

To: Jon Mueller, Chesapeake Bay Foundation

From: Charles Menzie, Ph.D., Michael Kierski, Ph.D. and Yvette Lowney, M.P.H.



Reference: Comments on Planned Approach for Risk Assessment and the Conduct of Round 2 Sampling for Sparrows Point

In this memorandum we provide comments on the plan to assess risks to human health and the environment and aspects of the proposed additional Round 2 sampling.

Review of Human Health Risk Assessment Methods

Our comments are provided below:

1. The Work Plan document prepared by EA¹ cites standard guidance documents from EPA. In some instances, obsolete guidance is cited, as well as the newer documents. In these cases, the obsolete documents should be omitted, or the approach should clearly state the hierarchy of use for the different documents. We note that there are differences in the application of risk assessment assumptions by EA for the earlier work they performed at Coke Point and what they propose to utilize here. Some of our comments touch on specific assumptions that are being made. Collectively, the new set of assumptions would lead to a less conservative assessment of health risks.
2. Section 9.3.1 discusses the Recreational User scenario, stating that the exposure routes that are considered complete include dermal contact with water, dermal contact with sediment, and ingestion of fish or crabs. This should be updated to include the incidental ingestion of water while swimming. This exposure pathway is well document, has precedents in other risk assessments for the Chesapeake Bay, and EPA provides adequate guidance for characterizing the exposures associated with this pathway. Specifically, the EPA's 2011 Exposure Factors Handbook includes section 3.6 on "Water Ingestion While Swimming and Diving." This section of the EFH and

¹ EA Engineering, Science, and Technology, Inc. 2014. Work Plan for Offshore Investigation of the Phase I Area of the Sparrows Point Site Baltimore, Maryland. *Prepared for Sparrows Point Environmental Trust, Maul Foster & Alongi, Inc.* EA Project No. 15131.01

associated tables provides appropriate input values for characterizing this exposure pathway that should be included in the HHRA.

3. Section 9.3.2 mentions that the “HHRA will evaluate results from surface sediment sampling, and modeled surface water and fish tissue/crab concentrations.” The rationale for not including fish/crab tissue data, and the method to be used for modeling of fish/crab is not documented.
4. This section also states that data may be “included or excluded from the HHRA” based on a data quality evaluation. The specific criteria for inclusion and exclusion are not provided. Recourse for poor data is also not discussed. Allowing elimination of poor data provides incentive for generating it. Therefore, conservative assumptions should be included in the face of poor data.
5. The Work Plan states reliance on the generic tables for EPA Regional Screening Levels (EPA 2014b), but these tables do not appear to include screening criteria for fish. The EPA RSL website can be used to develop such screening criteria, but the specific inputs to such modeling should be specified in the Work Plan. Note, care must be taken to select screening criteria that are consistent with the stated goal of targeting a THQ=0.1, as stated in the Work Plan.
6. Section 9.3.3 mentions “the adolescent and child recreational user.” However earlier in the document it is stated that “children younger than 6 years of age are not expected...” and that recreational users are assumed to be adolescents and adults. The work plan should be updated to include characterization of potential exposures (and associated risk) incurred by younger children. It is reasonable to assume that a younger child may consume fish brought home by a recreational angler. Direct contact with water and sediments would also be expected on excursions, an exposure scenario that is consistent with assessments for other areas within the Chesapeake Bay area, as well as for myriad contaminated waterways across the US.
7. Section 9.3.4 discusses the need to adjust oral toxicity values for application to dermal toxicity assessment, but does not present the specific method and derivation of such values for review.
8. Earlier sections of the Work Plan indicate that exposure point concentrations (EPCs) will be calculated assuming that undetected chemicals are simply not present. This assumption is inappropriate, inconsistent with EPA guidance, and results in EPCs that are biased low. Additionally, were such practice commonly allowed, it would have the

very negative consequence of discouraging PRPs from using analytical methods with adequately sensitive detection limits. Consistent with EPA guidance, the Work Plan should specify that all non-detects for target analytes will be assumed to be present at the detection limit or one half the detection limit of the analytical method used.

9. The calculation of skin surface area used is convoluted and confusing. The text mentions using data from EFH 2011, tables 7-2 and 7-12. 1) Table 7-2 doesn't provide the body parts specified in the exposure scenario (e.g., provides data on "legs" but not "lower legs"), and Table 7-12 only provides data for men older than 21 years of age. 2) The process and the specific values selected should be made very clear. 3) Additionally, some numbers appear to be extracted incorrectly. For example, the text mentions surface area of feet for adolescents as 0.105 m², however my review indicates that the value of 0.136 listed. 5) The exposure parameters listed represent 50th percentile values, while the text states selection of mean values. 6) Finally, no justification is provided for selecting 50th percentile (nor mean) values. Table 7-12 provides surface area values for other percentiles. For this screening assessment it would be appropriate to select more conservative inputs, such as the 90th or 95th percentile surface area values.
10. For swimming, the assumed skin surface area selected should represent higher percentiles of exposure. The EPA tables from which data were selected in the work plan specifically provide higher percentiles, so the same source can be used for higher percentile values.
11. The frequency of exposure selected for the site-specific screening level calculations appear to be arbitrarily selected and unsubstantiated. The assumed recreational use of 2 days per week may be low, especially if, as indicated in the text, these parameters are intended to represent individuals with boat docks at their houses. Similarly, better documentation of the assumed 39 days/year exposure by watermen should be provided. This could be based on site-specific data, or the percentage of the area over which the watermen range.

Review Ecological Risk Assessment Methods

1. It is clear from sediment toxicity testing on split samples collected during October 13 and 14 2014², that sediments in some regions offshore Sparrows Point are toxic to benthic invertebrates. This toxicity may not be predictable from existing chemistry data

² Toxicity testing performed by Lance Yonkos, University of Maryland College of Agriculture and Natural resources, Environmental Science & Technology, College Park, MD 20742

but the zonation of the toxicity implicates discharges and releases from Sparrows Point. These results need to be considered as part of Round 2 sampling. Because chemistry samples may yield false negatives with respect to site-related risks, it is recommended that measures of toxicity be incorporated into future efforts to delineate the risk zone associated with site releases. Alternatively, work could be undertaken to relate the toxicity to hydrocarbon content.

2. The details concerning how exposures to piscivorous wildlife will be modeled and risk characterized is lacking. The work plan would have benefited from including the assumptions that will be used to perform the screening level modeling. Also, it would have been helpful to specify if the results of the initial screening steps of the SLERA may negate the need for the food chain modeling that is specified in the work plan. As written currently it is not clear how the SLERA will be performed to address the potential risks to piscivorous wildlife.

Round 2 Sampling Considerations

Our comments refer to the memorandum³ issued in January 2015 regarding results of Round 1 sampling and planned sampling for Round 2.

1. The work relies upon analyses of Aroclors for PCBs. While this is a method that has been used in the past for sediments, such measurements can underestimate actual PCB concentrations and they give little insight into the composition of the PCBs including the presence or absence of congeners that pose risks to health and wildlife receptors. Therefore, it is recommended that a few of the sediment samples from the more highly-contaminated area offshore Sparrows Point be collected in Round 2 and analyzed for both Aroclors and PCB congeners. This would provide a means for bridging between Aroclor data and congener composition where the latter may provide more insight into effects and also sources.
2. There is ambiguity concerning the limits of horizontal sampling and such ambiguities need to be clarified. The purpose is to understand the spatial extent of the zone of risk adjacent to the site. Given the limitations of individual lines of evidence, spatial delineation should rely upon a mix of analytical techniques including toxicity testing and chemical analyses. While visual observations of oil and grease can be useful as a course measure and can help delineate the presence of NAPL, it should not be the sole metric for delineating the spatial extent of surface sediment contamination that could pose risks. To the extent that the presence of cutting and other oils that are or have emanated from the facility are posing risks to invertebrates in sediments, these risks may occur at levels that may be missed by visual observation. The plan is currently unclear on how visual observations will be used in this regard.
3. Related to the point of sampling pore water only in the sandy area, the plan should include a description that would help confirm the hypothesis that the groundwater will mainly discharge in the sandy area near shore. To that end, it would make sense to collect pore water samples along a few transects at both a sandy location near shore and in the fine grained sediment further offshore as a means of confirmation.

³ Memorandum from EA (John Morris, Samantha Saalfield, and Frank Barranco) to Andrew Fan (EPA), Barbara Brown (MDE), Madi Novak (Maul Foster & Alongi, Inc.), and Dan Silver (Sparrows Point Environmental Trust). January 2015. SUBJECT: Round 1 Sediment Investigation and Plan for Round 2 Investigation Sparrows Point Phase I Area

4. Elevated levels of contaminants in surface sediments can occur as a result of groundwater or surface water. Thus while zones of higher levels of contamination in groundwater can be used to explain localized areas of sediment contamination and releases, localized areas on sediment contamination in the absence of obvious groundwater contamination can still be indicative of sources from the Sparrows Point facility. Sources unrelated to groundwater can include storm water discharges and spills. Thus, while linking groundwater and sediments makes sense for understanding transport pathways, such linkage should not be used as a guide for distinguishing between site-related and non-site-related sources.

5. Dealing with non-detects in data sets is a critical aspect of assessing risks. In the case of PCBs and PAHs the most common and accepted approach to take when these mixtures are known to be present is to use $\frac{1}{2}$ the DL for estimating non-detected values.