



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION I

J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203-2211

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NCBC DAVISVILLE  
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April 29, 1994

Ms. Marilyn Powers  
U.S. Department of the Navy  
Northern Division - NAVFAC  
10 Industrial Highway  
Code 1823 - Mail Stop 82  
Lester, PA 19113-2090

Re: Draft Detailed Analysis of Alternatives, Site 09, Allen Harbor  
Landfill, Naval Construction Battalion Center, RI

Dear Ms. Powers:

Pursuant to § 7.6 of the NCBC Federal Facility Agreement (FFA), please find attached the Environmental Protection Agency's (EPA) preliminary comments on the above referenced document. We are requesting a fifteen day extension pursuant to § 7.6 (g) of the NCBC Federal Facility Agreement (FFA) in order to provide final comments. We will make every effort to submit comments prior to May 16, 1994.

Overall I found the timing of the subject document premature. The Remedial Investigation (RI) has not yet been fully evaluated. Your presumption of no human health or ecological risks attributable to the landfill have not yet been proven sufficiently.

The subject document does not fully evaluate the impacts of the proposed alternatives on the surrounding ecosystems. A discussion should be included of the impact of the alternatives on the surrounding groundwater flow. To answer these questions you may want to do additional groundwater modeling.

To provide a long-term protective final cover at all Superfund landfill sites, EPA requires a multilayered composite barrier cap including a two-component low-permeability layer (geomembrane(GM)/compacted clay liner (CCL)) as described in the EPA RCRA Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments (EPA/530-SW-89-047, July 1989). The recommended capping alternative of either a native soil cap or a RCRA Hybrid cap should be changed to recommending a RCRA "C" cap only. A native soil cap alone will not provide enough protection to the environment.

The main problem with a RCRA Hybrid cap (i.e. a single geomembrane barrier) is that once the geomembrane is punctured or has a hole due to defective design or due to mechanical failures during and after



construction, much larger leakage through the geomembrane can be experienced. Thus, a single layer geomembrane cover is not as effective as a composite barrier cap in impeding movement of liquid through the landfill.

I look forward to discussing these comments at your earliest convenience, please contact me at (617) 573-5736.

Sincerely,



Christine A.P. Williams  
Remedial Project Manager  
Federal Facilities Superfund Section

Attachment

cc: Richard Gottlieb, RIDEM  
Lou Fayan, NCBC  
Tim Prior, US F&W  
Yoo-Jean Choi, EPA/Superfund Support  
M. Peter Holmes, EPA/Wetlands Protection  
Mary Sanderson, EPA/Federal Facilities Superfund  
Patti Tyler, EPA/Biology

## General Comments

1. The recommended alternative (cap installation with containment of toe sediments, deed restrictions, and long-term monitoring) has been selected prematurely with insufficient information and essentially ignoring the potential for contaminants, currently in the ground water, to travel horizontally into Allen Harbor. Thus, the ability of the recommended alternative to meet the Remedial Action Objectives is not sufficiently proven.

If only a cap is installed, the contaminants currently beneath the water table will continue to leach from the landfill into Allen Harbor. The assumption that there are no current or future human health or ecological risks resulting from exposure to those contaminants leaching from the landfill into Allen Harbor is premature. Insufficient information exists at this time to draw the conclusion that no risks can be attributed to the landfill. Previously submitted comments indicate that the risk assessments, both human health and ecological, conducted for Allen Harbor Landfill are incomplete (see February 8, 1994 comments on the Draft Allen Harbor Landfill RI Report, and the Ecological Risk Assessment Appendix R of Draft Volume II Remedial Investigation Report). Information required, but not yet available, to assess the proper remedial action for Allen Harbor includes the following:

- Quantification of human health risks resulting from exposure to surface water in Allen Harbor contaminated as a result of contaminants leaching from the landfill
- Quantitative or qualitative risk analyses for all of the selected contaminants of concern (COCs) for a significant number of species/exposure zone pairings
- COC-specific Hazard Quotients (Hqs) for all of the COCs and indicator species for which food chain exposures were assessed in the ecological risk assessment
- Aggregate Hazard Indices (HIs are sums of HQs) for the exposures of benthic communities, pelagic communities (water column), and indicator species to mixtures of COCs in all exposure zones
- HQs and/or HIs for both the average and maximum (or upper bound) COC concentrations for sediment and surface water exposures (average and upper bound HQs, but no HIs, were calculated only for upland soil and Shrews)

Although the ecological risk assessment comments pertain to the entire site, until the issues pertinent to Allen Harbor Landfill are properly addressed, the assumption that no ecological risks can be attributed to the landfill is incorrect.

In addition to the risk information that is currently unknown, the

expected fate and transport of the compounds within the landfill, which ideally should be evaluated prior to assessment of risks, have not been fully developed. In order to thoroughly evaluate the potential effectiveness of remedial alternatives, the behavior of contaminants within the landfill must be known. At a minimum, this includes understanding the mass of contaminant currently leaching from the landfill, where it is traveling, and its rate of travel. Additionally, the estimated behavior of the contaminants resulting after the implementation of each possible alternative (i.e., those carried through for detailed analysis) should also be evaluated. This may need ground water modeling to answer.

Given the uncertainty of potential risks and behavior of contaminants associated with the landfill, it is of concern that recommendation of a preferred alternative at this time could influence alternative recommendations as additional information became available. This could result in implementation of a remedial measure that does not provide sufficient protection to human health and the environment, and such that costs much greater than would have originally been required to implement measures that will provide protection.

For example, if the selected remedy for the landfill only requires cap installation with no vertical containment to divert ground water flow, and additional information indicates that risks to potential receptors are significant, the installation of vertical barriers (e.g., sheet pile wall, bentonite-soil slurry wall) after construction of the cap will prove more costly and problematic than if installed prior to cap construction. The cap will require repairs after completion of the vertical barrier installation and the construction activities could result in damage to the cap in areas away from the alignment of the vertical barrier. For this reason, no recommended alternative should be provided at this time until all information is available.

2. A clear conceptual understanding of the various alternatives is not possible given the information provided in this Feasibility Study. The following information, at a minimum, should be provided for the capping only alternative, the capping with vertical barriers alternative, and the capping with pump and treat alternative:

- A scaled cross section and plan view of the landfill identifying the location of Allen Harbor and adjacent wetlands

- The location of the various components of the landfill, such as the soil layers, liners, and armored barriers for the landfill toe sediments

- The maximum, minimum, and average expected water table elevation beneath the landfill after construction of the cap, as well as the maximum minimum, and average sea level and surface water elevation in the wetlands

- The position of the waste relative to the water table, and ground water flow directions
3. Potential risks associated with the construction of the remedial alternatives have not been evaluated. These risks include exposure to contaminants, either volatilized or adsorbed to dust, during excavation of landfill materials. The potential receptors would be nearby residents or workers on the Navy site. The workers would not include those constructing the cap, but rather those working at other facilities on the base.
  4. The potential effects of hurricanes or large storms on the landfill (and various potential alternatives) have not been addressed. The proximity of this landfill to Narragansett Bay could result in significant impacts to the landfill during a hurricane or large storm, where significant tidal surge could occur. These potential impacts should be evaluated and given consideration when developing the conceptual design of each remedial alternative.
  5. The Remedial Action Objectives developed for this site consistently use the term "minimize" rather than prevent. This implies that significant risks could remain if the current risks are only minimized. For example, if human health risks are currently  $10^{-2}$ , they could be minimized to  $10^{-3}$  and still pose an unacceptable risk to human health. Use of the term "prevent" in place of "minimize" would seem to be more consistent with the guidance (see pg. 4-10 of Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, EPA 540 G-89 004, Oct. 1988).
  6. The method of evaluating Environmental Risk-Based Remedial Goals is insufficient (Section 3.2.3, pg. 3-7). Only two samples were used to determine if sediment concentrations exceeded the NOAA ER-L or ER-M criteria. Within these two samples, PAHs, 4,4-DDD, and inorganics actually did exceed the criteria. However, after noting that these two samples did have exceedances of the criteria, TRC then states that ecological risks were not identified for the Allen Harbor marine environment, the argument being that the samples were collected from sediments not typical of locations in Allen Harbor where organisms would typically live. The fact that these sediments may not be typical of habitats in the harbor is likely true; however, the data indicate a potential problem. Further assessment should be conducted to evaluate the potential impact to marine organisms in the harbor. Ideally, this assessment would include collection of sediments in the harbor where the marine organisms are expected to live. However, given that this information is not available, some simple mass transport calculations should be made estimating the amount of contaminant expected to leach to the harbor and the sediment concentrations associated with this mass (see Comment 1 above).

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7. The calculations conducted to assess vertical leaching of contaminants from soils into the ground water below the landfill are appropriate (Section 3.2.4, pg. 3-8). However, they fail to address the potential horizontal leaching of contaminants currently present beneath the water table into Allen Harbor.
  8. There appears to be no discussion of excavating and treating/disposing of any hot spots of contamination at the Allen Harbor Landfill. Selective treatment of the hot spots (i.e., lead) in the landfill might significantly reduce the total contamination at the site while not being excessively costly. Then the existing analysis of the various methods of capping could be used for the remaining materials at the site.
  9. To provide a long-term protective final cover at all Superfund landfill sites, EPA requires a multilayered composite barrier cap including a two-component low-permeability layer (geomembrane(GM)/compacted clay liner (CCL)) as described in the EPA RCRA Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments (EPA/530-SW-89-047, July 1989). For proper selection of the conceptual cover components the following should be also considered at your site:
    1. Depth of Frost Penetration: The low permeability layer must be located below the maximum depth of frost penetration. In other words, the vegetative layer and drainage layer together should be thicker than the maximum frost penetration depth at the site.
    2. Thickness and Type of the geomembrane: The minimum thickness of the geomembrane required for the final cover is 36 mil (PVC) and 40 mil (VLDPE). A HDPE geomembrane is not recommended due to its lack of strain and flexibility.
    3. Alternative Composite Barrier Cap (Geomembrane/Geosynthetic Clay Liner (GCL): The low permeability CCL may be substituted with GCL on the basis of hydraulic equivalency and constructibility, in areas where the slope is less than the interfacial friction angle (about 8 degrees) between the geomembrane and hydrated GCL. In areas where the slope is greater than approximately 8 degrees, the textured geomembrane and good soil bedding layer such as ML an SM (the maximum rounded particle size of 3/8 inch) in the unified soil classification system may be considered to promote side slope stability. The infiltration on side slopes will be minimal as the side slope enhances surface runoff.
  10. If a GCL is proposed for the RCRA "C" cap instead of 2' clay layer, the alternative cap provides better performance and easier installation at a significant cost savings.
  11. The recommended capping alternative of either a native soil cap or a RCRA Hybrid cap should be changed to recommending a RCRA "C" cap. The main problem with a RCRA Hybrid cap (i.e. a single geomembrane

barrier) is that once the geomembrane is punctured or has a hole due to defective design or due to mechanical failures during and after construction, much larger leakage through the geomembrane can be experienced. Thus, a single layer geomembrane cover is not as effective as a composite barrier cap in impeding movement of liquid through the landfill.

### Specific Comments

1. Page 2-3: First Paragraph, 1st Sentence

Underlying the fill material of the landfill, reference is made to a native sand and silt unit having interbedded lenses of organic silts and peat. This would be of concern in determining long-term settlement rates of the landfill, but has not apparently been addressed.

2. Page 3-9: First Paragraph, 2nd Sentence

This is a confusing statement to read. The technical explanation of the Summers and unnamed model methods is given in Appendix C.

3. Page 3-15: Fourth Paragraph, 2nd Sentence

Documentation of method and/or data used in calculation of landfill material volume should be shown.

4. Page 4-13: Fourth Paragraph, 1st Sentence

A determination of the landfill cap's stability and effectiveness of erosion control can only be ascertained after a detailed design analysis has been performed.

5. Appendix E

Several alternatives indicate a cost item, "Regrade Site and Cutback," for 44,450 cu. yd. How was this volume calculated? If this activity involves flattening of the steep harbor side slopes, exposing the existing waste would raise human health and ecological risk issues.

6. Figure 4-3

Indication of HDPE as a possible geomembrane material is not appropriate due to its poor strain and durability characteristics. Very Low Density Polyethylene (VLDP) is a better choice for landfill cap geomembrane material.

7. Table ES-3, Table 4-7, and Table 4-23

Replace "Description" in the header with "Comparison of Overall Protection of Human Health and the Environment."

8. Table ES-4

Remove or realign the second "Not Applicable" under the Action Specific Heading.

9. Table ES-5, Table 4-9, and Table 4-25

Replace "Description" in the header with "Comparison of Long-Term Effectiveness and Permanence."

10. Table ES-6, Table 4-10, and Table 4-26

Replace "Description" in the header with "Comparison of Reduction in Toxicity, Mobility or Volume."

11. Table ES-7, Table 4-11, and Table 4-27

Replace "Description" in the header with "Comparison of Short-Term Effectiveness."

12. Table ES-8, Table 4-12, and Table 4-28

Replace "Description" in the header with "Comparison of Implementability."