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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103

30 September 2003

Naval Facilities Engineering Command
Atlantic Division Headquarters, Code EV22
6506 Hampton Blvd
Norfolk, VA 23508-1278
Attn.: Winoma Johnson

Re: *Draft Ecological Risk Assessment Bousch Creek*
Naval Station Norfolk
Norfolk, Virginia

Dear Ms. Johnson:

The above referenced document has been reviewed by the Environmental Protection Agency. The following comments are offered.

General Comments

1. The entire potential chemical migration pathway to Bousch Creek is not adequately addressed in this document. Specifically the pathway to, and including, the 3,900 feet of Bousch Creek that is culverted, as well as Willoughby Bay is not adequately addressed. In addition, this ERA does not adequately address the ecological information from the other Superfund Sites (CD Landfill, LP 20, and Camp Allen Salvage Yard) that potentially impact Bousch Creek.

2. We concur with the recommendation that the ERA process continue. However, it is not clear if restricting the ERA process to metals in zones 1 through 5 of the upper creek is appropriate. It is unclear why pesticides and PAHs in the whole creek, and metals in the lower reaches of the creek have been eliminated from further consideration. The information presented in the report is insufficient to eliminate these chemicals from additional consideration.

Specific Comments

1. On page I, the Executive Summary indicates that this screening ecological risk assessment and step 3 of the baseline ecological risk assessment are for Bousch Creek, "...as associated with Site 1 (Camp Allen Landfill)." It is not clear why Camp Allen Landfill has been specifically identified as a focus when there are other Superfund Sites

(such as Camp Allen Salvage Yard, CD Landfill, and LP20) associated with Bousch Creek. This needs to be clarified.

2. On page II, the Ecological Risk Assessment Results for Surface Water states, "Surface water samples from the main creek channel were not available for the lower reaches." This represents a data gap and it needs to be determined if this data gap needs be filled.

3. On page III, the Ecological Risk Assessment Results for Surface Sediments indicates that the draft sediment quality criteria for five non-polar organic chemicals (three PAHs and two pesticides) are sufficient to suggest "...that potential exposures and risks are limited for organic chemicals." The potential uncertainties associated with this relationship would appear to negate this suggestion.

4. On page III, the Ecological Risk Assessment Results for Surface Sediments states, "This suggests that chemicals related to these sources are not migrating (and have not migrated) to the lower portions of Bousch Creek (north of the runway), and/or Willoughby Bay, in significant quantities." The fact that chemical concentration gradients exists in Bousch Creek does not necessarily support the purported no migration theory. Without measurements of quantities of chemicals or mass loading of chemicals to Willoughby Bay, the data reported does not support or refute whether or not significant quantities of chemicals have entered Willoughby Bay via Bousch Creek.

5. On page 2-4, Section 2.2.1.4, Surface Water Bodies, indicates there are 29 Bousch Creek outfalls. Figure 1-1, Location Map, appears to only show 28 of these 29 outfalls. The 29th outfall should be added to this map.

6. On page 3-1, Section 3.1, Site Background and History, indicates that regardless of other IRP sites that border either Bousch Creek or its tributaries, "...the defined scope of this ERA is focused on the CAL." This focus on the Camp Allen Landfill is still not logically described in this document. In fact, all of the IRP sites, including Camp Allen Salvage Yard, CD Landfill, and LP20, need to be the focus of this ERA for Bousch Creek.

7. Section 3.3.1.1, Habitats, presents a description of the habitat present in Bousch Creek. The section does not provide detailed descriptions of the types of wetlands present in the creek, and the dominant vegetation. A more detailed description of the wetlands in the creek should be provided.

8. Section 3.3.1.3, Site Hydrology, on pages 3-8 and 3-9 states that a 1995 dye tracer study was considered in the evaluation to directly measure the amount of dilution that occurs in Bousch Creek and Willoughby Bay. More detailed information should be provided on this study, including the time of year that the study was performed, and whether the flow would be considered above, at, or below normal from baseline conditions.

9. On page 3-9, Section 3.3.2, Summary of Available Analytical Data, states, "The data selected for quantitative use in the ERA were limited to the 1997 and 1999 surface water and sediment samples collected in the creek outside of the CASY and upstream of the 3,900-ft culvert...." This document still does not adequately address why the entire Bousch Creek potential chemical migration pathway to, and including, Willoughby Bay was not included in this ERA. This is a major omission which leads to the conclusion that this ERA is incomplete.

10. On page 3-10, Figure 3-4 is referred to as showing the inflows to Bousch Creek. This figure is actually the diagramatic conceptual site model. It is not clear if this figure reference should actually be to a map of the site with stormwater drainages.

11. Section 3.3.3.1, Potential Source Areas, on page 3-10 states that as discussed at the March 2002 Tier I partnering meeting, the scope of the ERA was limited spatially, in terms of quantitative risk evaluation to the upgradient end of the 3,900 foot culvert connecting Bousch Creek to Willoughby Bay. Justification should be provided stating why downgradient areas will not quantitatively evaluated, particularly when the migration pathway to Willoughby Bay is complete, and no samples have been collected from the bay.

12. On page 3-10, Section 3.3.3.1, Potential Source Areas, identifies specific street names. However, none of the figures appear to have any street names labeled. These referenced street names should appear on the figures.

13. On page 3-12, Section 3.3.3.4, Receptors, indicates that fish and benthic invertebrates "were not chosen as receptors." This statement is contradicted by the information presented in Table 4-3. The document further states that the data base on fish is limited, but there is no justification given for this statement. At a minimum, the document needs to document how the data base is limited and specifically why it cannot be used to assess ecological risk to fish in Bousch Creek.

14. On page 3-15, Section 3.4.2.1, Screening Exposure Point Concentrations, states, "Tissue concentrations in the aboveground vegetative portion of wetland plants were estimated...." There is no corresponding statement regarding the below ground vegetative portions of wetland plants. Since roots, tubers, and above ground portions of plants are potential food for ecological receptors, and they are known to accumulate chemicals differentially, it is not clear why the entire plant structure is not being evaluated in this ecological risk assessment.

15. Section 3.5.2, Ingestion Screening Values, on page 3-17 states that for food chain modeling, ingestion screening values based on growth and reproduction were used to evaluate risk to upper trophic level receptors. Table 3-15 provides ingestion screening values for mammals. The no observed adverse effect level (NOAEL) and lowest observed adverse effect level (LOAEL) proposed for evaluating risk from polychorinated biphenyls (PCB) are primarily 0.069 mg/kg/day and 0.69 mg/kg/day, respectively, for different arochlors. BTAG has

recently identified information on the effect of PCBs on mink with a screening value that is much lower than the values listed in Table 3-15. Two recent multigenerational studies have developed NOAELs and LOAELs based on mink reproduction and kit survival (0.003 and 0.19 mg PCB/kg bw/day) and kit growth (0.003 and 0.051 mg PCB/kg bw/day) from work in Saginaw Bay, Michigan. The first study (0.003 and 0.19) is from Heaton et. al. 1995. Arch. Environ. Contam. Toxicol. 28:334-343; the second study (0.003 and 0.051) is from Restum et al. 1998. J. Toxicol. Environ. Health Part A, 54: 343-375. These more sensitive studies should be used to evaluate risk to mammals from PCBs.

16. On page 3-17, Section 3.6.1, Selection of Chemicals of Potential Concern (COPCs), does not appear to address whether or not chemicals with concentrations less than detection limits and detection limits greater than ecologically sensitive screening values will be included in the list of COPCs.

17. On page 3-19, Section 3.7, Screening Risk Conclusions, contains the single statement, "COPCs were identified in each of the media evaluated (Table 3-20)." The outcome of a screening ecological risk assessment will typically result in one of the following conclusions: a) There is adequate information to conclude that ecological risks are negligible and therefore no need for remediation on the basis of ecological risk; b) The information is not adequate to make a decision at this point, and the ecological risk assessment process will continue to Step 3; or c) The information indicates a potential for adverse ecological effects, and a more thorough assessment is warranted. The last conclusion applies in this instance.

18. Section 4.1, Refinement of Conservative Screening Assumptions, on page 4-1 states that in cases where adequate spatial sampling coverage exists, mean concentrations are appropriate for evaluating potential risks to populations of lower trophic level receptors because the members of the population are expected to be found throughout the site. This assumption does not consider the size of the site being evaluated (area represented by a single sample), and ecological risk from localized areas of contamination (hot spots). It would be more appropriate to evaluate risk spatially in terms of area of the site where potential risk to lower trophic level receptors would be predicted. Once the area of risk is presented, the significance of this area relative to the population at the site could be discussed. Using only means to eliminate contaminants from further consideration without discussing these issues is unacceptable.

19. On page 4-1, Section 4.1, Refinement of Conservative Screening Assumptions, indicates that central tendency estimates (rather than high end or maximums) would be used in the baseline ERA (BERA). While it is acceptable to consider central tendency in ecological risk assessment, decisions on being protective of ecological receptors need to be based on reasonable maximum exposure (RME) estimates of both current and future land-use conditions. The intent of the RME is to estimate a conservative exposure case (i.e., well above the average case) that is still within the range of possible exposures.

20. Section 4.1, Refinement of Conservative Screening Assumptions, on page 4-1 states that since upper trophic level species are highly mobile, they would be expected to effectively average their exposure over time as they forage within the area defined by their home range. The section further states that average prey concentrations are most appropriately estimated using mean estimates of media concentrations and accumulation factors. The media concentration used to estimate tissue concentrations should be based on the home range of the receptor being evaluated, since for Bousch Creek, the home range for certain receptors may be smaller than the total acreage represented by Bousch Creek.

21. Section 4.1, Refinement of Conservative Screening Assumptions, on page 4-2 states that chemicals that were detected in less than 5 percent of the samples in a medium were not considered COCs in that medium if at least 20 samples were available. The justification to eliminate chemicals based on low frequency of detection should be based on the spatial extent of risk. Using frequency of detection alone is inappropriate for sites that are very large, where one sample represents a significant area of the site. Therefore, frequency of detection should not be used to eliminate chemicals from further evaluation.

22. On page 4-3, Section 4.2.1, Data Groupings, indicates that the data collected from Bousch Creek are being divided into two groups designated as the upper reach and the lower reach. It is not clear why these data groupings were selected and if they are ecologically meaningful. In addition, it is not clear how these two groupings of data relate to the eight zones that are used in the spatial trend analysis, see Section 4.3.3.2 on page 4-8).

23. On page 4-3, Section 4.2.2, Surface Water, states, "Thus, only an evaluation of the upper reaches was conducted for surface water." This means that there are no surface water data for the lower reaches and this represents a data gap, which may need to be filled.

24. On page 4-3, Section 4.2.2.1, Upper Reaches, indicates in relationship to surface water that mercury was detected in the filtered samples but not the total analyses. These results are inconsistent. If mercury is detected in the dissolved analysis, then it should also be detected in the total analysis. These results need to be fully explained. It appears that resampling and re-analysis may be warranted.

25. On page 4-4, Section 4.2.2.1, indicates that the chemicals that were retained as COPCs in the SERA because the reporting limit exceeded the screening value are not identified as PCOCs in the BERA. The information provided in this section and in the Uncertainties section is not adequate to support this approach. Adequate supporting documentation needs to be provided. This comment applies to other sections, as well.

26. On page 4-5, Section 4.2.3.2, Lower Reaches, in relationship to sediments, states, "For the SVOCs, the means were influenced by elevated reporting limits in a number of the 1999 samples. None of these undetected chemicals were identified

as PCOCs in sediment." The information provided in this document does not adequately support this decision to not identify these chemicals as PCOCs. Adequate support for this decision needs to be provided; otherwise these chemicals become PCOCs. This concern has potential impacts to other sections of this document.

27. On page 4-6, Section 4.3.1, Upper Reaches, states, "The mean concentrations of carbon disulfide, 2-butanone, and vinyl chloride were generally less than available screening values for other similar chemicals." The use of the term "generally less" is too vague. This description needs to include more specifics on which concentrations were less and which were equal to or greater than the available screening values for other similar chemicals. In addition, the uncertainties of using screening criteria associated with other similar chemicals needs to be adequately discussed.

28. On page 4-7, Section 4.3.2, Lower Reaches, refers to Table 4-11, Comparison of Sediment Concentrations With Equilibrium Partitioning-Based Sediment Values. From this table and the text, it is not clear if the mean TOC and the K_{ow} values used reflect appropriate RMEs. This concern needs to be adequately addressed in this section.

29. On page 4-7, Section 4.3.3 starts the discussion of spatial and temporal trends of sediment data in Bousch Creek. The information presented is not sufficient to determine if these data are adequate to allow a spatial or trend analysis of the chemical concentrations in the sediment. This concern needs to be adequately addressed in this section.

30. On page 4-7, Section 4.3.3 refers to Table 4-13 as a summary of COCs. In this table, there is a footnote that indicates the shaded cells indicate that exposure and risks are likely minimal when bioavailability factors are considered. The discussion of these bioavailability factors is inadequate and needs to be clarified.

31. On page 4-8, Section 4.3.3.2, Spatial Trends, states, "Data for the three lower zones (6, 7, and 8) were largely from the 1999 sampling event; the other zones had more of a mixture of data from multiple sampling events." This statement suggests that temporal trend analysis of these three lower zones is not possible. This needs to be clarified.

32. On page 4-9, Section 4.3.3.3, Temporal Trends, indicates that there were two to four samples within sample groupings in zones 1, 2, 3, 3A, 4, 5, and 7. It is not clear if the number of samples per grouping is sufficient to draw meaningful conclusions. This issue needs to be adequately discussed in this section. In addition, the uncertainties associated with this analysis need to be included in Section 5.

33. The uncertainties discussion presented in Section 5 is inadequate. The implications of the identified uncertainties are often unsupported, as are the

approaches that were taken to address the uncertainty. For example, the fact that reporting limits are "generally less than five times screening values" does not support eliminating these chemicals as COCs. Another example is the unsupported statement pertaining to sediment screening values that "These factors tend to make the resulting screening values conservative and likely to overestimate potential risks." No information is presented to support the premise that screening values based on correlational studies overestimate potential risks. Given the thresholds typically represented by these values, it can be argued that the use of these studies may also underestimate site-specific risk.

34. Section 7.1.2, Exposure Pathways, on pages 7-1 and 7-2 states that risk to lower trophic level receptors in the upper and lower reaches of the creek from pesticide and polycyclic aromatic hydrocarbons (PAH) are likely to be minimal when bioavailability factors are considered. This general statement regarding reduced bioavailability is not supported by any additional information. Discussion of the specific factors, if measured, and how they affect bioavailability should be presented in this report before this conclusion would be supported.

If you have any questions concerning any of these comments, please call me (215) 814-5129.

Sincerely,

Mary Cooke

Mary T. Cooke
Remedial Project Manager

cc: Channing Blackwell, CNRMA
Devlin Harris, VDEQ
Holly Rosnick, CH2M Hill
Todd Richardson, USEPA