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From: Rhoads, Kate

Sent: Friday, July 28, 2000 3:11 PM

To: Whiting, Kelly

Subject:

Below are my notes on copper and the need for further treatment of the POS runway runoff. They are not very conclusive based on the information that I have. Let me know if you need clarification - I wrote them down quickly and they may not be understandable. Kate

<<POS-Cu.doc>>

POS-Cu.doc	**Name:** POS-Cu.doc **Type:** Winword File (application/msword) **Encoding:** base64 **Description:** POS-Cu.doc

Comments on the Copper levels from SEATAC runways

- Copper levels seem high (based on Table 4-8) - I think that they would exceed the numeric surface water standard, but it is impossible to tell with the data presented. The data presented is total recoverable (TR) Cu and the standard is based on the dissolved fraction. Based on the TSS levels for the runways, I expect that most of the Cu is in the dissolved form. Hardness levels are not presented and are needed to determine toxicity. Assuming a hardness of 100, the acute toxicity standard for Cu is 15ug/l. The runway data presented has a median TR Cu concentration of 37 ug/l. I should also note that and excedance of the acute toxicity standard does not necessarily result in a fish kill, but there could be long term chronic effects. Also, the toxicity standard is an in-stream standard and (I think) the STIA data is stormwater runoff from the runways, prior to discharge to the creek.

  The comparisons in Table 4-8 show TR Cu concentrations within the same range of the runways. The TSS concentrations from these comparisons (NUPR, freeway, etc) are much higher than from the runways. Because of this, I would assume that the dissolved Cu fractions from the comparison data would be much less than the runway. Therefore, the dissolve fraction of Cu is probably higher for the runways and more of a toxicity issue than the comparison stormwater.

- Per the STIA NPDES permit, WET (Whole Effluent Toxicity) tests were performed at various outfalls. I have not seen the specific wording in the NPDES permit, but based on the requirements of 173-205 WAC Whole Effluent Toxicity Testing and Limits, the test species is not specified. The WET testing was done using daphnia, which is a common invertebrate in this area, and Flathead minnows. The NPDES permit may have specified these test species, or the port may have chosen them. Standard methods for toxicity tests lists prime considerations for the selection of species - including their recreational, economic, and ecological importance and relevance to the purpose of the study. I think that a more appropriate test fish species would have been a salmonid. Since the metal of concern is copper and copper is more toxic to salmonids than other fish species, and the receiving water is habitat for salmon, that would have been a more appropriate test specimen.

  Two WET tests were performed for the runway areas using flathead minnows - these tests had 95 and 98% survival rates. The dissolved Cu concentrations in the stormwater used for the WET test were 13ug/l, which is below the surface water toxicity standard of 15ug/l (as discussed above), and therefore low mortality would be expected. This is also lower than the reported median total recoverable concentration of 37ug/l in table 4-8. This makes me wonder two things: 1)were the WET tests performed with stormwater of typical Cu concentrations?, and if the WET test was performed using a more appropriate species with stormwater more in line with Cu concentrations identified in Table 4-8, would there be a toxicity problem?

- In conclusion, it is difficult to tell if additional stormwater treatment would be recommended for additional metals removal. I think that it might not be necessary, but I would be more comfortable making that conclusion based on better data.