

## MEMORANDUM

To: Linda Logan

December 8, 1998

From: Justin Kophs JK

55-2912-01 (61)

Re: Development of a site-specific copper translator for the Port of Seattle

The purpose of this memorandum is to summarize the options available for developing a site-specific metals translator. In developing a translator, WDOE recommends conducting a dissolved/total recoverable metal partitioning study that incorporates seasonal variation. Mark Hicks at Ecology, the primary contact for the Washington State Water Quality Standards Manual (WAC 173-201A), could not provide much information on site-specific translators and is not aware of any studies that have been conducted in the state. He also mentioned that there would be an intensive review process of the first site-specific translator proposed in Washington State.

We have obtained two documents outlining a translator study: 1) Prothro (1993), attachment B from the *Water Quality Standards Handbook*, and 2) *The Metals Translator: Guidance For Calculating A Total Recoverable Permit Limit From A Dissolved Criterion (1996) (EPA 823-B-96-007)*.

To conduct a partitioning study, total recoverable and dissolved metal samples need to be collected over time. In Prothro, the EPA recommends at least four pairs of total recoverable and dissolved metal measurements be made during low flow conditions or 20 pairs over all flow conditions. The EPA also suggests that the average of data collected during low flow or the upper 95<sup>th</sup> percentile for all flows be used.

Another approach to developing a site-specific translator is discussed in both Prothro and The EPA Metals Translator document. Using historical data on TSS and  $K_d$  values from the *Technical Guidance Manual for Performing WLA's (1984) (EPA-440/4-84-020)* a translator can be estimated from an equation. Site-specific translators based on this equation generally over-estimate the dissolved fraction, but the bias in estimate is likely to be conservative; this translator is likely to be closer to 1.0 than the translator using the first approach.

The EPA Metals Translator document recommends collecting dissolved/total recoverable metal samples at low flows with a minimum of 10 samples instead of four. The same approach as Prothro should be used for samples collected at all flows. EPA recommends weekly or biweekly sampling during specified flow conditions and biweekly or monthly sampling when developing a translator for a range of flow conditions.

The EPA Metals Translator document also outlines a laboratory study, similar to conducting a WER, for determining a translator. Effluent and ambient receiving water (upstream) samples are collected and mixed according to a dilution factor to simulate downstream water. The mixed waters are analyzed for dissolved and total recoverable metal. In this procedure, mixing must

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occur as soon as possible to minimize changes to the dissolved/total ratio due to adsorption onto the container.

Both documents recommend applying the site-specific translator to the receiving water data. If the site-specific translator is applied to the criteria equation, as well as the receiving water data, then the criteria will be lowered by the same factor as the receiving water data. Therefore, a site-specific translator cannot be used to influence permit limits like a WER, but it does provide a more accurate measurement of compliance.

cc: Doug Henderson 