recommended “that qualified third party consultants experienced in human health risk assessment be engaged to participate in the review of the study design and methodology plans and associated sub working groups.”

It is not apparent to me that the EAO or the Agency honoured this IHA request.

Lack of health impact assessment expertise at the Technical Working Group table was another reason why I had hoped that Daniel Krewski’s Risk Sciences International (<https://www.risksciences.com/>) would be contracted as a third-party consultant for this Project.

I thought this situation was yet another large Swiss cheese hole of concern. How could we, as professional health advocates for people in Kamloops and our region, be satisfied with “Trusting the Process”?

Please direct your attention now to how the IHA is integrated into the Ajax Mine Project’s draft Schedule B: Table of Conditions for an Environmental Assessment Certificate pertaining to areas such as air quality monitoring and mitigation, human health reporting, accidents and malfunctions communications:

<https://projects.eao.gov.bc.ca/api/document/598a181077a2820019e6e404/fetch>

If the Ajax Project is approved, is it possible that the EAO and government will be in legally vulnerable positions for a security of person Charter challenge given that IHA is already on record stating that – “It is beyond the scope of our regional health agency to guide the creation of defensible better practices for the construction, operation, and decommissioning of major industrial projects”?

The historical lack of transparent communication between the EAO and the Community Advisory Group demonstrated by CAG members having needed to file Freedom of Information Requests to learn of IHA’s input (or lack thereof) into the assessment process conflicts with the next Jardine and Krewski ethical guideline outlined below:

Foster informed risk decision making for all stakeholders (autonomy). - Fostering autonomous decision making involves both providing people with the opportunity to

participate, and full and honest disclosure of all the information required for informed decisions.

In other words, governments and related bodies should foster informed risk decision-making for all stakeholders with provision of the opportunity to participate, and with full and honest disclosure of all the information required for informed decisions.

There are numerous concerns in terms of respect of autonomy that pertain the proposed Ajax Mine and its current government-led environmental.

As it stands, Kamloops citizens have no official ability to grant or not to grant consent or social licence for this mine project within the current framework of the assessment process being used by the federal and provincial governments.

The size of the Ajax Mine proposed is several orders of magnitude larger than the historic Afton Mine in the same site. For example, the Report's stated predicted Ajax open pit depth of 577 metres (page 18) is roughly equivalent to the height of the CN Tower (553 metres). The predicted maximum area of the Ajax open pit is 300 hectares. A hectare is 10,000 square metres and is about the same size as an international rugby field.

As highlighted above, to have an open pit mine of this magnitude operating directly upwind and upstream of a valley city of about 90,000 residents is unprecedented in Canada. One could argue that this urban-industrial interface situation is unprecedented in the world. As part of the Agency and the EAO's own due diligence, what analogous mines have you documented to compare Ajax to in your analysis of the Report leading to the conclusions? Where would I and other members of the public find such information?

It is also unprecedented in BC and in Canada for an open pit mine of this size next to an urban population to require an Independent Environmental Monitor and Community Liaison Group to oversee mitigation effectiveness because the mine's size and location itself is unprecedented.

Again, how do you know that this type of mitigation monitoring will be efficient, effective, and economically affordable?

Still, kudos to the EAO and to the Agency for the aspiration to build into the project considerations such legally-binding environmental and community safe-guards. However, I do

not believe that the goals outlined in Schedule B: Table of Conditions for an Environmental Assessment Certificate will be achieved to a defensible degree.

Given that the proposed Ajax Mine project's potential hazards and the execution and suggested monitoring of impacts are unprecedented in scope, they could be viewed as EXPERIMENTS with the health of the environment; with the health of the SSN's traditional practices, heritage, and lands; and with the health of people residing in our City (especially within the Local Study Area).

MEDICOLEGALLY, INFORMED CONSENT IS REQUIRED FROM PARTICIPANTS BEFORE THEY ARE EXPOSED TO EXPERIMENTAL RISK.

I note that the SSN, the City of Kamloops, and numerous people who have posted during this and other Public Comment Periods have stated the informed choice to not consent to the Ajax Mine project proceeding ahead.

Please consider that seven of the nine current democratically-elected Kamloops City Council representatives, including our new Mayor Ken Christian, have openly campaigned about or have stated their Ajax Mine opposition.

As per Kamloops Mayor Ken Christian's campaign website, he clearly stated the reasons for his informed decision to oppose the Ajax Mine Project:

<http://www.kenchristian.ca/ajax-mine>

As a side note, Mayor Christian's LinkedIn profile shows an impressive and relevant resume with regards to this important decision for our city. As per the Summary: "Seasoned environmental health professional with strong interests in public policy, evidence-based decision making and organizational structure."

<https://ca.linkedin.com/in/ken-christian-684a5818>

I think that the last two Kamloops Civic Elections were referendums by proxy on the Ajax Project, since residents of Kamloops did not have other democratic means by which to demonstrate their agency to make this important decision in a meaningful way.

Note that Mayor Ken Christian won a resounding majority (63.91%) in the September 30, 2017 Mayoral by-election, and that Bill McQuarrie was second in line (18.34%) out of 6 candidates. Both individuals campaigned with stated opposition to the Ajax Mine Project.

<https://www.kamloopscity.com/city-kamloops-2017-election-results/>

As per the City of Kamloops website, Mayor Ken Christian's and Bill McQuarrie's combined percentage of votes equaled 82.25%, whereas pro-Ajax mayoral candidates Stu Holland and Todd McLeod gained only 10.88% of the votes combined. The by-election eligible voter turnout was 21.17% (14,731 ballots casted).

Furthermore, even Caroline King (founder and administrator of the Support Ajax Facebook page), had only 1419 votes (9th place) to become a city councilor despite having used this FaceBook page to request voter support and turnout. In contrast, Kamloops Arts Council Chair Kathy Sinclair placed first in the by-election of 2 city councilors (out of 21 candidates) with 3421 votes. Miss Sinclair was clear in her opposition to the Ajax Mine Project as she campaigned.

Although voter turnout at the recent City By-election wasn't ideal, I do not think the pro-Ajax side of the fence can continue to state that they are the majority voice in Kamloops. Even individuals working outside of Kamloops had clear means available to them to mail in a ballot or to vote early. Request of such mail-in ballots were only a click away on the City of Kamloops website.

Looking back to when I was first learning about the Ajax Mine proposal, I found it very compelling to discover that both Richard Boyce (referred to above in my Public Comment) and mining entrepreneur Ed Collett publicly opposed this Project. As per this October 28, 2013 article by Cam Fortems published by Kamloops Daily News/Times Colonist:

<http://www.timescolonist.com/news/b-c/kamloops-mining-entrepreneur-says-proposed-ajax-mine-is-way-too-close-to-city-1.674876>

“A major city mining entrepreneur is adding his voice to those who say the proposed Ajax mine is too close to Kamloops, while others caution it's too early judge the proposal.

Ed Collett, who owns international mining equipment supplier Intequip and opened the city's first commercial vineyard, said an open-pit mine immediately beside a city of 85,000 is a poor location.

“I have to agree with Richard Boyce (Steelworkers mine local president), it’s way too close to the city,” Collett said.

“There’s other ore deposits in B.C. We don’t have to destroy pristine areas that will never return.”

Boyce, who heads the union representing workers at Highland Valley Copper, announced at a public meeting this week that he opposes plans by KGHM-Ajax to reopen and expand the historic Ajax pit immediately south of Kamloops.”

“Collett has spent 30 years in the business, starting as a tire supplier and expanding into mining equipment supply worldwide.

He estimated he’s toured more than 100 mine sites around the world. Collett also said mining practices have improved immeasurably in the past few decades.

But he said the threat to Jacko Lake, loss of grasslands, threat to air quality and permanent scarring of the city landscape can’t be understated.”

“People have to understand what mining does for the globe. It’s a huge economic boost for any city. But people have to look at the pros and cons. Looking at those, I have to say ‘no.’”

I have copied much of the main body of Cam Fortems’ article here since I think that the points raised by Ed Collett are illustrative of a very informed choice to oppose (in other words, not consent to) the Ajax Mine Project, despite his being a mining entrepreneur. He also gives good voice to weighing important potential environmental risks against potential benefits.

I acknowledge that there are some open pit mines operating in proximity to communities around the world. However, these other mine sites cannot be considered analogous to the valley topography and the history or branding of Kamloops. For example, both Kalgoorlie in Western Australia and Timmins, Ontario are historical mining towns with open pits close to their populations.

Individuals who moved to these communities with adjacent mines consented to living and raising their families in those environments through their actions; whereas many people in Kamloops do not consent now to a large open pit mine becoming their neighbour. Again, please recognize that 7 out of our 9 elected officials oppose Ajax. Please also consider that both the Kalgoorlie and Timmins communities are relatively flat; therefore, their populations are not exposed to inversions nor general settling of particulates in valleys.

A more geographical analogous situation to Kamloops is Salt Lake City, Utah where winter inversions in this urban valley city are a frequent occurrence.

Much of the pivotal American research about the health impacts of particulate matter air pollution was co-authored by C. Arden Pope III, a Salt Lake City economist and health epidemiologist that was an expert author of the World Health Organization's (WHO) 2013 published Review of Evidence on Health Aspects of Air Pollution (REVIHAAP) Project.

For more details about the REVIHAAP Project, you can refer to this WHO website link:

<http://www.euro.who.int/en/health-topics/environment-and-health/air-quality/publications/2013/review-of-evidence-on-health-aspects-of-air-pollution-revihaap-project-final-technical-report>

There is also an excellent YouTube presentation by Dr. C. Arden Pope III you could view in which he gives a straight forward review of air pollution health impacts:

<https://www.youtube.com/watch?v=xxHfxQivkHc>

I have heard numerous times over the last few years (online, at forums, and in public comments) that miners CAN be healthy, as per anecdotes of friends or family members who have seemed well. This argument has been used in attempt to invalidate the concerns of people mindful of the risks of air pollution exposure, as if others have no reason not to consent to Ajax.

It is true that many miners CAN be healthy, particularly those who are physically active on the job. Epidemiologically, this phenomenon is called the "Healthy Worker Effect". However, this phenomenon should not negate attention to epidemiological evidence of negative health impacts of mining-related air pollution, even when controlling for smoking history. For example:

- Holman CD, Psaila-Savona P, Roberts M, McNulty JC. Determinants of chronic bronchitis and lung dysfunction in Western Australian gold miners. *British Journal of Industrial Medicine* 1987;44:810-818.

- Oxman AD, Muir DCF, Shannon HS, Stock SR, Hnizdo E, Lange HJ. Occupational dust exposure and chronic obstructive pulmonary disease: A systemic overview of the evidence. *American Reviews of Respiratory Disease* 1993;148:38-48.

As an anecdotal counter-argument to the purported lack of air pollution health effects upon mine workers, I state now that I have seen many abnormal chest X rays and/or CT chest scans over the last 12 years of working in Kamloops belonging to this population. For example, I referred a relatively young non-smoking individual to a lung specialist colleague after noting extensive chest X ray changes. Of note, this individual had worked for several years monitoring the tailings storage facility (TSF) walls at their mine, and acknowledged a history of TSF dust exposure. At the time of my consultation about un-related concerns (or maybe they were), the individual was no longer employed; therefore, there was no direct pathway to address the concerns with WorkSafe BC. Still, I encouraged the individual to do so. (Gender, age, mine site, and other identifying information withheld in order to protect patient confidentiality).

Back to a discussion of evidence, rather than of anecdotes, it is compelling that the EAO and the Agency's Report's strongest conclusions, with the relatively highest level of confidence in the application's assessment, pertain to the SSN's Value Components effects on fishing; hunting; plant gathering; cultural and ceremonial uses; archaeological sites; early settlement heritage sites; and Indigenous heritage.

As per Conclusions Section 18, page 405 of the Report:

“The Agency and EAO conclude that Ajax is likely to cause significant adverse environmental effects to the current use of land and resources for traditional purposes by aboriginal persons. Ajax would result in a high level of change, lasting far in the future, in how aboriginal persons carry out their traditional activities in their preferred locations and ways.”

“The Agency and EAO have moderate to high level of confidence in the effects assessment, as there is some level of uncertainty as to the extent to which SSN members would avoid the area because of the presence of Ajax. However, there is high confidence that Ajax would overlap with *Pipsell*, which is recognized as a cultural keystone area by SSN.”

Of note, the residual effects after mitigation for these value components (fishing, hunting, plant gathering, and cultural and ceremonial uses) were all deemed by the Agency and the EAO to be IRREVERSIBLE. In contrast, the purported financial benefits of the Ajax Mine Project are anticipated to span over a maximum of about 25 years.

As per Conclusions Section 19, page 407 of the Report:

“The Agency and the EAO considers the residual effects to Indigenous heritage be high in magnitude, because Ajax would affect substantial portions of intact sites of high importance, regional in geographic extent, based on the impact on the entire SSN, and far future in duration. The Agency and EAO conclude that Ajax is likely to cause significant adverse environmental effects to physical and cultural heritage based on effects to Indigenous heritage.”

“The Agency and EAO have a high level of confidence in the significance determination, given that there is high confidence that Ajax would overlap with *Pipsell*, which is recognized as a cultural keystone area by SSN.”

Of note, the former, and relatively tiny, Afton Mine had left numerous sites of high importance intact for the SSN.

I have heard pro-Ajax commentators say things online and in public comments along the paraphrased lines of “Why is Jacko Lake so important to the SSN now?” *Pipsell* has always been important to the SSN. Previously, the SSN could still practice their traditions at the sites.

Again, the residual effects after mitigation for these value components (archaeological sites, early settlement heritage sites, and Indigenous heritage) were all deemed by the Agency and EAO to be IRREVERSIBLE.

Since the greatest evidence-based certainty of residual effects after mitigation outlined in the Agency and EAO assessment Report pertains to SSN’s Value Component concerns, then the Ministers have the clearest reasons for your levels of government to reject the Ajax Mine Project – In other words, your final report tells you with a high level of confidence that the SSN will be harmed in significant ways.

Furthermore, I think it would be unethical for the BC or federal government to approve the Ajax Mine project. Such approval would disrespect the autonomy of the SSN's and the City of Kamloops' informed choices to reject the project in addition to demonstrating disrespect of the UNDRIP for which your governments have stated commitments.

Other individuals have added their voices of opposition formally to the Ajax Mine debate.

For example, the Thompson Rivers University's (TRU) ECO Club presented Kamloops City Council with a petition containing the signatures from over a thousand university campus members (staff and students) in April, 2017.

As taken from the [Kamloops This Week](#) article by Dale Bass published on April 25, 2017:

“Telling councilors they were not there to discuss the science of KGHM Ajax’s mining proposal, the members of the university’s Eco Club said they brought the document to council to share their “significant concerns” and ensure “our collective voices on campus are heard.””

“Club member Valerie Law told council her concern with the mine is its proximity to the city and potential health issues it could cause. Logan Dafoe, also a club member — both are science students at TRU — said he is concerned about the environmental impact of the mine. Both added they are not against mining, just not in favour of the location of the proposed Ajax project.”

<https://www.kamloopsthisweek.com/tru-students-bring-anti-ajax-petition-kamloops-council/>

Consider this – It is probable that the same TRU students and staff members who signed the Ajax Mine Petition will choose to transfer their university activities elsewhere if this project is approved.

Note that a November 24, 2015 article published in [Kamloops This Week](#) titled “International Relations: The Impact of TRU World” highlighted the financial and cultural mosaic importance of the TRU International Student Program to Kamloops, with more than 2,600 students representing more than 80 nations.

Could the financials and the diversity of TRU be challenged if the Ajax Mine became a reality?

Another Kamloops group of citizens to be mindful of is represented by the University of Victoria’s Environmental Law Centre.

With regards to drinking water SECURITY for the more than one hundred individuals with licences to draw water from wells downslope of the Ajax Mine site, please give your attention to the August 14, 2017 Globe and Mail article by Mike Hager:

“The University of Victoria's Environmental Law Centre mailed a letter to the local drinking-water officer Monday alleging previous environmental studies done on the Ajax Mine proposal, owned by the Polish firm KGHM, did not take into account how toxic chemicals from the open-pit copper and gold mine could contaminate surface water to leach into a nearby creek and two aquifers that provide drinking water to more than 100 residents.”

“The province is expected to issue its environmental assessment certificate as early as this fall, but this independent bureaucrat has the power to order the company to stop the project until it properly addresses the risks posed to the local water supply, according to Calvin Sandborn, the legal director of the UVic centre leading the campaign to stop the mine. If the officer does not issue an order, they can still ask B.C.'s environment ministry to ask the company to address inadequacies in its assessment of the contaminant risks identified in a new report from an independent hydrogeologist commissioned by the centre, he said.”

"The final [provincial environmental] certificate is not issued, that could happen in the fall – that's why we're filing this thing," Mr. Sandborn said Friday. "Even with the certificate, the drinking-water protection order takes precedence because the Drinking Water Protection Act takes precedence over other legislation."

“B.C.'s drinking-water officers were given this power after seven people died and more than 2,300 became sick in 2000 from tainted water in Walkerton, Ont., Mr. Sandborn said.”

<https://beta.theglobeandmail.com/news/british-columbia/bc-environmental-group-calls-to-stop-ajax-mine-project-over-water-safety-concerns/article35979893/?ref=http://www.theglobeandmail.com&>

With regards to the Walkerton public health disaster that occurred in May 2000, Dr. Krewski was the lead author of the commissioned “Managing Health Risks from Drinking Water – A Report to the Walkerton Inquiry,” *Journal of Toxicology and Environmental Health*, Part A 2002;65(21):1635-1823. This acknowledged leadership was another reason I thought of him as an appropriate individual for government to approach again for third party public health and risk management input.

I note that the Agency and the EAO had the following conclusions as to groundwater quality and quantity residual effects AFTER PRESUMED EFFECTIVE MITIGATION, as per Section 3 of Appendix A of the Report, pages 362 and 363:

“The Agency and EAO assessed groundwater quality as a pathway valued component. Changes in groundwater quality the potential to affect ecological and socio-economic values, as well as humans, which are the ultimate receptors. The results of the groundwater quality assessment inform the assessments and significance determinations of the following valued component assessments: surface water (section 2), fish and fish habitat (section 4), land and resource use (section 15), and human health (section 10).”

“Uncertainties were identified during the EA related to KAM’s groundwater quality modelling and selection of the RES-2 well as a proxy for assessing effects to groundwater quality from Ajax. There were also uncertainties identified with the interpretation of the hydrogeology of the Ajax area, and groundwater conceptual and numerical models that supported the assessment. The Agency and EAO have a moderate level of confidence in the effects assessment based on KAM’s groundwater quality modelling results and the analytical techniques used to support the assessment.”

As argued above, I do not think that the provincial government and associated bodies will be able to achieve the Agency and EAO’s aspirational goals of effective and defensible mitigation compliance monitoring. What will government language “to the satisfaction of the EAO” really mean? Have criteria for such satisfaction been defined?

As an example of such lofty goals, please note the Groundwater Investigation Plan, as per Section 22 on pages 18 and 19 of the draft Schedule B: Table of Conditions for an Environmental Assessment Certificate, posted on the EAO website:

“The Holder must retain one or more QPs to design a groundwater investigation plan. The plan must be developed in consultation with MOE, MEMPR, MFLNR, the City of Kamloops, and Aboriginal Groups.”

“The plan must include: a) Pumping tests around the Edith Lake fault zone and Jacko Lake, including installation of additional wells and monitoring instrumentation, to inform mitigation and monitoring; b) Drilling investigations in the vicinity of the Edith Lake fault zone to inform

mitigation and monitoring; c) Evaluation of groundwater quality in the Peterson Creek aquifer at a location nearer to the mine site property boundary than the RES-2 residential well (referred to in the Application, Figure 6.5-2) and upgradient of existing residential wells, to further characterize the baseline groundwater quality conditions within 1.5 km radius of the Mine Site Area; d) A schedule for reporting the results of the investigations in paragraphs (a) through (c) to the EAO, MOE, MEMPR, MFLNR, the City of Kamloops, and Aboriginal Groups; and e) The means by which the results of the groundwater investigations will be considered in the Project design, the development of the plan described under condition 23, the development of additional mitigation measures, and in the implementation of all applicable conditions of this Certificate.”

I think that it was “WILLFUL BLINDNESS” for the Agency and the EAO to have not required KGHM Ajax Mining to complete what could be considered additional baseline studies before making a conclusion that the Project will result in “no significant adverse effects”, so long as the effects are “mitigated”. Again, “willful blindness is a legal concept which means if there is information that you could know and should know, but you somehow manage not to know, the law deems that you are willfully blind”, as quoted above.

Pertaining to the Section 23 of Schedule B’s Groundwater Management and Monitoring Plan on page 23:

“The Holder must retain one or more QPs to develop a groundwater management and monitoring plan. The plan must be developed in consultation with MFLNR, MOE, MEMPR, the City of Kamloops, and Aboriginal Groups.”

“The plan must: a) Incorporate the results of the groundwater investigation plan required by condition 22 and associated monitoring data, including data collected from any new or revised monitoring locations; b) Include the groundwater management and monitoring commitments set out in the Holder’s memo Ajax Project EA/EIS – Response to Memorandum entitled ‘Ajax Mine Project – Review of Supplemental Correspondence BGC022’, dated April 13, 2017; c) Describe the means by which groundwater quality and quantity (including groundwater elevations and flow) will be monitored during all Project phases within 1.5 km of the Mine Site Area; d) Specify the approach for consulting with registered groundwater well owners in the Peterson Creek aquifer, for wells existing at the date of issuance of this Certificate, for the purpose of identifying allocated withdrawal volumes and current withdrawal volumes; e) Describe the mitigation measures to avoid or minimize impacts to groundwater quantity and groundwater quality. For groundwater quantity, this must include the means by which the Holder will ensure that the Project does not cause groundwater wells to be unable to satisfy their withdrawal volumes as identified in (d); f) Describe the approach and schedule for updating and recalibrating the groundwater flow and quality models used in the Application.”

The above examples of condition mitigation goals are not realistic to achieve when important mentioned “co-pilots”, such as the SSN and the City of Kamloops, in flying this Project’s “plane” have voted not to work for “KGHM International Airlines” due to their own safety concerns about how the airline company operates.

In this airplane analogy, my husband and I will likely choose to fly with our children on a different airline’s plane and to a different destination if your levels of government decide to approve the Ajax Mine Project despite the many evidence-based ethical and scientific concerns I have attempted to convey to you.

Be cautious in the face of uncertainty (“better safe than sorry”). - Risk management must adopt a cautious approach when faced with a potentially serious risk, even if the evidence is uncertain.

Jardine et al.’s article recommends that a cautious approach should be adopted in risk management decision-making when faced with potentially serious risk, even if the evidence is uncertain. Please consider the Mount Polley Mine Tailings Storage Facility (TSF) collapse as illustrative of the potential risk to people, fish habitat, and infrastructure posed by placement of an ~120 metre-high walled TSF positioned near Jacko Lake and upstream from the Ajax mine pit and our valley city. I note that the proposed buttressed TSF walls add to the structural stability of the TSF and are to be commended. However, TSF designs are not 100% infallible. For example, in November 2015, there was collapse of the BHP Billiton Ltd and Vale SA TSF that engulfed the Bento Rodrigues’ District in Brazil, resulting in loss of life and infrastructure.

KGHM could face fines and have the licence for its Sierra Gorda mine revoked by the Chilean government for breaches that include “not implementing measures to control emissions, altering the natural habitat for native wildlife, and operating a tailings dam in an unauthorized fashion” (Information taken from Mining.com March 9, 2016 posted article by Cecilia Jamasmie).

As a side question, did the EAO and Agency reviewers and ministerial decision-makers learn from the Chilean Superintendence for the Environment directly as to how KGHM has been operating in their country in order to inform how KGHM might operate an open pit mine locally? If not, one could argue an act of willful blindness on behalf of government leading to another hole in the mitigation and monitoring Swiss cheese.

I note the evolving and vast research literature that describes the health impacts of fine and ultrafine particulate matter, diesel exhaust, and heavy metal air pollution. Potential water and soil heavy metal contamination may occur as well, impacting upon the safety of individuals eating fish from Jacko Lake, for example, or consuming foods from the adjacent lands, also including country gardens in the downwind communities.

Further to the ethical principle of caution in the face of uncertainty, I am particularly concerned by the work of Dr. Lilian Calderón-Garcidueñas and her colleagues that highlights the autopsy-derived documentation of Alzheimer's and Parkinson's-type pathological changes in the brain tissue of children who resided in the Mexico City Metropolitan Area (MCMA) compared to brain tissue from matched cohort children who resided in geographical areas with statistically lower levels of fine particulate matter air pollution.

The same authors have also documented in a collection of studies a number of other findings such as MRI hyperintense T2 foci on neuroimaging, inflammatory markers systemically and in the central nervous system, and cognitive differences between cohorts of Mexican children from the MCMA versus clean air regions. The open access article cited below summarizes this research.

I think that recognizing the public health implications of such research is directly relevant to this ethical principle of caution in the face of uncertainty discussed. In terms of protecting a population, particularly youth, from undue risk of harm that might not clinically manifest until years later, please be mindful of the potential long-term impact of your current review of information and decision-making.

Calderón-Garcidueñas L, et al. Review Article: Early Alzheimer's and Parkinson's Disease Pathology in Urban Children: Friend versus Foe Responses – It is Time to Face the Evidence ***BioMed Research International***. Volume 2013, Article ID 161687 (Open Access article in PDF form through this link):

<https://www.ncbi.nlm.nih.gov/pubmed/23509683>

Please also take heed that Dr. Calderón-Garcidueñas' disconcerting research about Parkinson's Disease-related pathological changes in the brains of children correlated to particulate matter (PM) air pollution exposure is supported by the recent epidemiological correlation of PM10 air pollution exposure to the clinical occurrence of Parkinson's Disease, as per the research article by Chen CY, et al. PLoS One. 2017 Aug 15;12(8):e0182834. doi:10.1371/journal.pone.0182834. eCollection 2017:

<https://www.ncbi.nlm.nih.gov/m/pubmed/28809934/?i=3&from=air%20pollution%20dementia>

Risk management processes must be flexible and evolutionary to be open to new knowledge and understanding (evolution, evaluation, iterative process). - The incorporation of new evidence requires that risk management be a flexible, evolutionary, and iterative process, and that evaluation is employed at the beginning and through out the process.

My discussion of WestKam Gold Corp.'s potential benefits for the same people and businesses hoping to benefit from Ajax is an example of asking you to incorporate new information into the assessment process as it unfolds, in line with the above ethical guideline for risk management decision-making.

Please also consider the October 2, 2017 announcement by BC Health Minister Adrian Dix that 2,400 construction jobs will be created for completion of the next phase of the Royal Inland Hospital Expansion Project in Kamloops, as reported by [Kamloops This Week](#) on that date:

<http://www.kamloopsthisweek.com/firms-shortlisted-417-million-royal-inland-hospital-expansion-project/>

The RIH Expansion Project is anticipated to extend over 2018 into 2022.

I think that there would be meaningful cumulative effects on Value Components such as the availability of health care service providers and affordable places to live within Kamloops, if workers need to compete for resources with both Kamloops residents and in-migrated Ajax workers. As well, there will be probable in-migration of a large range of employees with different skills sets so to operate the new surgical tower and other updated services, far into the future. In other words, job creation effects would logically be long-term with this non-polluting hospital project. Alternatively, there could be long-term competition with Ajax on city resources such as available affordable accommodation if the Ajax project was approved.

As another updated way to look at the situation, the RIH expansion project offers almost the same number of construction jobs and direct and indirect benefits as could be superficially argued for Ajax. For example, people currently working outside of the Kamloops region could come home for a few years to help build the RIH expansion, rather than to help build Ajax.

I see a few main differences between these projects in terms of economy. The RIH expansion is relatively “green” with the potential to promote in-migration of more health care providers, whereas Ajax has already led to a reduction of health care services for Kamloops residents, as attested to by my Public Comment’s opening statements. Even as a physician myself, my children and I do not have a Kamloops family doctor, in part, due to proposed Ajax Mine.

Respectfully, I disagree with the EAO’s and the Agency’s conclusion that the Ajax Project will not impact health care services in Kamloops to a significant degree.

I also note that the EAO, the Agency, and KAM did not have the foresight to require that the contracted family doctor for Ajax employees not be recruited from Kamloops, since such recruitment would result in loss of physician services for other Kamloops’ residents. There also was no stipulation in the mitigation measures that the company physician have admitting privileges to RIH, thereby transferring burden to an already taxed hospitalist service that takes care of admitted “unattached” patients. “Unattached patients” are individuals who do not have a primary health care provider (doctor or nurse specialist) who can also provide inpatient hospital care.

Do more good than harm (beneficence, nonmalificence). - The ultimate goal of good risk management is to prevent or minimize risk, or to "do good" as much as possible.

Is the Ajax Mine really needed to address future employment opportunities on a percentage basis in Kamloops?

In addition to the above examples I put forward for your consideration, the BC Innovation Council, a provincial crown agency, reported on February 10, 2017 that Kamloops has 1,440 people employed in 160 technology firms.

<https://bcic.ca/news/media-releases/ibm-fortisbc-government-local-companies-seek-bc-tech-solutions-kamloops/>

I imagine that such technology jobs will persist in such numbers far into the future, possibly with further growth as more technology firms look for affordable communities outside the Lower Mainland for their employees. In contrast, the Ajax mine-related jobs are associated with Kamloops region population and environmental risks. As well, these jobs are relatively short-term, particularly those in the construction phase of the mine Project.

This risk – benefit discussion leads to what I think could be a win-win economic situation for governments and communities that engage in air quality management, as outlined in the April 5, 2017 BC Lung Association posted YouTube video interview with air pollution economist Dr. C. Arden Pope III.

In this interview, Dr. C. Arden Pope III illustrates how moving towards cleaner air in an airshed can result in economic benefits, with such benefits tending to outweigh the costs of management strategies.

He also gives good voice to weighing the costs versus benefits of polluting versus non-polluting economic activities. I think that such discussion is relevant to the review of the economic risks versus benefits review of the Ajax Project EIS/Application, and to some of the points I have made above.

Please consider viewing this less than 10-minute YouTube video of the Dr. C. Arden Pope III interview for an excellent and succinct overview of economic principles of air pollution management:

<https://www.youtube.com/watch?v=VkUkcIM26Z0>

Rather than reiterate other cost versus benefit analysis points discussed already in the Report and in my Public Comment above, I bring your attention again to the real risk of significant loss of Kamloops physicians, and hindered physician recruitment. Some physicians might even choose to “retire” and relocate, akin to my former family doctor’s actions. I do not think that the EAO and the Agency yet fully understand the scope of potential risks to the health of the Kamloops’ population and to the local economy as they pertain to the recruitment and retention of doctors and other allied health care professionals.

An updated survey on physician attitudes about the Ajax Mine project has not been performed. I had hoped that such a survey would be completed (as per previous Public Comments), but directed with detached, third-party oversight in a manner that would maintain the confidentiality of the answers while addressing possible concerns about survey method employed.

As demonstrated in the blog responses to the [Kamloops This Week](https://www.kamloopsthisweek.com/experts-concerns-proposed-ajax-mine/) LTE May 18, 2017 by Dr. Calder (<https://www.kamloopsthisweek.com/experts-concerns-proposed-ajax-mine/>), personal attacks have been directed towards us and other individuals with stated concerns about the risks versus benefits of the Ajax Project. Overall, KGHM has been a divisive force in Kamloops. Still, I have continued to make my opinions public. In contrast, many other colleagues have chosen to protect their anonymity, as attested to by their anonymous Public Comments posted to the EAO website.

In lieu of no proactive collection of such data by the proponent or by IHA, I recommend that the EAO, the Agency, and Ministerial decision-makers heed the results of emergency physician Dr. Alan Vukusic's correspondence to the City of Kamloops that was posted November 20, 2012 on Kamloops.civicweb.net.

Dr. Vukusic, Dr. Derek Plausinis, and Dr. William Beaton created and distributed the survey. This 3-question survey had 152 responses by 207 physicians in Kamloops (response rate 73.4%). 84.2% of respondents answered "Yes" to the question "Are you concerned about the potential health impacts of the Ajax mine on the people of Kamloops?" Nearly 70% of physicians responded "probably" or "definitely" to the question "If you were a physician searching for a community in which to practice, and the Ajax mine as proposed was in place, would you eliminate Kamloops as an option?" Thirty-six percent of Kamloops physicians who responded to the survey said they will "probably" or "definitely" move their practice to another community if the Ajax mine is approved.

Please also note that physicians who run their own offices are small business owners. They contribute to the local economy through paying operational expenses such as rent, strata fees, computer services, and staff salaries. For example, running my office directly contributes to the income of 4 individuals. Such direct and indirect economic benefits would be lost if physicians (and other health care professionals such as pharmacists, therapists, dentists, and chiropractors) choose to move from Kamloops due to the Ajax Mine project. Even my financial advisor, who is married to a medical student, is considering relocation.

I think it has been an act of willful blindness that an updated anonymous survey has not been conducted, nor mandated, in this current environmental assessment process. As a result, there is a very large Swiss cheese hole in the EAO and Agency's Report pertaining to the confidence in their conclusion that there will be no significant impact on health care services in Kamloops due to the Ajax Mine. Perhaps a federal Health Impact Assessment under the new proposed framework would have led to completion of another survey of physician attitudes.

In what fashion do you propose that this effect be mitigated, and by whom? I think IHA would take issue with the simple deferral of physician recruitment and retention responsibilities to IHA, as the Agency and EAO suggest in their Report. If IHA was very effective at physician recruitment and retention, we would not be in the situation of such a marked doctor shortage in Kamloops over the last several years, incidentally correlating well to the years of living with the “Ajax elephant”.

Physician recruitment and retention efforts have been disadvantaged by this “Ajax elephant” in the room for a long time. For example, during the 2012 Forefronts of Neurology Meeting of BC neurologists and neurology trainees, a Penticton, BC neurology colleague started his slide show presentation with a picture of a massive open pit mine. He then described to the audience that this will be Kamloops’ in the future. He then showed a picture of his breakfast view overlooking the mountains and lake from his Penticton deck. Such images were followed by his asking our colleagues: “WHERE do YOU want to live?” As a side note, Penticton, Kelowna, and Kamloops have been in competition for recruiting neurologists for numerous years now. It’s hard to win this competition.

The complete elimination of risk is not possible (life is not risk free).- Risk is pervasive in our society, and cannot be totally eliminated despite an oft-expressed public desire for “zero risk”. However, the level of risk that may be tolerable by any individual is dependent on values of beliefs, as well as scientific information.

Pay heed to the words “values or beliefs” in the above statements – I think these words are foundational in both the SSN’s and the EAO/Agency’s evaluation of the re-submitted Ajax EIS/Application. How would it be defensible ethically and scientifically, all things considered, to approve this project?

Dr. Krewski is the CEO, Chief Risk Scientist, and Co-Founder of Risk Sciences International. He has additional leadership roles such as being the Director of the McLaughlin Centre for Population Health Risk Assessment at the University of Ottawa. He worked alongside C. Arden Pope III on the Scientific Advisory Committee that supervised the implementation of the World Health Organization’s project on Review of evidence on health aspects of air pollution (REVIHAAP). The final technical report document was released in 2013 and is accessible online through the WHO Europe website, as linked to above in my Public Comment. Dr. Krewski has published extensively on various topics such as air quality and water quality risk assessment and management.

Please consider reading an excellent and succinct review article by Douglas W. Dockery that outlines the history of research on the health effects of particulate air pollution, key take home messages about associated health impacts, the requirement of the Health Effects Institute (HEI) to serve as an objective arbiter between industry and researchers pushing the EPA to shape policy, the appointment of the Dr. Krewski as the leader of the team of HEI appointed investigators for this project, and the process of the United States' Environmental Protection Agency (EPA) eventually revising its particle standard based on this type of independent review of data:

Dockery, Douglas W. Health Effects of Particulate Air Pollution. *Annals of Epidemiology* 2009 April;19(4):257-263:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3367838/>

The above article is also a historical example of corporate versus civic science facing off.

Individuals such as Dr. Krewski, Dr. C. Arden Pope III, and Dr. Dockery have been pioneers paving the way for rapidly escalating research on air pollution health effects.

In terms of a very current, layperson summary of potential health risks associated with air pollution, my last request of you is to read this September 19, 2017 article by Laura Beil published by Science News. Such self-education will support your efforts to be as fully informed as possible as substitute decision-makers on the Ajax Mine Project:

<https://www.sciencenews.org/article/list-diseases-linked-air-pollution-growing>

My last questions to you are these – Theoretically, if you approve the Ajax Mine, would you move to Kamloops, buy a home in Aberdeen, and have your children go to the Pacific Way Elementary School? Would you keep your children home from school or away from the playground when the Agency and EAO Report-predicted dust storms over your community occur? Would you grow a garden in your back yard? Would you sit outside with friends on your patio in the summer when it is windy? Would you be comfortable with your children attending Thompson Rivers University? Would you work at TRU in a straight line downwind from the Ajax Mine site?

Ultimately, like most situations requiring a code of conduct, a foundational ethical principle is “the Golden Rule”:

Impose no more risk that you would tolerate yourself (the Golden Rule). - The Golden Rule is important in risk management because it forces decision makers to abandon complete detachment from their decisions so they may understand the perspectives of those affected.

Thank you beyond words for having the attention and the patience to read my lengthy Public Comment. You have demonstrated respect, substitute decision-making responsibility, and due diligence in doing so.

I would have regretted if I had not invested my time into writing you this ethics argument- and costs versus benefits analysis- essay to the best of my ability. Kamloops is worth it. By integrating key passages from materials referenced and associated website links, I hope the approach I have taken has made for a relatively easier read. I did not think a succinct point-form approach would have done justice to the four years of self-education and self-reflection that have passed.

My other hope is that this Public Comment discussion has been of some value to you too as you come to your own decision as to whether to approve the KGHM Ajax Mine Project, in the context of your ministerial mandate letters.

My final words are those of the Project Management Institute, cited above:

“Ethics is about making the best possible decisions concerning people, resources and the environment. Ethical choices diminish risk, advance positive results, increase trust, determine long term success and build reputations. Leadership is absolutely dependent upon ethical choices.”

With respect,

Dr. Jennifer Takahashi, MD, FRCPC

Neurologist and Movement Disorders Specialist