



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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NAVSTA NEWPORT RI
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September 7, 2005

Curtis Frye
U.S. Department of the Navy
Naval Facilities Engineering Command
Northern Division
10 Industrial Highway
Code 1823, Mail Stop 82
Lester, PA 19113-2090

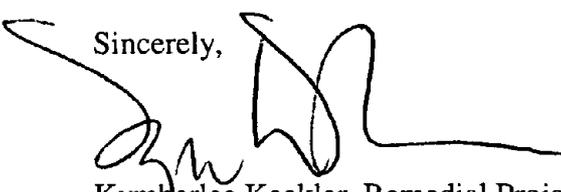
Re: Sediment and Groundwater Monitoring Report for the Old Fire Fighting Training Area

Dear Mr. Frye:

I am writing in response to your request for EPA to review the *Sediment and Groundwater Monitoring Report for Old Fire Fighting Training Area*, Naval Station Newport dated July, 2005. EPA reviewed this document in light of its adherence to the *Work Plan for Sediment and Groundwater Monitoring for the Old Fire Fighting Training Area* (November, 2004). Detailed comments are provided in Attachment A.

I look forward to working with you and the Rhode Island Department of Environmental Management toward the cleanup of the Old Fire Fighting Training Area. Please do not hesitate to contact me at (617) 918-1385 should you have any questions.

Sincerely,



Kimberlee Keckler, Remedial Project Manager
Federal Facilities Superfund Section

Attachment

cc: Paul Kulpa, RIDEM, Providence, RI
Cornelia Mueller, NETC, Newport, RI
Jennifer Stump, Gannet Fleming, Harrisburg, PA
Jim Latimer, USEPA, Narragansett, RI

ATTACHMENT A

<u>Page</u>	<u>Comment</u>
§2.3.2	The text incorrectly indicates a construction worker scenario was not evaluated in the human health risk assessment. A construction worker scenario was part of the human health risk assessment.
Table 4-4	Analytical results for rejected data should not be included in summary tables for any sampling event. Rejected results for arsenic are included in Table 4-4 and should be removed.
§4.2	<p>The statement, "...PAH concentrations generally decrease with depth..." is not adequately supported by the information presented in Table 4-3 as the sample depths are not specified in Table 4-3! Please clearly provide sample depths in the table.</p> <p>Please confirm whether the statement, "...overall PAH concentrations appear to be declining in the shoreline sediments between the sampling events in 1998, 2001, and 2005..." is based on point comparisons. Table 4-3 displays the 1998 result next to the 2005 result per sediment sample location for locations OFF-1 through OFF-7. Table 4-3 displays the 2001 result next to the 2005 result per sediment sample location for locations OFF- SD-411 through OFF-SD-445.</p>
§4.2.2	The text in this subsection repeats itself and contains typographical errors. The text needs to be corrected to ensure intended information is presented.
§5	<p>The summary and analysis section includes the statement that groundwater conditions are acceptable. This sentence should be deleted. Both lead and manganese were detected in the 2004 sampling event at concentrations that exceed the PRGs. Manganese is identified on page 2-5 as a risk driver in the groundwater risk assessment.</p> <p>The statement that current sediment data as compared to previous data shows improvement is contrary to a conclusion in the Appendix E forensic study. The 2005 forensic study states that hydrocarbon concentrations and PAH compositions were very stable between 2002 and 2005. Please clarify.</p>
Appendix E	This document describes the characterization of hydrocarbon compounds in sediments from Coasters Harbor adjacent to the OFFTA. The primary objectives of this work were to determine the relationship between the

hydrocarbon composition of Coasters Harbor sediments and that of a Reference Area (Jamestown Potter Cove, JPC), and to ascertain the extent to which Coasters Harbor sediments may have been impacted by recent site remediation activities at the OFFTA.

The distinction between OFFTA generated pyrogenic PAHs and pyrogenic PAHs from other sources (*e.g.* pavement needs) to be clarified. Moreover, the methodology for making this distinction should be clearly stated.

The document fails to identify and sufficiently explain the uncertainties associated with the study. An essential aspect of good scientific practice (beyond stating and interpreting the results) is that before conclusions are made, the uncertainty surrounding the data should be identified, explored, and then explained. Please revise the document to include an uncertainty section. The report needs to include a discussion on the uncertainties surrounding the data on the fingerprinting analysis and explain how these uncertainties affect the conclusions drawn by the Navy from those data.

As EPA has commented previously, the report should consider crankcase oil from cars/machinery because it is a major source of hydrocarbon pollution to the coastal marine environment. Although urban runoff was cited as contributing to the contamination, it was generally associated with asphalt and not crankcase oil. Most of the work done on petroleum hydrocarbons in urban runoff reveal used crankcase oil as the major component of the hydrocarbons present (contributing both aliphatic and aromatic constituents). If crankcase oil was considered explicitly it is likely that it would have been identified as a source. EPA recommends the following specific changes/additions:

- ▶ evaluate used crankcase oil as a source (for both PAHs and aliphatics)
- ▶ include figures that have the FID and GC/MS signatures of the source fuel oils, asphalt (and the used crankcase oil)
- ▶ since the OFFTA was used before 1990, the sediment samples (0-15 cm) may not be deep enough to capture the correct depth of deposition. Depending upon the sedimentation rate in the harbor, the sediment containing the horizons with the proper time frame were not sampled, or may have been diluted by less contaminated more recent sediments.
- ▶ the background site in Jamestown was referred to as either Porter or Potter cove. Please note that there is a Potter Cove located on the next island north of Jamestown (Prudence Island). It is odd that two coves within 5 miles of each other have the same name.

- ▶ Figure 3 has Allen Harbor in the caption within the figure and is labeled Figure 2.1. This is an error since Allen Harbor is on the mainland and not anywhere near Coasters Harbor (which is not labeled on the figure).

The report contains a detailed description of the analytical methods that were used to develop the fingerprints that characterize different types of hydrocarbon materials. Principal Components Analysis (PCA) is used to determine the factors that are most responsible for variability in the data. The report concludes that the hydrocarbon mixtures in the Study Area and in the Reference Area are similar and are attributed to abraded pavement and emissions from vehicular traffic.

An insufficient number of reference/background location sediment samples are used to characterize the regional background hydrocarbon signatures. As stated in the text of the subject report, the sampling strategy was based on Navy guidance (Stout *et al.*, 2003). The seventh paragraph, page 12, of Section 1.5.3.1 in this guidance document discusses sampling design strategy. In particular, the need to collect samples that are representative of background (not site-impacted) conditions is emphasized:

"Given the importance of background samples in demonstrating the concentrations of contaminants beyond the control of the Navy, the number of background samples needed to meet the objectives of the study should be carefully considered. Population statistics are vital to the defensibility of the conclusions and should be qualitatively and quantitatively considered."

It appears that the regional background signature in Narragansett Bay is defined by only one location, in Jamestown Potter Cove. The basis for limiting the background sampling to this area, and to two samples (one in 2002, one in 2005), is not clear. If this rationale was supplied in the previous study to which the author refers (Emsbo-Mattingly, 2002), a summary description of the reference area and reason(s) for the limited background sampling should be included in this document.

§2, ¶ 3

Hydrocarbons in sediments adjacent to OFFTA were characterized in a previous study (Emsbo-Mattingly, 2002). This paragraph states that selected data from that investigation will be incorporated, where appropriate, for comparison to the 2005 results. Please indicate, for readers who may not have access to the previous report, whether the

analytical methods that were used to derive the 2002 results are the same as, or at least comparable to, those used in the 2005 work.

- §3.6, ¶1 The text indicates that "...four methods of data visualization" were used in this report. These are, as listed: gas chromatograms, histograms, and Principal Components Analysis plots. What is the fourth method? If there is another method of data visualization that was used, please add it to the bullets listed.
- §4.1 Only two samples were used to represent OFFTA generated PAH contamination (SO-15 and SO-11). It seems improbable that these two soil samples could adequately represent the contamination that resulted from the fire training activities at the site.
- §4.2, ¶1 This paragraph contains an excellent description of the differences in petrogenic, pyrogenic, and diagenetic PAH patterns and how these patterns are used to distinguish PAHs from different sources. The text states that the PAH data "...are more reliable source indicators than the peak heights used in the simpler [GC/FID] hydrocarbon fingerprinting..." because the latter are subject to a number of potential interferences. Please discuss the possible interferences or other analytical artifacts that may also affect the PAH analyses, and the extent and conditions under which such effects, if any, may be significant.
- §4.2, ¶3 This paragraph describes the apparent reduction in PAH concentrations at the OFFTA locations OFF-SD-OTS-075 and OTS-OF093, from 36.0 mg/kg EPAPAHs in 2002 to 21.9 mg/kg in 2005, and 14.6 mg/kg EPAPAHs in 2002 to 0.44 mg/kg in 2005, respectively. The text speculates that this reduction is because of a change in land use. How did the land use change over this three-year period, and how would the apparent reduction in PAH concentrations be attributed to this change? Is this referring to the storm water upgrade with an oil/water separator? Please add to this section a brief statement of other possible explanations, *e.g.* sampling variability, analytical uncertainty, differences in analytical methodology, *etc.*
- §4.2, ¶6 The fourth and fifth sentences note that 5- and 6-ring PAHs in pavement samples may form from 'cooking' during the pavement manufacturing process, or they may indicate the presence of soot or other combustion byproducts. Pieces of eroded pavement are present along the shoreline adjacent to the OFFTA, and the report assumed that these are "...the most likely and potent source of heavy pyrogenic PAHs." How would the characteristic PAH fingerprints of the combustion products of the various

fuels used at the OFFTA compare to the 5- and 6-ring compounds found in paving samples? Please expand this discussion to address possible contributions of pyrogenic PAHs from historic kerosene and diesel combustion OFFTA activities. What are the signatures of combusted kerosene-range jet fuel, diesel-range marine fuel oil, and bunker-range heavy fuel oil and the soot that is produced by burning these materials? How would these compare to the reference standards (Table 1) – *i.e.*, 50% and 100% combusted diesel and kerosene?

§5, bullet 4 The pervasive occurrence of low-level, lightly to moderately degraded diesel range hydrocarbons in the Reference Area and Coasters Harbor sediments is attributed to chronic releases from vehicular traffic. Why is the fingerprint characteristic of the diesel-range compounds not present in the 2002 sediments but occurs in nearly all of the 2005 samples (Table 3)? Please explain their absence in the earlier sampling.

§5, bullet 5 Samples of abraded pavement, collected near the storm sewer outfall OF075 yielded 4-ring petrogenic PAHs (asphalt) and pyrogenic 3-to-6-ring PAHs (tar). This observation leads to the conclusion that particulates from regional roadways are the primary source of the hydrocarbons in the Study Area sediments. Please explain the distinction between pyrogenic PAHs associated with paving materials and those arising from on-site activities at the former OFFTA (*e.g.*, combustion of fire training fuels). (See also previous related comment).

Table 3 The report should specify whether the reference standards listed in Table 3 are the same standards that were used in the 2002 forensic study. The earlier study described the reference standards as follows. *“Reference samples of kerosene and diesel were prepared and analyzed by Battelle as part of a previous forensic investigation of the former fire training area in Cutler, ME (Emsbo-Mattingly, 2002). In addition to the dispensed reference samples, each petroleum distillate was independently evaporated and combusted to better identify the compositional changes attributed to fire training activities and environmental weathering. Additional reference samples from the National Institute for Standards and Technology (NIST) and the Battelle Reference Material Library were added for comparison to samples collected from the site.”*

Figure 5, a & b The Principal Components Analysis Scores plots suggest that most of the Study Area sediment samples are similar to one another and are dominated by pyrogenic PAHs. Figure 5b shows an enlargement of the portion of Figure 5a in which most of the Study Area samples are clustered. The linear distribution of the data (Fig. 5b) suggests that the bulk of the

sediments obtained their PAH signatures owing to mixing, with end members defined by the Reference Area samples (JPC03 and JPC03') and those from the storm sewer sediment (OF075). However, sample SO-15 (contaminated soil collected from a test pit at the OFFTA near the shoreline), which contains more pyrogenic PAHs, plots above and to the right of the cluster of sediment data but is still co-linear with the sediment data. Because the saturated fingerprints and triterpane biomarkers of SO-15 are similar to those of the sediment samples (Table 3), please explain why SO-15 is not considered as a possible end-member of the sediment mixture.

REFERENCES

- Emsbo-Mattingly, S. D., 2002, Environmental forensic investigation of hydrocarbon sources at the Old Fire Fighting Training Area: Naval Station Newport, Rhode Island. Final Report, TetraTech NUS, Wilmington, MA.
- Stout, S. A., Leather, J. M., and Corl, W. E. III, 2003, *A User's Guide for Determining the Sources of Contaminants in Sediments. A Demonstration Study: Sources of PAH in the Sediments of the Vicinity of the Norfolk Naval Shipyard*, Elizabeth River, Norfolk, Virginia. U.S. Dept. of the Navy, SPAWAR Systems Center, San Diego. Technical Report 1907, September 2003, 97 pp.