

EA-SnapLake

From: DahlJ@DFO-MPO.GC.CA
Sent: Wednesday, April 23, 2003 4:25 PM
To: robin.johnstone@ca.debeersgroup.com
Cc: EA-SnapLake
Subject: questions regarding Cr...

Robin,

Based on a review of our notes from last week's meeting on metals in the mine water discharge and the teleconference with you and Mark Diegel, we have identified a number of areas where there appears to be conflicting information and general confusion as to the concentrations of metals under various scenarios. I will attempt to present our current understanding with respect to Cr and areas where clarification is needed.

At the April 10 meeting, Tom Higgs described the treatment test program and the expected forms of metals in the mine discharge. Tom stated that the minewater contained particulate forms of metals that required filtration for removal, and that essentially all of the Cr present is in the solid form plus "very little dissolved metals". The use of coagulants was proposed as mitigation to facilitate the removal of the particulates, as necessary. Tom was not concerned with dissolved metals and was confident that the metals were in the colloidal (solid) form that could be precipitated. These statements appear to be in contrast to those of Mark Diegel as well as the EAR. Mark described that the "treatment" would remove a proportion of the solids fraction but that the dissolved fraction would pass through; the "dissolved" fraction being comprised of truly dissolved + colloidal material too small to filter. The EAR gives a Cr concentration predicted for the discharge of 7.46ug/L. Mark explained that this value is the "total" which = dissolved + colloidal + particulate. Mark also explained that the 4.6ug/L value in Table 12 of the Feb. Tech. Memo. represents the "dissolved only" fraction. A lot of our confusion stems from the inconsistent use of terminology. For example, in the Feb. 13 memo on Water Treatment Process Development, it states that the Cr and Cu in the untreated minewater is finely dispersed colloidal form, but later in the document it refers to the minewater having elevated concentrations of metals in the particulate form. The document continues to state that further reductions in the dissolved form of Cu and Cr would be required to meet Ambient Water Quality Guidelines - if the metals are present as colloidal form and particulate forms, where does the dissolved form come into the picture?

Could you please clarify the following:

- 1) do total metal concentrations = particulate + colloidal + dissolved forms? And when "dissolved" is referred to is this understood to be "truly" dissolved or truly dissolved + unfilterable colloids?
- 2) what is the predicted concentration of Cr in the minewater reporting to the treatment plant and what are the proportions of Cr⁺³ vs. Cr⁺⁶ in the feed water?
- 3) does the predicted value of 7.46ug/L Cr (EAR value) represent the concentration in the discharge water with or without removal of the particulate fraction (passive removal with TSS removal)? If it is without removal via TSS removal, then one would assume the concentration in the minewater feed to be equal to the discharge.
- 4) if 7.46ug/L is the predicted discharge concentration for Cr after passive removal with TSS, what does the 4.6ug/L value represent? Is it that portion of the 7.46 that is truly dissolved? Does the difference of 2.9ug/L therefore represent the colloidal form that is counted with the dissolved fraction? And what are the proportions of Cr⁺³ vs. Cr⁺⁶ in the discharge?
- 4) if the total Cr concentration in the discharge is 4.6 ug/L and this has a colloidal fraction in it, can this fraction be removed via the "optional" coagulation, precipitation and filtration process? If so, what would be the final concentration and proportions of Cr in the discharge?
- 5) what were the Cr and other metal concentrations when the various treatment options were tested that lead to the conclusion that because there was no apparent reduction with the more involved processes, that the lower cost option was chosen?

Please provide the above information as we are finding it impossible to determine whether or not Cr is still a concern for us.

Julie Dahl

(867)669-4911 | facsimile/ télécopieur (867) 669-4940

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dahlj@dfo-mpo.gc.ca

Area Chief, Habitat | Chef de Secteur, Habitat

Fish Habitat Management, Western Arctic Area | Gestion de l'Habitat du Poisson, Secteur de l'Arctique de l'Ouest

Central and Arctic Region | Région du Centre et de l'Arctique

Fisheries and Oceans Canada | 101-5204 50th Ave, Yellowknife, NT, X1A 1E2

Pêches et Océans Canada | 101-5204 50^e Ave, Yellowknife, T.N.-O, X1A 1E2

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