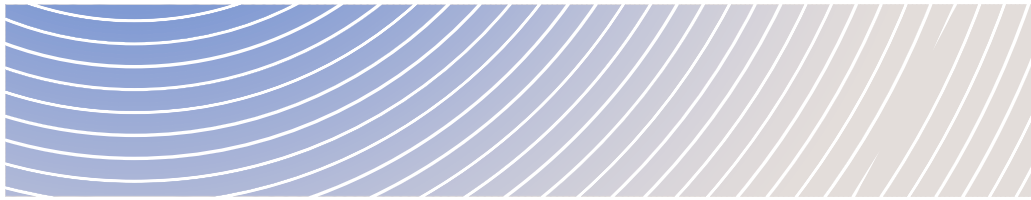


# Lynn Lake Gold Project



TECHNICAL REVIEW INFORMATION REQUESTS – ROUND 3

July 15, 2022

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## List of Acronyms and Short Forms

<b>Acronym or Abbreviation</b>	<b>Definition</b>
Agency	Impact Assessment Agency of Canada
CCME	Canadian Council of Ministers of the Environment
ECCC	Environment and Climate Change Canada
EIS	Environmental Impact Statement
EIS Guidelines	Environmental Impact Statement Guidelines
HHRA	Human Health Risk Assessment
ML	Metal leaching
MRSA	Mine rock storage area
NRCan	Natural Resources Canada
Project	Lynn Lake Gold Project
Proponent	Alamos Gold Inc.
RAA	Regional Assessment Area
RQD	Rock Quality Designation
TMF	Tailings Management Facility
UCLM	Upper confidence limit
VC	Valued component

**Information request format**

Reference IR#	Expert Dept. or Nation	EIS Guidelines Reference	EIS Reference	Context and Rationale	Information Requests
<b>Topic or Valued Component (e.g. Project Overview; Environmental Assessment Methodology; Fish Habitat; etc.)</b>					
Information Request (IR) Round 3: IAAC-R3-XX	Nation or Department Name  e.g. Impact Assessment Agency of Canada	Reference the section(s) of the EIS Guidelines that relate to the comment, concern, or information request.  e.g. Section 7.1.5 Fish and Fish Habitat	Reference the section(s) of the EIS that speaks to the comment, concern, or information request.	Identify what the EIS Guidelines require and/or the link to the <i>Canadian Environmental Assessment Act, 2012</i> (section 5 or section 19).  Briefly identify what the EIS presents and the information gap, inconsistency, or challenge.  Explain why filling that information gap is necessary to understanding potential adverse effects to areas of federal jurisdiction or impacts to rights.	Describe the information required. Focus on the essential information, explanation, or justification required.

Round 3 Information Requests (IAAC-R3-XX):

Reference IR#	Expert Dept. or Nation	EIS Guidelines Reference	EIS Reference	Context and Rationale	Information Requests
<b>Surface Water and Groundwater</b>					
IAAC-R3-01	Natural Resources Canada – Technical Review of Round 2 Information Request Responses	6.1.5 Groundwater and Surface Water	Federal Information Request Responses, Round 2, Packages 1 and 2, Response to IAAC-R2-62	<p>The Environmental Impact Statement (EIS) Guidelines require Alamos Gold Inc. (the Proponent) to provide an appropriate hydrogeologic model for the Lynn Lake Gold Project (the Project) area, which discusses the hydrostratigraphy and groundwater flow systems. The model should include the delineation of key stratigraphic and hydrogeological boundaries and the physical properties of the hydrogeological units. The Proponent is also required to perform a sensitivity analysis to test model sensitivity to climatic variations (e.g. the effects of variation in precipitation has on recharge rates) and hydrogeologic parameters (e.g. hydraulic conductivity).</p> <p>In the EIS, the Proponent indicated that groundwater wells used in the calibration of the groundwater model extended to a maximum total depth of 80 metres for the Gordon site and 30 metres for the MacLellan site. In its response to IAAC-R2-62, the Proponent notes that, despite the fact that hydraulic conductivity tests have not been completed within the deep bedrock unit at the Gordon site or within the lower 100 metres of the deep bedrock unit at the MacLellan site, the gaps in information and the related uncertainty associated with the limited testing of deep bedrock units have been addressed through calibration of the groundwater model.</p> <p>Natural Resources Canada (NRCan) noted that calibration of the groundwater model would not be sufficiently sensitive to the deep bedrock units and potentially the intermediate bedrock units, and that the sensitivity analysis did not address uncertainty regarding the hydraulic conductivity of the lower 90% of the open pit at the MacLellan site and the lower 50% of the open pit at the Gordon site.</p> <p>In its response to IAAC-R2-62, the Proponent noted that packer testing was conducted at the Gordon site to support their conclusions with respect to the hydraulic conductivity of the deep bedrock unit. NRCan noted concerns that, as packer testing has not been completed for the MacLellan site, no hydrostratigraphic information is available for the lower 100 metres of</p>	<ul style="list-style-type: none"> <li>a. Provide a plot showing the site-specific relationship between RQD and hydraulic conductivity for the Gordon and MacLellan sites.</li> <li>b. Using the existing model, provide an updated sensitivity analysis for the MacLellan site in which recharge, intermediate bedrock hydraulic conductivity, and deep bedrock hydraulic conductivity are adjusted. Should an upper limit on recharge limit the calibration of the model, present site-specific evidence for the recharge limit.               <ul style="list-style-type: none"> <li>i. If needed, revise the effects assessment for all relevant VCs to account for the results of the sensitivity analysis.</li> </ul> </li> </ul>

				<p>bedrock. The results of the sensitivity analysis presented in response to IAAC-R2-62 demonstrate that the groundwater assessment for the MacLellan site is sensitive to the hydraulic conductivity assigned to the intermediate and deep bedrock units within the numerical model, which is represented as Rock Quality Designation (RQD). As the model is sensitive to the parameterization of these units and no data is available, further information regarding the site-specific relationship between RQD and hydraulic conductivity is required to address the uncertainty within the model and provide confidence in the quantity of groundwater that would be intercepted by the open pit, the extent of drawdown associated with open pit dewatering, and the direction, timing, and quantity of seepage from the mine rock storage areas (MRSAs) at the Gordon and MacLellan sites. Further, although increasing the hydraulic conductivity of the lower bedrock unit has a negative effect on the calibration of the model, as noted in the Proponent’s response to IAAC-R2-62, improved calibration may be achieved with adjustment of the recharge parameterization. To reduce uncertainty in the assessment of effects to groundwater for the MacLellan site, an updated sensitivity analysis in which recharge, intermediate bedrock hydraulic conductivity, and deep bedrock hydraulic conductivity are adjusted is required.</p> <p>This information is required to support the Impact Assessment Agency of Canada’s (Agency) understanding of potential Project effects to fish and fish habitat, Indigenous Peoples, and other valued components (VCs) that may be affected by changes in groundwater and, through groundwater-surface water interactions, surface water quality and quantity.</p>	
IAAC-R3-02	Environmental and Climate Change Canada – Technical Review of Round 2 Information Request Responses	6.2.2 Changes to groundwater and surface water	Federal Information Request Responses, Round 2, Packages 1 and 2, Response to IAAC-R2-18	<p>The EIS Guidelines require the Proponent to predict changes to surface water quality and quantity associated with the Project.</p> <p>In its response to IAAC-R2-18, the Proponent stated that discharge loadings from the Sewage Treatment Plant are expected to meet federal and provincial effluent criteria. Environment and Climate Change Canada (ECCC) noted that some contaminants that may be present in effluents (e.g. phosphorus, coliforms) are not regulated under existing federal regulations. Additional information regarding discharge loadings is required to demonstrate that treatment of wastewater in the Sewage Treatment Plant will render effluent loadings negligible and will not affect aquatic productivity in the receiving environment, including the Keewatin River.</p>	<ol style="list-style-type: none"> <li>a. Provide the Sewage Treatment Plant intended effluent target levels for total suspended solids, biological oxygen demand, ammonia, phosphorus, and coliforms, if available.</li> <li>b. Provide an estimate of the environmental loadings in effluents from the Sewage Treatment Plant during each Project phase and describe changes to productivity that may occur in the receiving environment due to effluent discharges.</li> <li>c. If discharges, environmental loadings, and changes in productivity did not inform the effects assessment, revise the effects assessments for all relevant VCs to include this information.</li> </ol>

				<p>This information is required to support the Agency’s understanding of potential effects to fish and fish habitat, Indigenous Peoples, and other VCs that may be affected by changes to surface water quality.</p>	
IAAC-R3-03	<p>Environment and Climate Change Canada – Technical Review of Round 2 Information Request Responses</p>	<p>6.2.2 Changes to groundwater and surface water</p>	<p>Federal Information Request Responses, Round 2, Packages 1 and 2, Response to IAAC-R2-26, IAAC-R2-28, and IAAC-R2-30</p>	<p>The EIS Guidelines require the Proponent to describe potential effects to surface water and groundwater as a result of the Project, including changes to surface water and groundwater quality.</p> <p>In its response to IAAC-R2-30, the Proponent discussed fertilizer amendments as a potential pit lake treatment option for the removal of contaminants from surface water, should monitoring indicate that surface water quality in the pit lakes during the decommissioning/closure and post closure phases is not adequate for release to the surrounding environment. ECCC noted that it is unclear whether fertilizer amendments could potentially contribute to increased concentrations and loadings of nutrients in nearby waterbodies, which may contribute to eutrophication.</p> <p>In its response to IAAC-R2-26, the Proponent stated that the screening criteria for parameters of potential concern was applied to predicted water quality concentrations in receiving waterbodies at the Gordon and MacLellan sites as whole waterbody concentrations. ECCC noted that the Canadian Council of Ministers of the Environment (CCME) refers to total phosphorus within its guidance framework for the measurement of phosphorus in surface water and specifies total phosphorus threshold ranges based on the baseline trophic status of waterbodies. ECCC noted that it is unclear whether the potential effects (e.g. trophic status changes, eutrophication, oxygen depletion) of increased phosphorus loadings as a result of the Project were taken into consideration in the effects assessment.</p> <p>This information is required to support the Agency’s understanding of potential effects to fish and fish habitat, migratory birds, Indigenous Peoples, and other VCs that may be affected by changes to surface water quality.</p>	<p>a. Clarify if the use of fertilizer amendments as a pit lake treatment option could potentially result in elevated nutrient levels or loadings in surface water in the pit lakes that would potentially be released to the surrounding environment and identify all other potential sources of phosphorus loadings associated with the Project.</p> <p>b. Describe the baseline trophic status of waterbodies that may receive Project effluents or that may experience increased phosphorus loadings as a result of the Project and describe how the Project may affect these waterbodies (e.g. trophic status changes, eutrophication, oxygen depletion), including consideration of total phosphorus concentrations and loadings.</p> <p>i. If potential increases in nutrient levels and environmental loadings associated with the use of fertilizer amendments and other Project-related phosphorus sources were not taken into account in the effects assessment for the Project, revise the effects assessment for surface water quality and any related VCs to account for potential effects.</p>
IAAC-R3-04	<p>Environment and Climate Change Canada – Technical Review of Round 2 Information</p>	<p>3.2 Project activities</p> <p>6.2 Predicted changes to the physical environment</p>	<p>Volume 1, Chapter 8, Maps 8-26 and 8-29</p> <p>Federal Information Request</p>	<p>The EIS Guidelines require the Proponent to describe potential effects to surface water and groundwater as a result of the Project, including changes to surface water and groundwater quality.</p> <p>In its response to IAAC-R2-12 and IAAC-R2-75, the Proponent stated that seepage from the ore stockpiles, MRSAs, Tailings Management Facility (TMF), and other Project infrastructure would be captured by seepage collection ditches and contact water collection ponds or through open pit dewatering</p>	<p>a. Clarify if removal of the ore stockpiles would result in residual contamination, including mineralized materials, at the Gordon and MacLellan sites after operation and how the presence of these contaminants may affect groundwater quality, surface water quality, and related VCs.</p> <p>i. If these effects were not considered in the effects assessments for VCs, revise all relevant</p>

	Request Responses	6.2.2 Changes to groundwater and surface water	Responses, Round 2, Packages 1 and 2, Response to IAAC-R2-12, IAAC-R2-27, and IAAC-R2-75	<p>during operation, and would be collected in the pit lakes during decommissioning/closure and post-closure. ECCC noted concerns that, once dewatering and seepage collection is halted at the end of operation, particle tracking has shown that contaminants from source areas may lead to several waterbodies, including Farley Lake and Minton Lake at the Gordon and MacLellan sites, respectively. Depending on local recharge rates, the local hydrogeological context, and whether the sources of contamination remain present upon closure of the Project, dilution estimates may have been overestimated, which may result in exceedances of surface water quality guidelines. It is unclear how contamination of groundwater will be prevented once dewatering of the open pit and seepage collection ceases.</p> <p>The Proponent stated that during closure of the mine, once ore stockpiles are depleted, ore stockpile areas would be rehabilitated to eliminate sources of contamination. It is not clear what methods of rehabilitation would be used for the ore stockpiles.</p> <p>This information is required to support the Agency’s understanding of potential effects to fish and fish habitat, migratory birds, and other VCs that may be affected by changes to surface water quality.</p>	<p>effects assessments to account for the potential effects described in a).</p> <p>b. Describe how groundwater contamination from Project infrastructure, including the ore stockpiles, MRSAs, and TMF, and the subsequent transport and discharge of groundwater contaminants to surface waterbodies will be mitigated or prevented during decommissioning/closure and post-closure. Ensure the results of the updated sensitivity analysis referenced in IAAC-R3-01 is considered.</p> <p>c. Describe the approach planned for rehabilitation of the ore stockpiles after the ore is depleted.</p>
IAAC-R3-05	Environment and Climate Change Canada – Technical Review of Round 2 Information	6.6.2 Effects of the environment on the Project	<p>Volume 3, Chapter 20, Table 20A-1</p> <p>Volume 3, 21.4.1.2 Potential Effects of the Environment</p> <p>Federal Information Request Responses, Round 2, Packages 1 and 2, Response to IAAC-R2-71</p>	<p>The EIS Guidelines require the Proponent to document the assumptions that underlie any models used, the quality of the data, and the degree of certainty of the predictions obtained. The Proponent is also required to describe the baseline conditions for surface water, including hydrological regimes.</p> <p>In the EIS, the Proponent noted that the TMF would be 75% capped following operation, leaving a standing pond in the remaining area. ECCC noted that it is unclear whether a standing pond is necessary to maintain anoxic conditions in the tailings (i.e. prevent acid rock drainage and metal leaching) and to prevent wind erosion of tailings and dispersal of contaminants during the decommissioning/closure and post-closure phases. In the EIS, the Proponent acknowledged that, under climate change scenarios, summer precipitation would likely be reduced, temperatures may increase, and the risk of drought in the Regional Assessment Area (RAA) may become more extreme. ECCC noted concerns that, should a standing pond be required to maintain the safety of the TMF, the effects of climate change on temperature and precipitation patterns in the RAA may increase the risk of adverse effects to the environment from the TMF in the decommissioning/closure and post-closure phases if this pond cannot be maintained.</p>	<p>a. Clarify whether a standing pond in the TMF is required to maintain anoxic conditions in the tailings and/or prevent dry tailings during the decommissioning/closure and post-closure phases.</p> <p>b. Describe any potential risks or adverse effects to VCs that may occur should maintenance of a standing pond not be possible.</p> <p>c. Describe how drier summer months and increased evaporation from climate change would affect the water balance model compared to the assumption of a uniform distribution of precipitation. Describe how this may contribute to effects to VCs discussed in part b.</p> <p>i. If the precipitation and evaporation inputs used in the water balance model may contribute to uncertainty with respect to the vulnerability of the TMF to climate change:</p> <p>a. reassess the closure phase water balance for the TMF; and</p>



				<p>In its response to IAAC-R2-71, the Proponent indicated that the water balance model for the Project assumed a uniform distribution of precipitation over a consecutive 25 year period under three scenarios (i.e. dry, average, and wet), and the results were assessed against current baseline conditions. The reference period for the monthly mean values was from 1980 to 2010. ECCC indicated that the assumption of constant precipitation distribution and the prorating of each month to obtain the wet and dry scenarios precluded consideration of short-term droughts, which could result in deviations from the reference period. Further, ECCC noted that the evaporation estimates used in the model are from 2002 and are therefore likely outdated and do not account for increased temperatures associated with climate change in future years during the Project’s expected operation and decommissioning/closure phases. Additional information is required to determine the validity of the outcomes of the water balance model and to understand the risks that may be posed by the TMF in the decommissioning/closure and post-closure phases if a standing pond cannot be naturally maintained.</p> <p>This information is required to support the Agency’s understanding of potential Project effects to fish and fish habitat, Indigenous Peoples, and other VCs that may be affected by changes to surface water quality and air quality.</p>	<p>b. discuss the new risk of dry tailings in the decommissioning/closure phase given the new water balance data.</p>
<b>Fish &amp; Fish Habitat</b>					
IAAC-R3-06	Environment and Climate Change Canada – Technical Review of Round 2 Information Request Responses	6.3.1 Fish and fish habitat  8.0 Follow-up and Monitoring Programs	Federal Information Request Responses, Round 2, Packages 1 and 2, Response to IAAC-R2-04	<p>The EIS Guidelines require the Proponent to describe changes to groundwater, surface water, and fish and fish habitat as a result of the Project, and, where there is uncertainty about effects outcomes, the Proponent is required to describe the follow-up and monitoring program that will be implemented and adaptive management measures that will be applied.</p> <p>In its response to IAAC-R2-04, the Proponent indicated that the Aquatics Effects Monitoring Plan for the Project would include monitoring of mercury concentrations in fish tissues. The threshold that would be used to indicate when adaptive management measures are required was defined as: concentrations in the exposure area that are greater than 0.5 milligrams/kilogram wet weight mercury (i.e. equivalent to the <i>Manitoba Water Quality Standards, Objectives, and Guidelines Regulation</i> tissue residue</p>	<p>a. Provide a rationale to support the proposed fish tissue mercury concentration threshold selected, including how the proposed threshold would provide an early indication of Project-related effects to fish and Indigenous Peoples.</p> <p>b. If baseline fish tissue mercury concentrations are not comparable to reference area levels, consider defining the threshold using comparisons to baseline levels and use detection of upward trends in mercury concentrations to trigger adaptive management measures.</p>

				<p>guideline for human consumption) and statistically higher than mercury concentrations in fish tissue in the reference area.</p> <p>ECCC noted concerns that the proposed fish tissue concentration threshold of greater than 0.5 milligrams/kilogram total mercury is 15 times higher than the methylmercury tissue residue guideline established by the CCME and no rationale was provided to support the proposed threshold. It is unclear whether the proposed mercury concentration threshold selected would provide an early indication of Project-related effects to fish and Indigenous Peoples from mercury exposure.</p> <p>This information is required to support the Agency’s understanding of potential effects to fish and fish habitat and Indigenous Peoples, including current use and Indigenous health conditions.</p>	
<b>Cumulative Effects</b>					
IAAC - R3-07	Health Canada – Technical Review of Round 2 Information Request Responses	<p>4.2.2 Community Knowledge and Aboriginal Traditional Knowledge</p> <p>6.2.1 Changes to the atmospheric environment</p> <p>6.2.3 Changes to riparian, wetland, and terrestrial environments</p> <p>6.3.4 Indigenous peoples</p> <p>6.6.3 Cumulative Effects Assessment</p>	<p>4.3.2.1 Spatial Boundaries</p> <p>4.3.2.2 Temporal Boundaries</p> <p>7.4.1.1 Analytical Assessment Techniques</p> <p>Federal Information Request Responses, Round 2, Packages 1 and 2, Response to IAAC-R2-51 and IAAC-R2-86</p>	<p>The EIS Guidelines require the Proponent to identify and justify the spatial and temporal boundaries for the cumulative effects assessment for each VC selected, and to describe potential Project effects to the atmospheric environment, including noise levels, riparian, wetland, and terrestrial environments, and how changes to the environment caused by the Project will affect Indigenous Peoples.</p> <p>In its response to IAAC-R2-51, the Proponent indicated that the 95% upper confidence limit (UCLM) prediction for dustfall and metal accumulation in soil within the Local Assessment Areas (LAA) was used to assess potential risks of direct exposure via soil and country foods in the cumulative effects assessment. However, as noted in the Proponent’s response to IAAC-R2-86, the baseline dustfall rate used in the Human Health Risk Assessment (HHRA) was a mean calculated from the 2016 sampling dataset as opposed to the 95% UCLM. Health Canada noted concerns that the use of mean dustfall rates in the HHRA may not be protective of human health at receptor locations.</p> <p>This information is required to support the Agency’s understanding of potential effects to Indigenous Peoples and other VCs that may be affected by changes to the atmospheric, riparian, wetland, and terrestrial environments.</p>	<p>a. Clarify whether the prediction of dustfall and metal accumulation in soil within the LAAs was based on the 95% UCLM or mean values based on baseline sampling for both the HHRA and the cumulative effects assessment.</p> <ul style="list-style-type: none"> <li>i. If the values used are different, provide a rationale for the approach used.</li> <li>ii. Discuss whether the values used are protective of human receptors, including Indigenous Peoples, under current and future use scenarios.</li> <li>iii. If values used are not protective of human receptors, provide a revised assessment for Indigenous health conditions and other relevant VCs using the most conservative value.</li> </ul>