



STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Department of Environmental Management
DIVISION OF SITE REMEDIATION
291 Promenade Street
Providence, R.I. 02908-5767

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

Dear Ms. Powers:

The Division of Site Remediation has conducted a review, to the extent practicable at this time, of the *Draft* Detailed Analysis of Alternatives Report for Site 09 - Allen Harbor Landfill. Due to the substantial information still outstanding, specifically Human Health and Ecological Risk information as well as complete fate and transport data, the remedial alternatives presented in this report cannot be fully evaluated at this time. The comments and concerns generated by our limited review are attached.

Of primary concern to the Department and as we have stated in the attached comment package, the report failed to evaluate a "traditional" RCRA C cap. Given the past disposal history of this site, strong consideration must be given to this type of closure or at least one that exhibits equal or greater performance criteria. The Department will certainly consider other remedial alternatives presented, however, the alternative providing the greatest reduction in risk and thereby protection of human health and the environment, will be given the strongest consideration. Obviously, feasibility of implementation will also be weighed heavily.

Finally, it has come to our understanding that the Navy has had some preliminary discussions with the EPA regarding remediation of this site in a phased approach (i.e. operable units) similar to the methodology employed for the McAllister Point Landfill at the Naval Education Training Center (NETC) in Newport. We would be more willing to endorse such an approach provided that the any Record of Decision signed for an operable unit clearly commits the Navy to a schedule for continued investigation and subsequent operable unit(s) remediation ultimately resulting in a comprehensive whole site remedy.

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M. Powers
17 May 1994

If during your review, you have any questions regarding our comments, please contact Richard Gottlieb or Judith Graham at (401) 277-2797.

Sincerely,


Warren S. Angell II, Supervising Engineer
Division of Site Remediation

cc: R. Gottlieb, DEM DSR
J. Graham, DEM DSR
T. Gray, DEM DSR
C. Williams, EPA

DRAFT
DETAILED ANALYSIS OF ALTERNATIVES REPORT
SITE 09 - ALLEN HARBOR LANDFILL
MARCH 1994

RIDEM Division of Site Remediation Comments:

General Comments:

1. Due to the lack of a complete and final Remedial Investigation (RI), it is not possible for this Division to fully evaluate the selected remedial alternatives. The primary deficiencies at this time relate to the lack of finalized human health and ecological risk data as well as complete fate and transport information.

Given the lack of a finalized RI this report would be more beneficial if it reviewed a broader range of potential alternatives.

At a minimum, the alternatives must consider a "traditional" RCRA C cap, or one which exhibits equal or greater performance criteria, as the landfill has historically received large volumes of hazardous wastes/materials.

Also, consideration may also be warranted for the modified limited action alternative presented by Mr. Robert Johnston. As Mr. Johnston has obviously devoted many hours of research into this project under your guidance, his "ecological" restoration alternative or some variation thereof may warrant an engineering evaluation.

Finally, the Department would like to see the evaluation of a closure plan consistent with RIDEM Solid Waste regulations.

2. In order to thoroughly evaluate the performance of any capping scenario for the landfill, each alternative should evaluate its impact on the fresh water lens and the salt water groundwater. Also, the report should more thoroughly evaluate the potential effects on the water table which would result from the installation of a slurry wall or by sheet pile.
3. Utilizing Figure 2-8 Geologic Cross Section B-B' as presented in the RI, this report should compare and contrast salinity measurements and contamination levels for both shallow and deep wells at peak and low seasonal flows to provide a better understanding of the site hydrogeology.
4. In considering a whole site remedy for the Allens Harbor Landfill, consideration should be given to existing documentation available for barrier beaches and littoral and oceanic islands as the conditions at this location may share similar characteristics, specifically, these areas are those whose only route for freshwater recharge is through rain fall infiltration. In instances such as these, the aquifer most often exists in an unconfined condition with fresh water present in a lens above the heavier sea water. Further

information pertaining to this topic is readily available in the literature.

We bring this to your attention as it should be considered and factored into any modelling conducted for this site and subsequently factored into the decision making process.

5. Please be advised that all alternatives must take into account a 30 year ground water monitoring program which is retroactively required for all landfill closures in Rhode Island.
6. If the Navy has not already done so, it is important that communication is initiated with the Coastal Resources Management Council (CRMC). They will have a significant role in the selected remedy implementation.
7. As MSL datum throughout much of the east coast is based upon outdated information, additional seasonal measurements would be beneficial to determine varying hydraulic gradient between the salt marsh and the harbor. Site specific could be obtained through long term tide gauging data. This information would be beneficial to the remedial evaluation process.

Specific Comments:

1. **Executive Summary, Background;
Page ES-2, 5th Paragraph:**

"While ground water contamination was detected, ingestion of ground water is not anticipated to be a potential exposure pathway, based on the site's proximity to Allen Harbor and the probable brackish quality of the ground water."

The results of the supplemental Phase II RI work for Allen Harbor Landfill, when available, should be used to determine the nature of the water at this site and its possible ingestion as a potential exposure pathway.

2. **Executive Summary, Feasibility Study Summary;
Page ES-4:**

In order to fully evaluate Remedial Action Objectives, the Division needs to further evaluate containment distribution and migration mechanics and potential. This task will be required for the finalization of the Remedial Investigation.

3. **Executive Summary, Feasibility Study Summary
Page ES-6, Alternative 3 - Containment:**

If this alternative is selected, with either a hybrid or RCRA Subtitle "C" cap, gas vents may be required along with complete fencing around the landfill to restrict access. This should be noted in this section and in Table ES-2.

**4. Executive Summary, Alternative 3 - Containment;
Page ES-6, Second Paragraph:**

"The cap would also reduce the potential for leachate seeps to discharge directly to Allen Harbor, especially if a single-barrier cap was utilized."

The above statement is currently undergoing evaluation by this Division.

As mentioned in the General Comments, it would be prudent to consider more alternatives at this time in the investigation. Along with the additional alternatives mentioned above, future submittals of this report should also include evaluation of a native soil cap with a selective vegetation plan which maximizes evapo-transpiration.

Also, the Division believes that a model is required which takes into consideration tidal effects and specific geologic and hydrogeologic conditions at Allen Harbor.

**5. Executive Summary, Alternative 4 - Containment With Ground Water Treatment;
Page ES-7, 1st Paragraph, 1st Sentence:**

"This alternative would also be protective of human health and the environment although the reductions in potential ecological risk associated with ground water remediation may not be justified by the costs associated with providing vertical containment and groundwater treatment."

Regardless of the issues surrounding risk reduction versus costs, the Division requires a technical evaluation of the effectiveness of vertical containment under site specific conditions. The purpose of a Feasibility Study, or in this case a Detailed Analysis of Alternatives, is to consider such issues once all the data, including costs, is compiled.

**6. Executive Summary, Recommendations and Conclusions;
Page ES-8, 1st Paragraph:**

"Based on the lack of ecological impacts attributable to contaminated ground water migration identified during site and Allen Harbor ecological studies, the lack of ground water treatment is not expected to adversely effect the environment."

It should be noted that the results of the Ecological Risk Assessment For Allen Harbor, Narragansett Bay, RI, presented by Robert K. Johnston at the 5 May 1994 RAB meeting contradicts this statement.

Also, for the purposes of potential future reuse, please be advised that if Alternative S/W 3B (RCRA Hybrid Cap) is chosen as the preferred alternative, access control would be required at the site, thereby limiting future recreational use.

**7. Section 1.4.2, Regional Hydrogeology;
Page 1-9, 4th Paragraph:**

"GB ground water is not suitable for public or private drinking water use"

The report should note that with treatment, GB ground water is suitable for drinking. Please correct the above statement to reflect this.

**8. Section 1.4.2, Regional Hydrogeology;
Page 1-10, 2nd Paragraph:**

When discussing the Hunt Ground water reservoir, the report should note that it is a sole source aquifer.

**9. Section 2.3.2, Site Hydrogeology;
Page 2-4, 3rd Paragraph:**

Typo: August 19, 1993 should be changed to August 13, 1993.

**10. Section 2.6.1, Volatile Organic Compounds, Subsurface Soils;
Page 2-10, 2nd Paragraph:**

TP-2-21 and TP-9-20 are not found on Figure 2-6. Please locate on the figure.

**11. Section 2.7, Risk Assessment Pilot Studies (Allen Harbor Studies);
Page 2-25, 3rd Paragraph:**

"Samples of Mya were collected at 20 stations, and evaluated in the laboratory for rate of infliction within each subpopulation."

The report should state the conclusions of this study.

**12. Section 2.7, Risk Assessment Pilot Studies (Allen Harbor Studies);
Page 2-26, 3rd Paragraph:**

Please define "aggregated metric".

**13. Section 3.2.1, Comparison of Contaminants to ARARs/TBCs;
Page 3-2, Soil Contamination Evaluation:**

It is stated that the only standards/guidance levels applicable to soils which have been identified are those related to PCB and lead contamination. Please explain why risk-based levels are not being considered.

**14. Section 3.2.4, Contaminant Migration Considerations;
Page 3-9, 4th Paragraph:**

"Since the ground water at Site 09 is thought to be brackish, with no potential use as a source of potable water....."

This statement is premature since the supplemental Phase II RI studies are still being conducted. These studies will aid in determining the nature of groundwater at this site.

**15. Section 3.3, Remedial Action Objectives;
Page 3-15, Sediment:**

The report should explain how environmental impacts associated from exposure to contaminated sediments will be minimized without creating more significant adverse environmental impacts.

**16. Section 4.2.6 Alternative S/W-3 - Containment Alternative Evaluation;
Page 4-9, Short-Term Effectiveness:**

It is estimated that this alternative will take two years to construct. Please explain why the risk analysis for the construction worker scenario is based on one year of exposure.

**17. Section 4.2.7, Alternative S/W-3A - Native Soil Cap Containment Option
Description:
Page 4-10:**

Figure 3-2 should be Figure 4-2.

**18. Section 4.2.9, Alternative S/W-3B - RCRA Subtitle C Hybrid Cap Containment
Option Description;
Page 4-13, 3rd Paragraph:**

Figure 3-3 should be Figure 4-3.

**19. Section 4.2.10, Alternative S/W-3B - RCRA Subtitle C Hybrid Cap Containment
Option Evaluation;
Page 4-17, Cost:**

Appendix E shows the cost of the revetment (shoreline protection) to be \$321,000. Please explain why the discussion on this page shows the cost of the revetment to be \$500,000.

**20. Section 4.2.11 Alternative S/W-3C - RCRA Landfill Cap Containment Option
Description:
Page 4-18, 1st Paragraph:**

Figure 3-4 should be Figure 4-4.

**21. Section 4.2.12 Alternative S/W-3C - RCRA Landfill Cap Containment Option
Evaluation:
Page 4-20, Implementability;**

It is stated that sufficient volumes of low-permeability soil for the barrier may be difficult

to obtain. Please note that an article in the 20 April 1994 edition of the Providence Journal says there will be *free* clay available from the Boston Central Artery project. It may be worthwhile for the Navy to request material for this project.

In addition, if options 3B or 3C are chosen gas vents might also be required along with a fence to restrict site access.

**22. Section 4.3.2, Compliance with ARARs;
Page 4-23, 2nd Paragraph:**

"In addition, storm water discharge monitoring would be conducted in accordance with NPDES and RIPDES requirements."

The State of Rhode Island has been delegated authority, by USEPA, for the NPDES program. Therefore only the RIPDES requirements apply.

**23. Section 4.3.6 Implementability;
Page 4-25, 3rd Paragraph:**

If Allen Harbor Landfill is to be used for recreational or conservational purposes and alternatives 3B or 3C are implemented then consideration must be given to exposure from the gas vents that may be necessary.

**24. Section 4.3.6, Implementability;
Page 4-26, 1st Paragraph:**

Again it is stated that clay material for the cap may be difficult to locate. Refer to the previous comment on this subject.

**25. Section 4.4.2, Alternative GW-1 - No Action Alternative Evaluation;
Page 4-27, 1st Sentence:**

"Because no direct association between ground water quality and impacts to the environment has been clearly defined, the no action alternative could be considered protective of the environment."

It has not been shown that there is no relationship either, thus one cannot say that this alternative is protective of the environment. The statement should be removed unless a definitive statement one way or the other can be made.

**26. Section 4.4.3, Alternative GW-2 Limited Action Alternative Description;
Page 4-28:**

It is stated that ground water has no value as a potable water source due to brackish qualities may not be true for the entire site. The supplemental Phase II RI studies should better define where fresh and brackish water lie on the site and those results should be

incorporated into the feasibility study.

**27. Section 4.4.4, Alternative GW-2 Limited Action Alternative Evaluation;
Page 4-29, Overall Protection of Human Health and the Environment, 2nd
Paragraph:**

The Division is currently evaluating the relationship between ground water discharge and impacts to the environment. The Division requires this evaluation in order to establish the overall protectiveness of this alternative.

**28. Section 4.4.7, Alternative GW-2B - Deed Restrictions Option Description;
Page 4-33:**

It is stated that groundwater is expected to be too brackish for use as a potable water. The results of the supplemental Phase II RI may show areas of potable water.

**29. Section 4.4.10, Alternative GW-3 - Containment Alternative Evaluation;
Page 4-35, Short-Term Effectiveness:**

It is noted that some increased short-term risk could result from the implementation of this alternative although personal protective equipment could be used to minimize these risks. Please describe what would be done to minimize the risks to the ecological environment.

**30. Section 4.4.13, Alternative GW-3B - Sheet Piling Containment Option Description;
Page 4-38, 2nd Paragraph:**

It should be noted that sheet piling need not necessarily go to bedrock. If a low permeability clay can be found in the soil strata the sheet piling need only go to this depth.

**31. Section 4.4.21, Alternative GW-4C - UV Oxidation Organic Treatment Option
Description;
Page 4-49, 3rd Paragraph:**

In order for UV to work the water must have a low suspended solids concentration (low turbidity), usually less than 25 mg/l of suspended solids. This should be considered since during Phase II RI testing, turbidity was discovered to be a problem. Turbidity could significantly impact the effectiveness of this alternative unless treatment to remove turbidity is provided prior to the UV unit.

Accordingly, the costs associated with turbidity reduction must be considered.

**32. Section 4.4.23, Alternative GW-4D - Precipitation Inorganic Treatment Option
Description;
Page 4-52, last Paragraph:**

The report should indicate whether the sludge generated from this option would need to be disposed of as hazardous waste.

33. **Section 4.4.26, Alternative GW-4E - Membrane Microfiltration Inorganic treatment Option Evaluation;**
Page 4-56, Reduction of Toxicity, Mobility or Volume Through Treatment:

Please reference the Superfund site and DuPont treatment system used that produced sludge which passed TCLP tests.

34. **Section 4.4.27, Alternative GW-4F - Discharge to Surface Water Option Description;**
Page 4-57:

Alternative GW-4F is an integral part of all the other ground water treatment alternatives since the treated water must be discharged from the treatment system via some mechanism. It is therefore not a treatment alternative and should not be represented as such. The costs associated with this action, however, should be included with the other ground water treatment alternatives.

With respect to discharge of treated effluent, consideration could also be given to underground injection. This would then provide an alternative means of discharging treated effluent from the ground water treatment system.

35. **Section 4.4.28, Alternative GW-4F - Discharge to Surface Water Option Evaluation;**
Page 4-57, Short-Term Effects:

It is erroneous to state that no construction is required under this alternative as the discharge pipe must be installed in the ground. Please amend in future submittals.

36. **Section 4.6.2, Alternative SD-1 - No Action Alternative Evaluation;**
Page 4-63, Overall Protection of Human Health and the Environment:

".....compliance with ARARs would be dependent upon a continued lack of identification of impacts to the environment in the future. This alternative does not include any long-term monitoring to identify any potential changes to sediment quality, should they occur in the future."

These statements seem contradictory since monitoring would be required to determine if changes occur, yet no monitoring is proposed. Please clarify.

37. **Section 4.6.2, Alternative SD-1 - No Action Alternative Evaluation;**
Page 4-64, Implementability:

If no monitoring is done, the report should explain how impacts would be determined for the five-year review.

38. Figure 4-9, Chemical Precipitation Schematic:

Consideration should be given to adding a filter in between the flocculator/clarifier and pH adjustment unit operations to remove particles which did not settle out in the flocculator/clarifier. This would remove additional inorganics which did not flocculate and settle out of solution prior to pH adjustment and subsequent discharge back to the environment.

39. Table 4-29, Comparison Among Ground Water/Leachate Alternative Cost:

For alternative GW-4 - Extraction/Treatment Discharge, the total present worth is shown as ranging from \$2.4 to 13.0 million. Upon examination of the six options under this category, the total present worth ranges from \$93,000 to \$11,000,000. Please explain this discrepancy.

Additionally, the costs associated with option GW-4F - Discharge to Surface Water should be combined with other options under this category since it is applicable to all the options.