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## HAMMOND REEF GOLD PROJECT RESPONSE TO COMMENTS ON FINAL EIS/EA

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### COMMENT – T-45

**Source:** Canadian Environmental Assessment Agency

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#### Summary of Comment

The Proponent identifies a number of key water quality model limitations including changes to site conditions and the ability to accurately forecast operational conditions due to the dynamic nature of developments and potential short-term changes.

The information needed will help to bound potential effects should an unanticipated increase in contamination occur and ensure appropriate mitigation measures are implemented.

#### Proposed Action

Clarify the following:

- the use of natural runoff freshet values collected in 2012 or earlier from land that was naturally vegetated and only potentially impacted by exploration activities will be representative of operational conditions for a bare soil (non-vegetated) stockpile that could possibly be a source of increased suspended solids and metal leaching;
- the composition of groundwater in the vicinity of the open pits could be influenced by changes to groundwater quality caused by possible interactions with the waste rock stockpile, low-grade ore stockpile, overburden stockpile, process plant control pond, and intermediate collection pond;
- the composition of site facility runoff could be influenced by metals, ammonia (explosives), fuels and other potential contaminants.
- the suitability of assigning natural runoff quality to the remediated and revegetated TMF.
- Perform Sensitivity analyses on the water quality modeling results. By assuming an order of magnitude increase in contamination (i.e. one order of magnitude increase above what is indicated by geochemical testing).

#### Reference to EIS

Hammond Reef Gold Project Site Water Quality TSD S 4.0 Water Quality Model.

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#### Response

Comment: *The use of natural runoff freshet values collected in 2012 or earlier from land that was naturally vegetated and only potentially impacted by exploration activities will be representative of operational conditions for a bare soil (non-vegetated) stockpile that could possibly be a source of increased suspended solids and metal leaching.*

Response: Natural runoff quality was assigned to the overburden stockpile. Given that the geochemical characteristics of the overburden are similar to existing near surface rock and soils, it is expected that the resulting runoff will also have similar characteristics.

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In terms of increased suspended solids, it is noted in Table 8-2 of the Final EIS/EA Report that stockpiled soils will be protected against erosion and erosion protection measures will be modified through adaptive management if soil erosion significantly undermines water quality from the stockpiles. It is also expected that vegetation of the bare soil stockpile will naturally occur within a short period of time further reducing the erosion potential. Lastly, all runoff from the overburden stockpile will be captured with the site water management system and, if discharged, will comply with Total Suspended Solids (TSS) release water guidelines. Runoff will be monitored during operations and at closure to verify prediction and adjust predictions if necessary. An allowance for treatment has been included should the monitoring data differ from the predicted values.

Runoff from the WRMF, ore stockpile and unremediated TMF were assigned runoff water quality based on the geochemical analysis of these source terms.

*Comment: The composition of groundwater in the vicinity of the open pits could be influenced by changes to groundwater quality caused by possible interactions with the waste rock stockpile, low-grade ore stockpile, overburden stockpile, process plant control pond, and intermediate collection pond.*

Response: All water (excluding expected evaporation) interacting with waste rock, overburden, stockpiles and process water ponds are assigned a metal concentration based on the geochemical data available as described in the Geochemistry, Geology and Soils TSD and Site Water Quality TSD. This water is assumed by the water quality assessment to be fully captured within the site water management system.

All water that enters the mine pit during operations will be captured and conveyed to the site water management system. At closure, water interacting with waste rock, overburden, stockpiles and process water ponds is tracked (independent of the pathway) and are added to the pit water inventory, thus are captured in the assessment.

*Comment: The composition of site facility runoff could be influenced by metals, ammonia (explosives), fuels and other potential contaminants.*

Response: As noted in Section 4.2.1 of the Site Water Quality TSD, it has been assumed that Canadian Malartic Corporation's operating policies and Environmental Management Plan (EMP) will limit and contain fuel of chemical spills, such that runoff from site facilities will not become contaminated. Nitrate and ammonia (explosives) are considered in the assessment as described in Section 4.2.3 of the Site Water Quality TSD.

*Comment: The suitability of assigning natural runoff quality to the remediated and re-vegetated TMF.*

Response: The surface of the TMF is non-acid generating with limited potential for metal leaching. The tailings will be vegetated at closure and runoff is expected to be of similar water quality as natural runoff given the expected geochemical conditions of the tailings.

Natural runoff water quality was only applied to the TMF surface post closure and the runoff is only accounted for in the pit flooding model for a period of three years following closure. After which, the TMF flows will be routed to Sawbill Bay (see memorandum entitled 'Revised Pit Flooding Model' in the Version 2 Conceptual Closure and Rehabilitation Plan)

*Comment: Perform Sensitivity analyses on the water quality modeling results. By assuming an order of magnitude increase in contamination (i.e. one order of magnitude increase above what is indicated by geochemical testing).*

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Response: Sensitivity in relation to flows and water quality is provided in both the Site Water Quality TSD (Section 4.3) and the Lake Water Quality TSD (Section 4.2 and 4.3.2). In these cases a range of flow conditions is provided and an “average” case and “upper bound” case water quality is provided (using 75<sup>th</sup> percentile values for chemistry inputs).

It is considered that the sensitivity model runs as provided are appropriate since they are based on measured and modelled data developed following standard procedures such as those provided in MEND 2009 and GARD, 2012. During the detailed design stage additional information collected will be used to develop a more robust modelling evaluation to refine and optimize the design of the seepage collection system.

It is the intent of Canadian Malartic Corporation to work with the design engineers and the applicable regulatory agencies to ensure that future data collection and the development of predictive models will meet both the requirements of engineering design and needs of the agencies with respect to permitting requirements.