



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

NEW ENGLAND - REGION I
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BOSTON, MASSACHUSETTS 02114-2023

N62578.AR.002228

NCBC DAVISVILLE

5090.3a

February 13, 2007

Curtis Frye
Dept of the Navy, BRAC PMO Northeast
Code 5090 BPMO NE/CF
4911 South Broad St
Philadelphia, PA 19112-1303

Re: Responses to EPA Risk Related and Forensic Related Comments on the Draft Phase III Remedial Investigation Quality Assurance Project Plan for IRP Site 16, at the former Davisville Naval Construction Battalion Center, North Kingstown, RI, dated January 19, 2007

Dear Mr. Frye:

Pursuant to ' 7.6 of the Davisville Naval Construction Battalion Center Federal Facility Agreement dated March 23, 1992, as amended (FFA), the Environmental Protection Agency has reviewed the subject document and risk and forensic related comments are below. I will forward hydrogeological comments after our conference call on Wednesday February 14, 2007. Comments that were concurred with are not addressed in this document.

Navy Response to EPA General Comment 3. Please ensure that the Creosote Dip Tank Area and the Fire Fighting Training area are included in the definition of the "site" along with the groundwater contaminant plume, rather than just the extent of the groundwater contaminant plume.

Response to EPA General Comment 10: concur, provided that subsurface and surface soils are evaluated separately for risk. For instance, risk should not be evaluated for 0-10 ft soil if 0-2 ft soil OR 2-10 ft soil has higher concentrations than 0-10 ft soil.

Response to EPA General Comment 15: It seems that neither the Allen Harbor SLERA nor the upcoming Site 16 soil SLERA will evaluate the wetland adjacent to the Allen Harbor Landfill on the north side of Allen Harbor. The lack of soil data from this wetland may represent a data gap

Navy Response to EPA General Comment 20. EPA does not believe that there is a source area in the MW16-55 area, only that contaminated groundwater may be moving past this location at this depth since there was an unusually high FID and FID with filter hit

(200/500) noted in the log while drilling the MW16-55D boring. However, EPA welcomes the Navy's offer to take a groundwater sample at the corresponding depth.

Response to EPA Specific Comment 40: The issue whether recreation can occur on land designated "waterfront commercial" is a risk management and legal issue, rather than a risk assessment issue. The marina currently accepts recreational vessels and therefore supports recreational uses such as swimming off the docks or moored vessels. The buildings currently support recreation and therefore are intrinsically recreational. Recreational risks must be addressed if they are allowed at the site now or in the future.

Navy Response to EPA Specific Comment 58. Please be advised that for low level analysis for vinyl chloride in water, the method may require no preservative be added to the sample collection vial, the sample cooled to below 4° C, and that analysis be done within 7 days. The Navy may only need to collect unpreserved groundwater or piezometer samples in the areas where there are known low levels of CVOC and a future indoor air risk scenario may need to be evaluated, such as near bldg E-107, in the nearshore, and in the "north central area" or on the western, southern, and eastern outer fringes. EPA believes unpreserved sample collection would not be necessary in areas above the highly contaminated groundwater or in areas where the CVOC has not degraded from parent to significant daughter products. It may be necessary to wait for the next round of groundwater sample results to identify the areas necessary for unpreserved sample collection.

Response to EPA Specific Comment 66: Since this comment, EPA has placed toxicity values for iron and aluminum on the Human Health Provisional Peer Reviewed Toxicity Value database (<http://hhpprtv.ornl.gov>). EPA will email the printout of these toxicity values separately. Please include iron and aluminum in the risk assessment if the concentrations exceed human health screening levels

Response to EPA Specific Comment 67: Since HHPRTV values for aluminum and iron have been issued, please evaluate these chemicals for risk. Since there is no value for copper, please do not evaluate risk of copper.

Response to EPA Specific Comment 71: concur, subject to confirmation in final document.

Response to EPA Specific Comment 77: concur with 4 hour exposure time for construction worker in trench

Response to EPA Specific Comment 79: EPA would like to achieve consistency among Region I Navy sites for exposure assumptions. EPA is currently waiting for a response to EPA's proposed 5 mg/cm² sediment adsorption factor for sediments at Naval Air Station South Weymouth. EPA would like to defer final selection of a sediment adsorption factor so that both sites will have the same factor for sediments. EPA will propose such factors as soon as possible.

Response to EPA Specific Comment 80: EPA would like to achieve consistency among Region I Navy sites for exposure assumptions. EPA is currently waiting for a response to EPA's proposed Fraction Ingested value of 1 in response to Navy's proposal of FI =0.5 at Naval Air Station South Weymouth. EPA would like to defer final selection of a FI value so that both sites will have the same factor. EPA will propose such factors as soon as possible.

Response to EPA Specific Comment 84: EPA would like to achieve consistency among Region I Navy sites for exposure assumptions. EPA is currently waiting for a response to EPA's proposed Fraction Ingested value =1 in response to Navy's proposal of FI =0.5 at Naval Air Station South Weymouth. EPA would like to defer final selection of a FI value so that both sites will have the same factor. EPA will propose such factors as soon as possible.

Response to EPA Specific Comment 86: Although EPA Region I is attempting to update Region I practice to reflect the most recent national guidance as new risk assessments are conducted, EPA Region I withdraws the original comment because use of 1.5 L/day would require cumbersome adjustments of toxicity values per Appendix 1A of EPA (1997). Please use 1 L/day.

Response to EPA Specific Comment 87: Although EPA Region I is attempting to update Region I practice to reflect the most recent national guidance as new risk assessments are conducted, EPA Region I withdraws the original comment because use of 2.3 L/day would require cumbersome adjustments of toxicity values per Appendix 1A of EPA (1997). Please use 2 L/day.

Response to EPA Specific Comment 98. The food and water ingestion rates in the revised Table C-2 have been better explained with the addition of Table C-3. The ingestion rates are acceptable except as noted below:

* For the northern bobwhite, the food ingestion rate has been multiplied by 0.15 to convert it to a wet-weight basis. It should be noted, however, that the study used to derive the bobwhite ingestion rate used dry commercial game food (5-10% moisture). As the ingestion rates are already based on dry food, there is no need to include the wet to dry-weight conversion. Please confirm the actual values in Koerth and Guthery (1991) and/or remove this factor.

* Please clarify Tables C-2 and C-3 for the invertivorous bird. Table C-2 lists the American Woodcock while Table C-3 and the Draft Table C-2 refers to the robin.

If you have any questions with regard to this letter, please contact me at (617) 918-1384.

Sincerely,

Christine A.P. Williams, RPM
Federal Facilities Superfund Section

Enclosure: Forensic Analysis Comments

cc:

Brian Balconis, RIDEM
Johnathan Reiner , ToNK
Steven King, RIEDC
Steve DiMattei, EPA (via e-mail only)
Rick Suggat, EPA (via e-mail only)
Kathleen Campbell, CDW (via e-mail only)
Carol Stein, GF (via e-mail only)
Lee Ann Sinagoga, Tetra Tech NUS, Inc (via e-mail only)

EPA Comments on the Navy's Responses to EPA Forensics Comments

EPA General Comment 27: In this Comment, EPA has stated the rationale for questioning Navy's conclusions, particularly with regard to impacts from Site 16 creosote operations to near-shore sediments. The second paragraph of this Comment discusses the overall distribution of PAHs in Allen Harbor sediments and suggests that a more uniform distribution would be expected if the dock pilings were the primary contributor of PAHs to harbor sediments. The third paragraph addresses Navy's conclusions regarding the PAH distribution in the southeast corner of the harbor, which Navy attributes to runoff from non-Site 16-related vehicular traffic and storm drain discharge. EPA also noted that the extent, location, and direction of the storm drain is not known. Finally, the fourth paragraph recommends that Navy take additional actions, including:

- Collection of pore water samples via Henry samplers, to supplement the groundwater seep piezometer survey that Navy has already proposed;
- Collection of additional sediment samples, around the docks and shore line, for PAH analysis;
- Development of a more accurate understanding of the storm drain network, including catch basin locations, points of infiltration and discharge, water table depths, etc.

RTC GC 27: Navy's response to this comment states that EPA's conclusion regarding the distribution of PAHs is based on Figure 4-8 of the Phase II SLERA, which shows the predicted total PAH contours in the southern part of Allen Harbor. The Response goes on to state that EPA "...should reconsider the PAH gradients" in the harbor, suggesting that concentrations are higher around the dock pilings than in neighboring open-water areas.. Navy's response cites three samples (AH-32, AH-33, and AH-45) in the vicinity of AH-29 and suggests that, because these are lower in EPAPAH concentrations than AH-29, there is a 'concentration gradient' indicating that the marina pilings are the source of PAHs in the sediment. The sample locations cited in this Response are indeed lower in PAH concentration than the implied "source area" (the southern dock), but Navy's argument is not well supported because:

- The number and distribution of samples is too sparse to develop a persuasive picture showing a concentration gradient in the vicinity of the southern dock;
- Two other samples taken immediately adjacent to the docks, AH-23 (EPAPAH = 11.9 mg/kg) and AH-17 (EPAPAH = 6.88 mg/kg), do not show particularly elevated PAH concentrations.

Navy's conclusion regarding the incomplete pathway from the source area to the sediments is not consistent with the plot provided by EPA showing a strong correlation

between PAHs in site groundwater (03 28-GW-07S) and Seep 16-01).

Navy's Response concludes with a statement of intent to survey the storm drain system, including known inlets and outlets and any other relevant data. EPA endorses this task, as this information will be critical to an accurate assessment of the contribution that may be transported into the harbor sediments via this pathway.

In addition, the Response indicates that Navy will also conduct "[A]dditional work...for further evaluating PAHs from the marina and storm sewer systems." When will this additional work be performed? What will this involve? Which media will be sampled, where, and how many locations/samples? What type(s) of analysis? Will Navy produce a Work Plan and if so, will all parties have a chance to discuss this? Please provide additional details regarding this additional work in response to this letter.

Comments on Appendix B, Final Report, Environmental Forensic Investigation, Site 16

EFI Comment 1: This comment asked for a more thorough discussion of the weathering of creosote and how various fate and transport processes might be expected to affect the PAH signatures at the source area as well as in the harbor sediments. Navy's Response briefly explains that 2- and 3-ring PAHs are more susceptible to weathering (e.g., by volatilization, dissolution, biodegradation) and the 4- to 6-ring PAHs are more stable and thus relatively less mobile than the lighter PAHs. However, the response did not discuss how weathering affects individual PAH compounds that are observed in the Site 16 source and study areas, or attenuation during transport, both by overland surface flow (in solution and adsorbed onto particulates and/or colloids) and through groundwater discharging into the Harbor. For example, EPA specifically asked how weathering might have affected the observed anthracene/phenanthrene ratios (A0/P0) in Site 16 soils and harbor sediments. In light of the significance placed on these ratios as a key part of the fingerprint of source-area creosote (e.g., Sec. 4.3, p. 12), please address this question. Please consider the possibility that weathering of source-area soils by relatively low-pH meteoric infiltration, under aerobic conditions, and with a terrestrial microbial population, may yield an A0/P0 ratio in the harbor sediments (a saline and suboxic to anoxic environment, with different microbiota) that may not necessarily reflect the ratio observed at the source area. A more extensive discussion of differences between source-area and harbor sediment samples should also acknowledge that the A0/P0 ratios from source-area samples vary widely, from approximately 2 in the sample from Source 1-2 to 0.14 in soil from Source 2-1. Finally, analytical uncertainty should also be acknowledged, i.e. some duplicate analyses report values varying by as much as a factor of nearly 2. The magnitude of this uncertainty becomes more important for ratios of other constituents, such as benzo(b)fluoranthene/benzo(j,k)fluoranthene; fluoranthene/pyrene; and benzo(e)pyrene/benzo(a)pyrene; as these ratios are generally closer to unity than A0/P0.

EFI Comment 2: This comment requested clarification of the rationale for comparing study area sediments to samples from three reference areas that are “physically dissimilar” to Allen Harbor. The Response assumes that Allen Harbor traps the same suspended particulates and thus the same mix of PAHs as the Reference Areas. The Response states that “...relative abundances of hydrocarbons (e.g. the PAH source signature) is expected to be similar in Reference Area and Allen Harbor sediments” while absolute abundances vary due to localized factors. These factors include dilution due to a higher influx of sand, and increased concentration in areas with higher sedimentation rates. A third factor is “...land use (runoff from more urbanized areas will contain higher levels of PAHs relative to residential or undeveloped areas.)” Given that the contribution from localized runoff will have different proportions of the various PAHs dependent on the localized sources, how can this statement be reconciled with the previous sentence indicating that the PAH source signature should be similar in Reference Area and Allen Harbor sediments?

EPA believes the data presented are inconclusive to agree with the Response, that “[T]he PAH concentration gradients and source signatures both suggest that the marina and storm water runoff represent the most significant sources of PAHs in Allen Harbor.” As stated in the discussion of the RTC GC 27, the data do not show a compelling gradient with the (southern) dock as a point source. Rather, a general overview of the distribution of PAHs in Allen Harbor sediments suggests that PAH concentrations in sediments collected in close proximity to the docks are not uniformly high, as might be expected if the docks are the source. Although sampling density is clearly higher at the southern end of the harbor, the number and distribution of forensic samples is not sufficient to demonstrate unequivocally that the docks are the source of PAHs in harbor sediments. The contribution from the storm water discharge point requires further investigation. If storm water runoff is a significant source of PAHs in Allen Harbor, a correlation with lead (Pb) might be expected. However, other than locations AH-50 (storm drain outfall) and AH-28 (southeastern shoreline), no correlation of PAHs with Pb is apparent.

As was discussed in the meeting on Friday additional source area forensic studies should be performed on the “new pavement” and “old pavement” to conclusively tie the pavement at the former NCBC site to the sediment in Allen Harbor.

EFI Comment 3: The Comment questioned the absence of ‘weathered creosote’ among the reference materials used in the Environmental Forensic study (i.e., those listed in Sec. 2.3). The Response states that samples from the location of the creosote dipping operations (Source 1-1 and 1-2) constitute “weathered creosote” and that no additional reference samples are necessary. Please see the preceding discussion and questions related to creosote weathering (EFI Comment 1); the intent of EFI Comment 3 was to assess the extent to which the reference materials included creosote samples, containing different formulations, that had undergone weathering in both terrestrial and marine environments. If Navy feels that additional reference materials are available in the literature cited in EFI Comment 1 and the Response, those data should be incorporated into the forensic report.

In addition to samples of “weathered creosote” from Source Area 1, please consider taking samples of the pilings at locations corresponding to sediment samples, to demonstrate effects of creosote weathering in the marine environment and also any effects that may be attributed to transport processes in harbor sediments.

EFI Comment 4 and Response address the need for further exploration and delineation of the stormwater outfall pipe. *[The Response to Comment 4 states that the impact of the seeps to the Allen Harbor sediments appears minimal. The plot EPA provided to the Navy in the previous response to comment document showing the strong correlation between individual PAHs in groundwater from 03 28-GW-07S and Seep 16-01 appears to contradict this. This issue was discussed at the December 8th meeting and EPA is satisfied that the Navy will be doing additional investigation to delineate the source of Seep 01.]*

EFI Comment 5: EPA believes that the data are inconclusive with respect to Navy’s assertion that PAH concentrations in Allen Harbor are homogeneous. Navy’s Response repeats text from RTC GC 27 and EFI Comment 2 stating that the dock pilings and storm water are the “most likely” sources of PAHs in Allen Harbor. Please see (above) discussion of those responses.

[The Response asserts that “EPA incorrectly associated AH-35 with the Seep 16-01” and that this sample location is next to a marina piling. In the “Comments” column in Table 2-3, location AH-35 is characterized as “gradation from seep” even though it is located near a piling.]

EFI Comment 6. The Response is satisfactory.

EFI Comment 7. In this Comment, EPA questioned Navy’s statement (p.10, Sec. 4.4, 2nd bullet) regarding the significance of anthracene enrichment. From the Response, it is clear that Navy had intended this term to mean ‘enrichment of anthracene *relative to phenanthrene*’ as an indicator of chemical refining. EPA appreciates the clarification and continued discussion during the December 8th meeting. As noted in the discussion of the RTC Comment 1, the ratio of anthracene to phenanthrene (A0/P0) in Source Area 1 soil is relatively high (1.46 and 1.97 in Source 1-1 and 1-2, respectively). However, in the remaining source areas, the A0/P0 ratio varies from 0.14 (Source 2-1) to 0.28 (Source 3-2). The accompanying plot shows the distribution of A0/P0 in Allen Harbor sediments. Samples with the lowest A0/P0 (from 0.18 to approximately 0.3, consistent with Source Areas 2, 3, and 4) are located along the southern shoreline and A0/P0 increases to the north, with the exception of the sample adjacent to the pilings at AH-29 (A0/P0 = 0.51).

Recommendations

NCBC Davisville Site 16

1. *Collect additional soil samples from the Site.* The three pairs of samples (from Source Areas 1, 2, and 3) are not sufficient for adequate characterization of the

variability of the various PAHs known to be present. Samples should be collected from surface and subsurface soils, and target areas should include the southern part of the site (near the intersection of Westcott and Davisville Roads) as well as the rest of the area within the “extended boundary of potential historical creosote dipping operations.”

2. *Collect “new pavement” and “old pavement” source samples.* As was discussed in the December 8th meeting, forensic analysis should be performed on the pavement suspected to be the source for the storm water sediment.
3. *Groundwater sampling.* MW 16-07S, Source Area 2, this well and others downgradient should be sampled and forensic analysis performed to determine if the same material collected in the soils has partitioned into the groundwater, since conventional sampling and analysis had not been conclusive.
4. *Demonstrate variability (if present) in marine-piling creosote and collect additional samples if necessary.* For example, the report and the PowerPoint presentation focus on the sample collected at location AH-29, next to the southern dock, as an example of a ‘point source.’ Samples were also taken next to pilings at AH-17 (for quantitative, forensic, and screening analyses) and at AH-23 and AH-35 (quantitative and screening). If these samples show different fingerprints from AH-29, additional samples may be required for adequate characterization of creosote attributed to the marina structures. It is recommended that samples of the pilings be analyzed to determine if these sources are the same as the sediments next to the pilings. While the Navy stated it was not their job to determine the sources of the PAHs in the sediments, analyzing the creosote flaking off the pilings would go a long way in explanation to the public for lack of sediment cleanup and reduce the uncertainty of the current data set.
5. *Develop a flow chart or other schematic that summarizes the forensic evaluation process for the non-specialist.* We acknowledge that this is a highly complex process and that Navy has taken great care both in their execution of the forensic analysis and in their documentation of the results. It would be helpful for those who are not specialists in this field, including the general public, to see the key steps in the evaluation process in summary form, e.g. as a ‘bulletized list’ or some other abbreviated format. This list would include the principal elements that are used in the forensic process – for example, the ratios of anthracene to phenanthrene, benzo(b)fluoranthene to benzo(j,k)fluoranthene, and benzo(e)pyrene to benzo(a)pyrene; key peaks used in the hydrocarbon fingerprinting; etc. A table showing how the sediment samples do or do not conform to the diagnostics (e.g., if a ratio is used, report the value and the associated uncertainty; if specific chromatogram peaks are diagnostic, indicate presence or absence; etc.) would render the forensic evaluation process more accessible to non-chemists. A more succinct presentation would make it easier for the layman to see how the data do or do not support the Navy’s conclusions. Such a chart included in a Proposed Plan

for the site may create both an understanding and acceptance of the Navy's position.