Ajax Sub-Working Group Meeting: Surface Water, Groundwater, Fish and Fish Habitat

Wednesday, April 6, 2016 Surface Water, Groundwater, Fish and Fish Habitat

Location:Coast Kamloops Hotel, Kamloops (and teleconference)Time:8:30 AM - 4:00 PM

Attendees:

- Erin Rainey, MOE
- Paul Draycott, SLR
- Glen Reynolds, SLR
- Emily Lomas, City of Kamloops
- Glen Farrow, City of Kamloops
- Alan Michener, City of Kamloops
- Annette Muttray, SLR
- Greg Baytalan, Interior Health
- Mark Phillpotts, FLNRO
- Darren Bennett, FLNRO
- Bruce McFarlane, FLNRO
- David Thomson, FLNRO
- Colleen Dreger, FLNRO
- Travis Marr, SSN
- Jessica Mackie, KP
- Katrina Jackson, KP
- Hamish Weatherly, BGC
- Trevor Crozier, BGC
- Andrea Raska, CEAA
- Peter Reid, Stantec
- Stephanie Eagen, KP
- Oscar Gustafson, KP
- Sunny LeBourdais, SSN
- Mike Anderson, SSN
- Amanda Watson, SSN
- Gilles Wendling, GW Solutions (for SSN)
- Nick Sargent, Golder (for SNN)

- Zoltan Fabian, CEAA
- Kevin Inouye, CEAA
- Tracy James, EAO
- Alanya Smith, EAO
- Krysia Zurakowski, EAO
- Nettie Ore, KGHM
- Ryan Deneault, KGHM
- Clyde Gillespie , KGHM
- Mike Wypych, KGHM
- Todd Goodsell, KGHM
- Jason Rempel, ERM
- Allyson Longmuir, ERM
- Stephen Sheehan, ECCC
- Bhupendra Khadka, FLNRO
- Shelley Ball, NRC (phone)
- Sean Shaw, MEM
- Dale Desrochers, DFO
- Timo Kirchner, Lorax
- Bruce Carmichael, MOE
- Gabriele Matscha ,MOE
- Christa Pattie, FLNRO
- Susan Fitton, FLNRO (phone)
- Brent Beattie, MEM (phone)
- Bob More, ECCC (phone)

Meeting purpose:

- 1. To review and clarify key issues to date.
- 2. To understand KGHM Ajax Mining Inc.'s path forward to address the issues.
- 3. To provide an update and seek sub-Working Group input on Proponent's proposed approach for addressing key issues.

1. Round of introductions

Ajax Sub-Working Group Meeting: Surface Water, Groundwater, Fish and Fish Habitat

2. Review of Agenda

- EAO introduced the purpose of the meeting, as outlined in the agenda.
- EAO reminded participants that, where possible, comments should be paired with specific issues and potential resolutions.

3. Proponent Update

- ERM provided an update on status of responses and general approach forward.
 - ERM identified that if a response has been given on a comment, not too much time will be spent today on the comment.
 - Received ~2,400 comments from reviewers, including federal, provincial, SSN and City of Kamloops members of the Working Group. KAM has provided responses to about 50% of them.
 - There are approximately 200 comments remaining on SSN tracking table requiring a response and those are currently a priority to help facilitate discussions in support of SSN process.
 - o Tracking sheet filters can help sort comments by issue.
- SSN asked what the process is if an inadequate response is received.
 - ERM confirmed the round 2 comments are intended to provide opportunity for followup comments/responses.
- MOE asked about dust sensitivity analysis on base case regarding solubility in streams and if it was discussed yesterday at the air quality sub-Working Group meeting.
 - ERM noted that Stantec is available today and can speak to this as needed during today's meeting. ERM summarized key points from April 5 air quality meeting.
- SSN highlighted that the fishery on Kamloops Lake should be brought forward for greater focus.

4. Groundwater Update (BGC)

- BGC provided an update on the key issues to date. These include: conceptual site model; Peterson Creek and aquifer interactions; effects to Edith Lake fault zone; Jacko Lake-pit interactions; pumping tests; GW monitoring plan; SW-GW interactions; and model calibration.
 - BGC will provide a memo on conceptual site model to map out what has been done and to provide clarification on the model parameters.
- SLR asked if the depth modelled in the pit will be addressed.
 - BGC confirmed that this will be part of the responses in one of the technical memos. Several technical memos are being drafted to address the comments received.
- ECCC asked MEM about the number of MEM's comments that are considered permitting-stage issues and indicated that ECCC believes some of them may need to be addressed at the EA stage. ECCC reiterated that where there are impacts to water bodies, there are potential water quality and habitat issues.
 - EAO noted that the potential flow of water from Jacko Lake to the pit and the stability of the pit wall have been raised as issues by members of the Working Group.

Ajax Sub-Working Group Meeting: Surface Water, Groundwater, Fish and Fish Habitat

- MOE agreed and noted that the recent comments focus on these issues.
- BGC indicated that they may not have received all of the federal comments yet (as some were submitted recently), but should be receiving them soon.
 - ECCC stated that a number of their comments relate to the potential intrusion of Jacko Lake into the pit.
 - ERM pointed out that these comments came in at the end of March and the distribution (to the Proponent's consulting team) and review of these are in progress.
- BGC's plans to harmonize the responses to comments on the surface and groundwater monitoring and summarize for discussion with regulators.
 - SLR acknowledged that details are typically established in the permitting phase, but would like to see a more robust concept for the monitoring approach at this stage.
 - BGC plan is to provide clear rationale on the conceptual approach as part of responding to initial Working Group comments.
- SLR asked about the level of certainty on the pit lake filling model is and suggested that, if the pit lake were to fill completely, it could have an effect on Aberdeen. Also questioned whether blasting velocities will be addressed, as this relates to slope stability in Aberdeen.
 - BGC identified that the pit lake filling was assessed in the water balance model which shows the pit won't fill completely.
 - SLR indicated that a stochastic model may be better; if monthly data is used, do you get a result that the pit lake may fill?
 - o BGC indicated that it is a monthly model, and that the pit will not fill completely.
- MOE asked for clarification related to the flow path diagrams and to surface water quality.
 - BGC stated that Peterson Creek-Peterson Creek aquifer interactions have been looked at further; a 200 day pumping time was required to see a mixing effect.
 - BGC stated that there is no direct hydraulic connection between the creek and the aquifer.
 - MOE asked if you can see the plug between the Davidson and Peterson aquifer looking at the recharge and discharge predictions.
 - o BGC noted that the particle tracking diagrams should be looked at for this.
- SLR stated that additional sensitivity analysis may be needed to make the case to support the claim of no interaction between Peterson Creek and the Peterson Creek aquifer.
 - BGC explained that the aquifer pumping test was completed after the assessment and showed that the model assumptions (i.e. the hydraulic conductivity) are supported by what is seen in the pumping test. BGC indicated that the model covers it accurately. BGC also considered the stream bed conductance.
- BGC stated that the Aberdeen area is considered to the same degree as was done for the mine site. 48 data points from the area provide the basis for calibration to the Aberdeen area; BGC believes the area was represented accurately.

Ajax Sub-Working Group Meeting: Surface Water, Groundwater, Fish and Fish Habitat

- SSN/GW Solutions stated that the model is at the limits of resolution in key areas; still concerned that a potential impact may be missed, and that if the pit lake model is incorrect, then there could be an impact on Aberdeen.
 - BGC's water balance model may help address these concerns.
 - o SLR noted that the requested response should provide cross sections into Aberdeen.
- BGC indicated that the Edith Lake Fault Zone (ELFZ) is represented as a vertical 50 m fault zone through all bedrock layers.
 - SLR indicated that some additional sensitivity should be considered.
 - \circ $\;$ FLNRO asked why a conductivity factor of 10 for the model was chosen for the ELFZ.
 - BGC stated that a tightening of the "brackets" can occur based on more recent pumping tests, which were not available at the time of study.
 - SSN/GW Solutions stated view that more pumping tests are needed to better understand the behaviour of the groundwater.
 - BGC noted that some projects are characterized without any pumping projects in the EA phase; so BGC feels there is a good characterization between the pit and Jacko Lake. In terms of ELFZ, some additional investigation may be warranted, but monitoring may be a more reasonable approach to look at longer term patterns.
 - ECCC identified this fault zone connectivity with Jacko Lake as one of the key issues. Agreed with SSN that a better understanding of the potential interactions with the ELFZ is required.
 - ECCC asked if the location of the waste rock pile was a result of staying outside of City of Kamloops boundaries?
 - KAM noted that the change in the General Arrangement was based on comments from the community, but also a technical decision based on topography and to optimize the facilities.
 - ECCC reiterated that a good understanding the potential flow of contaminants along the fault is important.
 - FLNRO inquired whether there was a monitoring well at or near the ELFZ and suggested that this could be a potential path forward for resolving this issue. Monitoring wells could be used to verify the model predictions.
 - BCG replied that there is not currently a well as this location, but suggested that the path forward could involve installation of a monitoring well to address these concerns.
 - SLR stated that any additional sensitivity analysis should assume some connection between the lake and fault. Also, SLR identified the east pit fault and requested that KAM address the potential implications of this fault in the effects assessment.
 - BGC stated they can consider these in the sensitivity analyses and suggested that the assumptions are currently quite conservative. Regarding the east pit fault, BGC has not identified any concerns with it, but is preparing a response to that comment.
- ECCC commented that groundwater monitoring will be required at the fault to prove or disprove predictions from the EA and to give enough time to react to any contamination that occurs.
 - EAO suggested that the proposed sensitivity analyses could identify further work as the next step.
 - BGC stated that the primary steps include increasing the hydraulic conductivity of the fault zone to understand what happens to seepage pathways; looking at flow rates and

Ajax Sub-Working Group Meeting: Surface Water, Groundwater, Fish and Fish Habitat

how they may contribute to flux in connectivity; and including monitoring to validate the model predictions.

- FLNRO indicated that BGC's proposed approach forward sounds reasonable, but FLNRO would need to review the details first. FLNRO is still waiting for responses to their comments, but indicated that conceptually, this sounds like a good path forward.
- SSN asked if a similar approach could be applied to Aberdeen.
 - BGC stated that the assessment is robust as far as Aberdeen is concerned from a groundwater perspective.
 - SSN/GW Solutions stated their perspective that monitoring based on a model to see what happens and applying mitigations does not give a good level of confidence.
- SSN/GW Solutions asked about the pit wall geotechnical stability.
 - KAM commented that a lot of effort has been given to assess the slope stability of the pit and there is a high level of confidence that it will be stable over the long term. Monitoring of the slope stability is planned to identify concerns as they arise. Backfilling would also add to this stability over time.
 - SSN concerned about stability and indicated that a notice of work exists for more drilling.
 - KAM noted that the notice of work application clearly states the drilling needed is for the embankment that will be built on Jacko Lake and is not related to the pit wall.
- SLR stated that the potential hydraulic connection between Jacko Lake and the pit requires additional sensitivity analysis and that SLR considers it a critical focus for the assessment.
 - BGC stated that the level of the investigation to date is robust and sufficient for the assessment; additional work may not be as reasonable as monitoring going forward. The existing pit is also a good analogue for what is going on at the site.
 - SLR noted that the existing pit is further away and much shallower so not sure it is actually a good analogue.
 - SSN acknowledged that there have been a lot of studies done but asked if there is a contingency plan if things don't turn out to be as stable as expected.
 - KAM noted there is a contingency plan. As mining happens, the extensive monitoring would trigger changes to the mining rate if any movement is noticed during mining. Also, step outs and benching can be altered to address any movement when mining is happening.

5. Surface Water Update (BGC)

- BGC indicated that approximately 50 of the 60 comments received have been responded to so far.
- Issues focused on cover mitigations; climate change projections; flows in Peterson Creek and geochemical source term updates. Did Working Group members note any other key issues?
 - FLNRO asked if potential water losses are contained within managing flows.
 - SSN asked again about the pit lake filling model sensitivity.
 - MOE asked about Jacko Lake water level fluctuations.
- BGC summarized the work on mitigation model sensitivities.

Ajax Sub-Working Group Meeting: Surface Water, Groundwater, Fish and Fish Habitat

- SLR asked if infiltration prediction include MRSFs and pointed out the infiltrations may be inconsistent.
 - BGC will look at this but also noted that the different elevations should have different infiltration rates.
- BGC noted that climate change comments asked for assessment of additional simulations. BGC used Climate BC to assess a change in temperature by 3 degrees in 2085; precipitation reduced by -3.6mm. Simulations showed evapotranspiration increases; runoff decreases and a later onset of snow accumulations and earlier onset of snowmelt.
 - MOE asked if 3 degree varies from year to year and how this affects the water supply requirements.
 - BGC noted that it does vary and that additional water may be needed but the variability is similar to the variability in the model.
 - Knight Piesold (KP) stated that they would consider applying the variable climate change inputs to the water quality model if requested.
 - FLNRO asked how this would affect water availability.
 - o BGC noted that it may have implications for water availabilities and licencing.
- BGC noted that the pit lake filling model considered a more deterministic model than stochastic; under the base case, the water level is 120 m below the pit crest; under a climate change scenario (less runoff and evaporation increases) it would take longer to reach the maximum fill and the water level would be 30 m lower.
 - FLNRO stated a need to review the model inputs more closely.
 - SLR noted that the negative water balance may be affected by climate change.
 - BGC stated that make up water could increase (15-20% in 2085).
 - Interior Health asked if climate change means more or less water and would the mine affect potential evapotranspiration (PET)?
 - BGC identified that future conditions will increase evapotranspiration; rainfall is expected to be similar to existing conditions.
 - SLR asked how this relates to the timing of project.
 - BGC stated that is somewhere between existing conditions and 2085; the supplied response will include the details specific to the project timeline.
 - MOE noted the concern may be addressed by increasing the temperature incrementally so the operation of the mine is not at the 3 degree extreme. Suggested this issue could be addressed through a more qualitative discussion.

Peterson creek stream flow impacts:

- BGC described a reduction of 9 m³/hour and a predicted reduction of approximately 10 cm in Jacko Lake.
- Mitigation options being discussed include Keynes Creek licences (60,000 m³) stored and pumped into Peterson Creek; Kamloops Lake percentage be pumped into Jacko Lake; Humphrey Creek Licences (more problematic); increase storage in Jacko Lake for dry years; low flow releases from the Peterson Creek downstream pond; acquire existing Peterson Creek licences; and increasing storage in upstream lakes.
 - SLR noted that if water levels in Jacko Lake increase this would need to be translated into the sensitivity analysis for groundwater.

Ajax Sub-Working Group Meeting: Surface Water, Groundwater, Fish and Fish Habitat

- DFO noted that the reduced stream flow is a long-term effect and the mitigations need to be on the same timeframe.
- SSN stated that a mitigation that involves digging the bottom of Jacko Lake is not acceptable to First Nations.
- FLNRO asked what the sources for the increased storage options are.
 - BGC noted that some of the options don't necessarily mean more water; for example flows from Peterson Creek Diversion Pond (PCDP) would be adjusted.
 - FLNRO commented that there will be licencing issues and indicated that more detail will be required to review the options that have been presented.
- FLNRO asked how water draining into the pit will be stopped if the rate is greater than expected.
 - KAM noted that part of operations utilizes horizontal drains (not wells) since the flow is so low; if a structure in the pit wall results in a greater flow, the wall can be grouted if needed.
 - MOE noted that Jacko Lake pumping system would be adjusted and has some flexibility to account for variable seepage.
 - BGC agreed but pointed out the need to consider downstream licences.
- MOE asked how 7Q10 is calculated in a reservoir system.
 - BGC stated this is a challenge but are working on this and the metrics requested by the Working Group will be provided.
- SSN asked how seepage from the lake will be stopped.
 - BGC noted that if monitoring indicates movement, grouting would mitigate the issue.
 - KAM noted that any water entering the pit would not be pumped back into Jacko Lake, but rather would be used for process water.
- FLNRO asked for clarification on the acquisition of licences on Peterson Creek.
 - BGC stated that the idea is to change the potential use of the license from irrigation to ecological flow as needed.

Source term predictions (Lorax)

- Due to time constraints, Lorax provided an abbreviated presentation on updates to the source term predictions.
- Key geochemistry issue is the updating of source terms with new data from continued kinetic testing. Only long term mine rock source terms would be affected by these new data.
- Updated leaching rates are representative of what was presented in the EA. A full update will be provided.
 - SLR asked if this update will incorporate all new data for the tailings and if it is sufficient to characterize the tailings.
 - Lorax stated that the composite sample used for the HHERA accurately represents the tailings.
 - ERM indicated that more details on the inputs to the HHERA will be provided, including commentary on adequacy for model.

Ajax Sub-Working Group Meeting: Surface Water, Groundwater, Fish and Fish Habitat

- MEM clarified that during a review, issues are identified for the permitting phase as a heads up to the proponent. However, there is no indication of where some of the existing waste rock on site is and how it will be incorporated into the proposed facility.
 - KAM noted that some details on the volume of the existing waste rock are lacking but the current plan is to level the waste rock so it can be used as a base for the MRSF.
- SLR asked the Proponent to clearly articulate in their response if/how the geochemical source term predictions have changed and whether this will affect any other assessments in the Application.

6. Water Quality – Knight Piesold (KP)

- KP identified that the surface water quality key issues focus on Category 2 parameters; modelling of dissolved vs. total metals; dust fall solubility and cumulative effects in lower Peterson creek.
 - MOE provided further issues for discussion and response, including:
 - N:P ratios, as these may drive increased periphyton development;
 - critical low flow modelling (7Q10);
 - Potential new water quality site at Long Lake Road, upstream of PC02 in order to focus on mine effects.
 - KP noted that the N:P ratio issue will be addressed in a memo.
 - MOE asked MEM and FLNRO to provide some confidence that the groundwater quality inputs are supported.
 - KP stated that some potential sites may be more focused are under consideration.
- SSN reiterated SSN's request that KAM use effluent from the City of Kamloops wastewater plant as makeup water for the mine. When will that be looked at seriously and has KGHM asked New Gold for results from their study of the question?
 - KAM noted they are continuing to look at the issue to judge the feasibility. KAM stated they have the New Gold study.
- MOE challenged the categorization of the water quality parameters and indicated that they may change, depending on the confidence of the inputs to the model.
 - KP noted they don't expect to see these changes, based on the comments received from MEM and FLNRO to date regarding inputs to the water quality model.
 - MOE noted they will look also at parameters that change the productivity of the system not just parameters that exceed guidelines.
 - o SSN noted that mercury is not on the list.
 - KP responded that the guideline for mercury is low and the results are below detection. Lorax added that mercury concentrations are below the detection limit from the various tests so mercury does not appear to be an issue.
- SSN asked if bioaccumulation was considered.
 - KP identified that this as an aspect of the human health assessment.
- SLR asked if an exceedance is shown in one or more phases, why wouldn't that parameter be carried forward.

Ajax Sub-Working Group Meeting: Surface Water, Groundwater, Fish and Fish Habitat

- KP stated that this would add more parameters that are considered less likely to have an effect.
- KP noted that the variable climate model results in unlikely interactions between seepage and dust fall. A summary and description of the modelled exceedances was given by KP for each of the Category 2 parameters. The lack of frequency provides part of the rationale for not carrying some parameters through.
- Humphrey Creek is not considered fish habitat so exceedances of aquatic life guidelines are not as relevant.
- MEM noted that sensitivity analysis did not look at variation in source terms.
 - Lorax stated the source terms provided were median concentrations.
 - MEM clarified that this would be an exercise to pull out a parameter that may need to be assessed further.
- SSN stated that a water quality index could be used to add value when consider looking at changes in quality over time and recommended looking at this.
 - KP stated that a water quality index was not used, as it is not typically done in an EA.
 - ECCC noted that the categorization is, in effect, an index.
- EAO asked if KP is proposing to move forward more Category 2 parameters.
 - KP responded that this needs to be discussed with KAM and potentially a smaller group (of water quality subject matter experts from the Working Group) to decide if this is required.

ACTION: KP/KAM to discuss an approach for potentially carrying forward Category 2 parameters in the water quality assessment. Discussion to include water quality subject matter experts from the Working Group, as required.

- MOE noted that a number of guidelines are as total metals and it is expected that the receiving environment concentrations be presented as total, not dissolved, concentrations. Concern that the results are under-representing concentrations in the environment.
 - KP noted that all dust fall was assumed to be fully soluble, which is a conservative assumption.
 - MEM agreed that this is a conservative approach.
 - KP added that adding the particulate load results in unrealistic concentrations.
 - MOE noted a concern about the model being too conservative for a number of parameters.
- KP discussed cumulative effects in lower Peterson Creek; the approach includes understanding salt application from the city and other urban inputs.
 - MOE asked if cumulative effects at the mouth of Peterson creek will be modelled. An opinion on the impacts to fish habitat from water quality changes at that location is needed.
 - KP stated this additional modelling is not planned and that the assessment will be discussed qualitatively. Additional monitoring sites have been added in the area (one of which is located at the mouth of Peterson Creek) and there is approximately a year's worth of data from these sites. So far, there seems to be a strong correlation between

Ajax Sub-Working Group Meeting: Surface Water, Groundwater, Fish and Fish Habitat

Peterson Creek Park and the mouth of Peterson Creek. There appear to be some increases in Selenium closer to the mouth.

- MOE stated these data will be useful but there is likely not enough data yet.
- KP noted that understanding the sources for contributions to various parameters is part of addressing what is going on in lower Peterson Creek.
- MOE added there are a number of models that would help describe the flow in lower creek that apply coefficients that have been used in other projects for parameters of concern.
- EAO suggested that KAM could seek input from MOE on a path forward for this issue.
- MOE agreed that a smaller meeting to get resolution would be appropriate.
 ACTION: KP (Proponent) and MOE to coordinate a meeting (with others as necessary) to determine an appropriate approach for addressing the issue of cumulative effects at Lower Peterson Creek.
- SSN asked if a flash flood has been modeled.
 - KP stated the model is monthly and not represented as a flash flood, but this would reduce/dilute water quality concentrations during such a flood event.
- SSN stated that about 900 m downstream of HWY 5 may be a good location for a site; this may be good for a cumulative assessment.
 - KP noted that a monitoring site is in that location but not too much data are available yet.
- SLR asked about water colour guidelines and whether these were considered.
 - KP stated that exceedance in the drinking water guideline was not discussed if the water was not a drinking water source.
- SLR also inquired about KAM's approach for incorporating the 70% mitigation "upset scenario" for dust mitigation in the water quality effects assessment. ERM responded that the reduced dust mitigation scenario of 70% and 80% will be considered a short-term "upset case." The proponent's intention is not to rerun every model as the long term deposition numbers will not change.

7. Groundwater Quality

- SLR asked if the groundwater quality effects were assessed.
 - KP assessed groundwater quality at the nearest down-gradient residential well, RES-2. It was acknowledged that there were some higher concentrations at RES-4, however, RES-2 was considered closest to the area of influence.
 - SLR asked if the Proponent intends to assess the effects to groundwater quality at the property line. Concern that the current assessment doesn't account for the possibility of a future well to be installed somewhere closer to the site than RES-2.
 - BGC noted that the particle tracking lead to the Peterson Creek aquifer which is why the RES-2 location was chosen. The source predictions at the PCDP are available, but concentrations can be modelled at closer locations if required.
 - SLR noted that this is part of the comment already submitted to EAO as part of the review process.

Ajax Sub-Working Group Meeting: Surface Water, Groundwater, Fish and Fish Habitat

8. Fish and Fish Habitat – Knight Piesold

- KP summarized the key issues to date. These include the Kamloops Lake intake, Jacko Lake blasting effects, Peterson Creek habitat loss, harmful alteration, disruption or destruction (HADD) and offsetting.
- Kamloops Lake intake: KP indicated that additional details are now available on the Kamloops Lake intake design. Some excavation will be required on the shoreline below the ordinary low water level for upgrades to the existing pumphouse. A new fish screen will be required on the intake, however, there will be no de-watering needed as commercial divers will be used.
- Blasting effects to fish: KP stated that the assessment of blasting effects is considered robust with respect to fish, as the overpressure criteria for fish protection are easily met.
 - SSN noted that additional concerns of impacts to the spring trout fishery on Peterson Creek include loss of habitat in Jacko Lake. The Aboriginal spring trout fishery is described in SSN's Cultural Heritage Study. KP indicated that there is ongoing work with SSN to address this issue.
 - FLNRO stated that avoiding blasting from 10am to 2pm is not ideal for fishing and not sure how that will be managed. Sub-lethal effects on rainbow trout post blasting such as changes to feeding need to be addressed. Also the lethal effect to hatching chironomids from blasting. KP will provide a technical memo to address these.
 - KAM noted that, during the fishing season, blasting will not occur between 10 am and 2pm. When the lake does need to be cleared, there will be announcements in the media; there will be a buoy or chain marking the cleared area. A detailed management plan is forthcoming and can be provided to the group as soon as it is ready.
 - FLNRO stated that they would like to comment on the recreational fishery management plan, when available for review.
- SLR, regarding the blasting plan, noted that the predicted sound pressure level for blast design is based on predicted averages. SLR asked the Proponent to clarify whether the thresholds considered in the effects assessment were maximum or average.
 - KAM noted that the sound pressure level and vibration criteria are not averages but are thresholds that are not to be exceeded.
 - SLR stated this will need clarification. SLR also requested clarification on the pile driving threshold that was considered in the assessment.
 ACTION: KAM to provide clarification on the vibration thresholds (maximum or average) including the pile driving threshold.
- SSN stated that fish are most sensitive and questioned how fish closest to blasting will be protected.
 - KAM stated that the detailed modified blasting procedure will include reduced amounts of explosives as the open pit advances toward Jacko Lake in order to reduce peak particle velocity and to ensure overpressure levels are below thresholds that have been established to protect fish.

Ajax Sub-Working Group Meeting: Surface Water, Groundwater, Fish and Fish Habitat

- DFO noted that effects to the physical water bodies and both the recreational and Aboriginal fishery are being considered and there is a lot to explore. This will take time and effort to resolve. Additional discussion on this topic is necessary to reduce the potential effects at the EA level.
- SSN added the experience of being outdoors in a natural setting is as important as the actual fishing.
- KAM noted that the experience will be different. The previous mine noted that anglers wanted to be closer to the mine during a blast to watch. Not sure if the experience will be better or worse, but it will be different.
- SLR asked what additional fishing pressure will result because of workers at the site.
 - KAM noted that workers will not be able to access the lake while travelling to and from work but, as residents of the area, some may visit the publicly accessible lake to fish during off work hours.
- SSN noted that the SSN community is interested whether the application includes an assessment of impacts on salmonids in Kamloops Lake and in the mouth of Peterson creek.
- SSN expressed disagreement with KAM's presentation/description of the Aboriginal fishery. SSN especially took issue with the statement that KAM allowed SSN to access Jacko Lake in 2015, as this makes it appear that the Aboriginal fishery only started in 2015, which is not true. There are SSN members who have accessed mine property previously, but are concerned about identifying themselves.
 - KP worked with the information that was provided by SSN and will work with any additional fishery information if available.

Serious Harm and Offsetting

- KAM indicated that they are currently:
 - Assessing potential alternatives to the Peterson Creek diversion system;
 - Re-visiting the description of the northeast arm dam in Jacko Lake (to clarify its necessity) and also assessing alternatives; and
 - Clarifying the design of the Kamloops Lake intake.
- DFO noted that the definition of serious harm should include recreational and aboriginal fisheries.
 - Based on comments received to date, KP/KAM outlined the next steps for addressing the issues, which include working on a revised fish habitat and fishery offsetting plan, which will include a more detailed habitat assessment. The serious harm assessment will be updated. Fish habitat gains associated with the Peterson Creek Downstream Pond will not be considered/counted in the offsetting. Offsetting ratios will be further discussed with DFO. Additional discussion will also occur with regulatory agencies to determine what additional details are required to assess effects to Aboriginal fisheries, as these effects are not currently quantified in the Application.
 - SSN indicated that they had provided a number of comments since March 2015 regarding the inadequacy of the effects assessment to the Aboriginal fishery. This is considered largely due to SSN's view that the assessment should have considered different (e.g. broader, longer) spatial and temporal scales used. SSN reiterated their

Ajax Sub-Working Group Meeting: Surface Water, Groundwater, Fish and Fish Habitat

view that any offsetting will not compensate for the loss of the Aboriginal fishery at Jacko Lake.

Offsetting Plan Update

- KP provided an update on the offsetting plan and indicated that KAM is moving away from the Inks Lake plan because of the lack of support for various reasons including the lack of addressing concerns regarding the Aboriginal fishery. Work is ongoing to identify the best option and the revised offsetting plan will aim to address this.
 - DFO commented that KAM needs to understand that all options to avoid impacts to recreational and Aboriginal fisheries must be considered to have the project move forward in its current form. Other options may need to be considered.
 - KAM indicated that they have aimed to strike a balance between impact avoidance and technical/economic feasibility of the project.
- FLNRO stated they have submitted information requests regarding impacts to salmon.
- SSN asked if there is any data on salmon history in Peterson Creek.
- FLNRO noted that chinook and coho have used lower Peterson Creek at the south Thompson for rearing but not spawning due to lack of suitable habitat.
- FLNRO asked how the Jacko Lake population will continue to seed Peterson Creek downstream considering there will not be fish passage beyond the Peterson Creek Downstream Pond.
 - KP noted that this is a potential impact that there is currently no mitigation for but stocking could be considered if this is thought to be important to sustain a downstream population.
 - FLNRO noted that the risks to the recreational fishery add up to a potential loss of recreational fishing. FLNRO also noted the need for the offsetting plan to be expanded to include options to manage effects to the recreational fishery; also to be able to quantify the effects and adaptively manage, if needed. FLNRO asked what the contingency plan is for managing this potential loss.
 - KP noted that quantifying angler behaviour is a challenge and asked for FLNRO advice and input on ways to best quantify current angler behavior and potential impacts.
 - FLNRO requested that KAM describe actions that would be taken to increase angler days if needed.

Alternatives to Peterson Creek Diversion System

- ERM asked the group for opinions on alternatives to the proposed Peterson Creek diversion system that will pump water from Jacko Lake north of the open pit via buried pipeline to discharge directly upstream of the Peterson Creek Downstream Pond.
- DFO acknowledged the implication of the Peterson Creek diversion on the Aboriginal spring trout fishery and requested that KAM come up with design options to address this impact.
- SSN inquired about the cumulative effects to Peterson Creek and whether the transportation of concentrate to Vancouver was considered.
 - ERM noted that transportation to the port of Vancouver was considered on the level of the GHG, accidents etc.
 - KP summarized that they will be providing more details to quantify the fisheries and if this is insufficient guidance will be requested.

Ajax Sub-Working Group Meeting: Surface Water, Groundwater, Fish and Fish Habitat

- SSN noted that the SSN process includes both western and Aboriginal knowledge (principle of "walking on two legs").
 - KAM requested that SSN provide additional information to support the assessment of effects to the Aboriginal fishery.
 - \circ $\,$ SSN pointed to previous letters and submissions from SSN to KAM that contain this information.

9. Next Steps (EAO)

- ERM commented that the remaining SSN comments (~200) are the priority at the moment; targeting the 15th of April.
- Memos for the WG comments are expected in the next two weeks and on April 15th an additional set of responses will be sent to EAO for distribution to the Working Group.
- The provincial review schedule will adjusted soon to address the current situation (e.g altered timelines).
- EAO noted that Round 2 timelines will be communicated as soon as they are known.
- CEAA noted that the Federal timeline is not advancing as this will be driven by responses to the IRs that have been provided.
- Subsequent small group discussions will be needed to get some resolution on some issues.

10. Action Items

- 1. KP/KAM to discuss an approach for potentially carrying forward Category 2 parameters in the water quality assessment. Discussion to include water quality subject matter experts from the Working Group, as required.
- 2. KP and MOE to coordinate a meeting (with others as necessary) to determine an appropriate approach for addressing the issue of cumulative effects at Lower Peterson Creek.
- 3. KAM to provide clarification on the vibration thresholds (maximum or average) including the pile driving threshold.