

Anchor QEA

1. The toxicity test program that was used to develop the TPH effects-based concentrations has several issues that make the proposed "protective values" uncertain, particularly for diesel-range organics.

a. The concentration and composition of dissolved hydrocarbons generally determines the aquatic toxicity of physically and chemically dispersed oils (Redman and Parkerton 2015). While use of fresh gasoline and diesel to evaluate concentrations protective of surface waters may be applicable to cleanup of fresh spills, it is not appropriate for application at legacy MTCA cleanup sites with weathered petroleum constituents. WET testing results on weathered diesel constituents suggests protective concentrations on the order of 700 µg/L, more than four times the value proposed for freshwater in the implementation memo. The gasoline and diesel test materials used to develop these new values were supplied in carriers of methanol and acetone, respectively.

b. The variability between nominal and measured concentrations was higher for the diesel test than for the gasoline tests. This difference may be indicative of entrained droplets of oil. Droplet interaction would be expected to be most substantial with organisms having a high surface area to volume ratio.

c. Of the four species that were tested, the two species that would be most susceptible to physical fouling by droplets would be echinoderm eggs and *Ceriodaphnia dubia*. Interestingly, these two species were the most sensitive to diesel. At the least, the echinoderm and *Ceriodaphnia* tests should be rerun and concentrations validated using passive sampling to quantify the dissolved fraction and additional analysis to characterize saturated hydrocarbons that are diagnostic of droplets (Redman and Parkerton 2015). Also, the fact that the toxicity values from the gasoline exposures are similar for the fish and invertebrates suggests that the dissolved fractions were driving the toxicity for the gasoline tests, but that this was not necessarily the case in the diesel test.

2. The memorandum states: "These effects levels would be directly applicable to whole effluent testing (WET) that is carried out under WAC 173-205. WET refers to the aggregate toxicity of pollutants contained in wastewater effluent. It represents the total exposure of aquatic life to pollutants in a controlled lab environment. Once the effects levels have been established, TCP's Policy and Technical Support Unit will then write an implementation memorandum, recommending protective values under WAC-173-340- 730(3)(b)(ii) (Environmental effects) – Surface Water Cleanup Standards." We are concerned that Ecology is proposing new cleanup standards in advance of already planned MTCA rule revisions. The study on which these levels are based is one source of information that can be used in that planned rule-making process, but it is not definitive and needs to be considered along with other information at that time.

Redman, A.D., and T.F. Parkerton, 2015. "Guidance for Improving Comparability and Relevance of Oil Toxicity Tests." *Marine Pollution Bulletin*, 98: 156-170.