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

COMMENT – T-48

Source: Canadian Environmental Assessment Agency

Summary of Comment

The Proponent's conclusions that there will be no exceedances of criteria for any parameters in seepage, based on the seepage quality modelling does not appear align with real-world observations at many other mine sites where seepage has higher levels of contamination than surface waters that are in contact with tailings/waste rock. There are questions about the Proponent's modelling and conclusions by virtue of the exceedances for various metals in the shake flask leach tests of waste rock and tailings, and tailings water aging tests. Usage of the steady state humidity cell test results ignores these earlier pulses of metal leaching (these metals can remain mobile) and would underestimate seepage concentrations in the field.

This information will be necessary to have a clear understanding of what the effects of seepage will be on water quality in the receiving environment.

Proposed Action

Provide updated water quality modelling for seepage that uses more conservative inputs that reflect the effect of longer contact times between water and the tailings/waste rock mass.

Reference to EIS

Site Water Quality TSD, Section 4.3.2 – Site facilities and Seepage

Response

There will undoubtedly be differences in 'real-world' observations relative to values available from laboratory testing, however the differences are dependent on many factors, and examples in recent history of real- world sites have shown values that are often lower than laboratory predictions due to chemical reactions and mineral precipitation. In the past, prior to the government implementing standard approaches to geochemical evaluation, proponents did not evaluate or understand the potential for acid mine drainage. Over the last few decades, substantial research has been undertaken to better understand this phenomenon and standard approaches to laboratory testing and prediction have been developed (Price 1997; MEND 2009 and INAP 2012).

Concentrations used in the water quality predictions were developed based on standard industry approaches as outlined in Price (1997); MEND (2009) and INAP (2012), and are consistent with requirements under Ontario Closure Regulations (O.Reg 240/00 of the Ontario *Mining Act*) which indicates that the Price (1997) guidance document or subsequent updates are to be used.

There are many factors which govern precipitation or dissolution of chemical parameters; simply allowing longer contact time between water and tailings/waste rock often results in reduction in observed chemical concentrations due to adsorption and/or precipitation of chemical elements, as can be observed in age test results for some parameters, and in humidity cell tests (although flushing may also reduce concentrations in humidity cell tests).

Substantial effort has gone into developing the standard approaches as outlined in the guidance documents referenced, and as used in estimating the geochemistry, and water quality inputs for the Hammond Reef Project.

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The values used as described in the Geochemistry, Geology and Soil TSD; and the Site Water Quality TSD are considered reasonable and appropriate for the purposes of Final EIS/EA Report.

The water quality assessment considered sensitivity in relation to flows and water quality as provided in both the Site Water Quality TSD (Section 4.3) and the Lake Water Quality TSD (Section 4.2 and 4.3.2). The sensitivity analysis considered a range of flow conditions ranging from 100-year dry to 100-year wet and "average" case and "upper bound" water quality scenarios (using 75th 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 operations monitoring of both geochemical characteristics of the materials mined, and water quality will be undertaken. Although not expected to be necessary, based on the results of this monitoring adaptive management measured can be implemented if necessary, and may include additional seepage collection measures and/or supplemental treatment.