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

SURFACE AND UNDERGROUND WATER IMPACTS

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

Summary:

**AJAX' assessment severely underestimates impacts to both surface and ground waters*
**The mine would pump up to 1.5 million liters of fresh water per hour from Kamloops Lake*
**Impacts on Kamloops Lake's and Thompson River's waters and fish habitats have not been properly assessed*
**Natural contamination of groundwater is already problematic, with high levels of sulfate, molybdenum, and selenium*
**AJAX's mine would add significant quantities of water contaminants, including sulfate, molybdenum, selenium, arsenic, iron, and copper*
**These toxic substances would contaminate Peterson Creek and its Aquifer for decades or centuries, contrary to BC's Water Sustainability Act and BC's Ground Water Protection Regulation objectives*
**The project would also have irreversible negative impacts on Jacko Lake's and Peterson Creek's fisheries and fish habitats, contrary to the federal Fisheries Act policy*

Main quotes:

"…we have found a cumulative and substantial underestimation of the extent and severity of [water] contamination. This means that the likely impacts, damage, and harm to human health and environmental quality are significantly underestimated in the Ajax [environmental assessment]" (Morin 2016: vi)

"...the predictions are not reasonable, and they significantly underestimate the likely contamination of water on and leaving the proposed mine site" (Morin 2016: iv)

"The [Peterson Creek Aquifer] already has elevated baseline levels of some elements... the proposed Ajax site would significantly increase the contamination, including toxic metals that are not currently high in the Aquifer, rendering more of the Aquifer unfit, which is opposite of provincial legislation" (Morin 2016: 7)

"[The] intentional release of a contaminant plume into the Peterson Creek Aquifer fails to meet the objectives of British Columbia legislation" (Morin 2016: v)

"Negative impacts to [Jacko Lake and Peterson Creek] fisheries are [also] a significant concern to the Department [of Fisheries and Oceans Canada] and may pose challenges for the Department to issue a Fisheries Act Authorization, especially in the absence of any viable measure to counterbalance those effects" (DFO 2016)

“Department [of Fisheries and Oceans] does not support [AJAX's statement of no or little impact] as the loss of Peterson Creek directly affects the Aboriginal fishery and the impacts to [Jacko Lake’s] northeast arm will reduce [its] productive capacity” (DFO 2016)

"The Department [of Fisheries and Oceans] does not consider the creation of engineered dams around the periphery of Jacko Lake as “reasonable offset” to preserve the fisheries in Jacko Lake" (DFO, in CEAA 2016: Annex 2)

" Fresh water will be supplied from Kamloops Lake via pipeline [...] at a maximum rate of [1.5 million of liters per hour]" (MEM 2016: 9). “[AJAX’s environmental assessment] does not present enough information to understand the effects to fish and fish habitat in Kamloops Lake and downstream Thompson River habitats resulting from the Kamloops Lake water intake" (DFO, in CEAA 2016: Annex 1)

Water Contamination:

"[The Peterson Creek Aquifer] would transmit contaminated water from the Ajax site to residential water wells and/or reaches of Peterson Creek where aquatic life could be locally affected... the Ajax [environmental assessment] has underestimated the extent and severity of contaminated water entering and flowing through this Aquifer" (Morin 2016: 4)

"The Peterson Creek Aquifer is rated by the British Columbia Ministry of Environment as… vulnerable to pollution and contamination" (Morin 2016: 5)

“[This contamination would be a] failure to meet British Columbia's Water Sustainability Act and the Ground Water Protection Regulation… [The] contamination of the Peterson Creek Aquifer and its discharges to surface is not consistent with protecting stream health and aquatic environments, nor with conservation and efficiency of water. The Ajax contaminant groundwater plume will not “ensure that water stays healthy and secure for future generations” (Morin 2016: 8)

"…The [waste rock and tailings storage] facilities are responsible for an increase in the relative loading of SO4, Fe, Cu, Mo and Se to the receiving environment. Dustfall is the main contributing source of Cu and Cr during operations, while seepage from the [waste rock and tailings facilities] account for the majority of additional SO4, Fe, Mo and Se observed in the model scenarios" (MEM 2016: 14)

*"…tests like “shake flasks” on overburden... exceeded the higher provincial guidelines, such as for arsenic and **selenium**" (Morin 2016: 13)*

*"...Ajax environmental “static test” analyses grossly underestimate [by a factor of 10] the true total amount of **arsenic** measured by the Ajax assay database..." (Morin 2016: Fig.4.2)*

*"...**molybdenum** concentrations in [current] on-site waters... is [often] far above the federal guideline..." (Morin 2016: 20)*

*"Seepage from the [waste rock and tailings facilities] during **post-closure** is potentially a measurable source of arsenic, molybdenum, and selenium to the receiving environment" (MEM 2016: 14)*

"...Layering [as a mitigation measure] to prevent [acid rock drainage] has not been tested and verified on a large scale at the site" (Morin 2016: 35)

"...the proposed prevention of [acid rock drainage] for Ajax waste rock fails to meet government policy and has a good chance of causing [acid rock drainage] to arise and spread through the waste rock" (Morin 2016: 36)

"Unprocessed ore that is not milled at the end of mine life is a liability that could adversely affect water quality in post-closure phase..." (MEM 2014: 14)

Water Usage Impacts:

"Water will be obtained from a variety of sources, including fresh, contact and recycled sources. Fresh water will be supplied from Kamloops Lake via pipeline [...] A water intake system will be used to source fresh water from Kamloops Lake and pump it 16 km to the Ajax site at a maximum rate of [1.5 million of liters per hour]" (MEM 2016: 9)

"The [environmental assessment] does not present enough information to understand the effects to fish and fish habitat in Kamloops Lake and downstream Thompson River habitats resulting from the Kamloops Lake water intake" (DFO, in CEAA 2016: Annex 1)

"[AJAX's statement] that "Kamloops Lake has a relatively low biological productivity" [is incorrect] as Kamloops Lake provides an important migration corridor for anadromous fish and habitats for a variety of fish species, such as shoal rearing for juvenile Chinook salmon and mountain whitefish and lake rearing for juvenile Sockeye salmon. This statement is further confirmed in section 6.7.2.3 Kamloops Lake Baseline Studies that considers the lake to provide productive fish habitat" (DFO, in CEAA 2016: Annex 2)

Impacts on Jacko Lake & Peterson Creek:

"Negative impacts to [Jacko Lake and Peterson Creek] fisheries are a significant concern to the Department [of Fisheries and Oceans Canada] and may pose challenges for the Department to issue a Fisheries Act Authorization, especially in the absence of any viable measure to counterbalance those effects" (DFO 2016)

"Rainbow Trout Recreational Fishery within Jacko Lake is likely to be negatively affected by the Project as currently proposed and the Aboriginal Spring Trout Fishery located at the outlet of Jacko Lake/Peterson Creek completely lost" (DFO 2016)

"The current open pit design proposes to destroy approximately 20,400m2 of productive littoral habitat within Jacko Lake… [and] to destroy approximately 105,600 m2 of Peterson Creek instream and riparian habitats" (DFO 2016)

"Jacko Lake will experience water loss from seepage into the open pit" (DFO, in CEAA 2016: Annex 2)

"Lower Peterson Creek (below Jacko Lake) base flows are permanently and irreversibly reduced due to open pit development" (DFO, in CEAA 2016: Annex 2)

"…the reductions in flow to Peterson Creek as a result of the open pit are considered permanent, i.e. in excess of 300 years" (DFO, in CEAA 2016: Annex 2)

"Mine operations, primarily through blasting and vehicle traffic, will [also] likely alter the accessibility of Jacko Lake to local, resident and non-resident anglers" (DFO 2016)

"Juvenile Chinook salmon also utilize the habitats within the lower reach of Peterson Creek near the Thompson River at various times of the year" (DFO, in CEAA 2016: Annex 2)

"Department [of Fisheries and Oceans] does not support [AJAX's statement of no or little impact] as the loss of Peterson Creek directly affects the Aboriginal fishery and the impacts to [Jacko Lake's] northeast arm will reduce [its] productive capacity" (DFO 2016)

"The Department [of Fisheries and Oceans] does not support [AJAX's] determination "that the project would have a minor effect on the [First Nation's] ability to practice fishing interests in their traditional territory" (DFO, in CEAA 2016: Annex 2)

" Peterson Creek is noted to be a valued trout fishery for the Tk'emlúps te Secwépemc (TteS) and Skeetchestn Indian Bands (SIB), jointly known as the Stk'emlupsemc te Secwépemc Nation (SSN). Both the inlet of Peterson Creek to Jacko Lake and the outlet of Peterson Creek at Jacko Lake have been identified as historic trout fishery sites by the SSN, with the "Jacko Lake spillway providing an important area for spring fishing using traditional methods" (DFO 2016)

"It is [also] well established that Jacko Lake supports a high valued recreational trout fishery utilized intensively throughout the licenced season" (DFO 2016)

"…proposed offsetting to counterbalance the impacts to the Jacko Lake recreational fishery have not been proven to be technically feasible and at this time are a concern to regulatory bodies and Aboriginal peoples" (DFO 2016)

"The Department [of Fisheries and Oceans] does not consider the creation of engineered dams around the periphery of Jacko Lake as "reasonable offset" to preserve the fisheries in Jacko Lake" (DFO, in CEAA 2016: Annex 2)

"The Department [of Fisheries and Oceans] does not support [AJAX's conclusion]… as it does [not] appear to take into account the direct loss of the Aboriginal fishery, or the combined impacts to productivity and mine management actions that have potential negative implications to the Recreational fishery, nor the potential for seepage from Jacko Lake to the proposed open pit to become catastrophic. The Department does not consider the offsetting plan as currently proposed to be technically feasible to meet the principles of the Fisheries Productivity Investment Policy. As such the Department does not support the conclusion that the effectiveness of the offsetting plan to address serious harm to fish is high" (DFO, in CEAA 2016: Annex 2)

Water Impacts Underestimated:

"...the predictions are not reasonable, and they significantly underestimate the likely contamination of water on and leaving the proposed mine site" (Morin 2016: iv)

"...the contaminant plume modelling in the Ajax EIS underestimated the much larger extent and severity of contamination reasonably expected in the Peterson Creek Aquifer" (Morin 2016: v)

"Based on the [environmental assessment], the volume of contaminated water flowing from the... east waste-rock disposal dump... into the groundwater will be at least 16 times higher than modelled in the appendix. This would drive the contamination down into and through the aquifer at much greater rates than estimated in the predictions […] The low modelled volume is due to the false assumption that a fully intact dry cover will be installed on top of the rock dump when mining starts [...] the time before a fine-grained cover is fully installed, intact, and permanently stabilized would be about a minimum of about 10-20 years, and perhaps 30-40 years..." (Morin 2016: 6)

"...near-neutral contaminant concentrations from small samples at Ajax (less than 1 m high...) could grossly underestimate contamination under full-scale mining […] Studies of full-scale mine site components have repeatedly shown that full-scale contamination cannot be reliably predicted from small samples" (Morin 2016: 22)

"...it is unlikely that natural attenuation would persist for at least 200 years as shown [in AJAX's application] ... because the aquifer would continue to increase in concentrations as the contaminant input continued for decades and centuries" (Morin 2016: 7)

Gaps & Methodology Issues:

"The company has refused to release the [full] assay database, so we do not know the real, high levels of metals and other elements…" (Morin 2016: 16)

"Contaminant concentrations from the various dilute tests... were compared directly to provincial water-quality guidelines, and... not compared to the more stringent ("cleaner") federal CCME guidelines" (Morin 2016: 12)

"...only "dissolved" concentrations were predicted for Ajax source terms, whereas water-quality guidelines are typically based on total (dissolved plus suspended) concentrations" (Morin 2016: 13)

"Maximum source [of contaminant] concentrations were not used" (Morin 2916: 5)

"[AJAX's] use of dissolved metal concentrations only would be expected to under-predict exposure and subsequent risk associated with potential metals in drinking water" (Health Canada, in CEAAA 2016: Annex 2)

"Annual average surface water quality results were used [by AJAX] to screen for metals in surface water. Health Canada guidance recommends use of the maximum observed concentrations to account for seasonally elevated concentrations." (Health Canada, in CEAA 2016: Annex 1)

"[AJAX's environmental assessment] appears to have underestimated potential future sediment concentrations of metals… Health Canada recommends consideration of total metals in assessing metals concentrations in fish from both surface water and sediment" (Health Canada, in CEAAA 2016: Annex 2)

"...mass of metals deposited on soils and surface water [are not assessed, or not available]" (GPRA 2016: 4)

"...suspended-sediment levels at Ajax were not predicted (we could not find any such predictions) and ...total-metal levels in Ajax rock were [not] made available... (the company refuses to release the assay database)" (Morin 2016: 13)

"Peterson Creek Aquifer has not been studied in detail... the [environmental assessment] lists only five groundwater monitoring wells near the [east waste-rock disposal dump]. Of those five, only one, just one, in an aquifer 18 km2 in lateral area and up to 80m deep, is installed in the Peterson Creek Aquifer" (Morin 2016: 10)

"...the [groundwater flow] model may not adequately characterize and assess baseline conditions, accurately capture potential impacts or evaluate proposed mitigation measures" (Ministry of Forest Lands and Natural Resources, 2016: 1)

"When it comes to contamination of water around and downstream of the proposed Ajax Project, the [environmental assessment] clearly fails to uphold [AJAX's own commitments to] the Precautionary Principle and Zero Harm" (Morin 2016: iv)
