



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
JOHN F. KENNEDY FEDERAL BUILDING
BOSTON, MASSACHUSETTS 02203-0001

June 10, 1997

Mr. Philip Otis
U.S. Department of the Navy
Northern Division - NAVFAC
10 Industrial Highway
Code 1811/PO - Mail Stop 82
Lester, PA 19113-2090

Re: Addendum to the Sites 03 and 09 Phase III Work Plan, Offshore Geotechnical Sampling and Confirmation Study at Site 09 for the Installation Restoration Program at the former Naval Construction Battalion Center (NCBC), Davisville, Rhode Island

Dear Mr. Otis:

Pursuant to § 7.6 of the NCBC Federal Facility Agreement (FFA), the Environmental Protection Agency's (EPA) has initially reviewed the above referenced document. Please find our draft comments enclosed. Additional comments may be forthcoming within 3 weeks. These draft comments are forwarded to you at this time due to the perceived need for expedition of the work plan.

The Navy has previously proposed the use of a toxic effects threshold instead of either ERLs or ERM's to determine both the extent of sediment removal and evaluation of the performance of the remedy. EPA suggests that the Navy use this sample gathering activity to perform sediment toxicity tests also. EPA also suggests the Navy sample pore water for salinity, specific conductance and chemistry and gather a baseline of all parameters in the shoreline monitoring wells as was proposed in last summers draft Site 9 sampling plan.

EPA New England looks forward to working with the Navy and RIDEM toward development of this sampling plan and the long term monitoring plan for this site. If you have any questions about this letter please call me at (617) 573-5736.

Sincerely,

A handwritten signature in black ink, appearing to read "Christine A.P. Williams".

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

Enclosure

cc: Richard Gottlieb, RIDEM



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General Comments

1. The QA/QC analysis plan for this work is lacking and must be prepared for our review.
2. The proposed work will provide useful information about the distribution of contaminants in harbor sediments near the Allen Harbor Landfill. In addition to the work proposed, we suggest that the Navy consider sampling and analyzing fluids in pores from the soil samples for salinity and specific conductance. This information would be useful for determining the offshore extent of ground-water flow from the landfill area into Allen Harbor. Also, ground-water samples analyzed for chemicals of concern could provide information about partitioning of chemicals between the soils and water. We realize that this effort may require more water than can be extracted from cores; pumping from screens temporarily placed in the coreholes may be an option for collecting water samples.

The balance of this technical review focuses on two primary issues:

- (Issue 1) Is the proposed investigatory work sufficient to meet the intended objectives of the investigation.
- (Issue 2) Is the proposed investigatory work consistent with the pre-design sampling plan that was prepared for the subject site in the summer of 1996.

General Comments (Issue 1):

3. With respect to Issue 1, a determination of the adequacy of the subject report was difficult to ascertain, due in part to the general objectives of the investigation and lack of specific rationale for the locations of each soil boring. While the locations of the soil borings appear to be adequate to assess the geotechnical properties of the unconsolidated soils and sediment, it does not appear that the soil borings are adequate to confirm the results of the geophysical studies (magnetometer and seismic) conducted at the site earlier. As stated in the report, the soil/sediment boring locations were placed near the wells located on the perimeter of the landfill. These borings appear to be placed in locations ideally suited for confirming the continuation of possible preferential flow paths (ie. sandy layers) that were identified in the well logs for the wells bordering the perimeter of the landfill. Sandy layers were identified at the following depths in the wells located along the perimeter of the landfill:

MONITORING WELL*	APPROXIMATE DEPTH OF SAND LAYER
MW09-21	none
MW09-08	-5ft to -8ft msl
MW09-20	-5ft to -12ft msl

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MONITORING WELL*	APPROXIMATE DEPTH OF SAND LAYER
MW09-09	-5ft msl.
MW09-17	-12ft to -18ft msl
MW09-23	-13ft to -19ft msl
MW09-10	-2ft to -4ft msl
MW09-11	2ft to -4ft msl

*Well order is the order of the wells along the landfill from the SW to the NE.

4. With respect to the geophysical studies, of primary concern to EPA was the evaluation of preferential flow paths from the landfill to harbor sediments identified in the seismic reflection study. The seismic reflection study identified three “possible” buried channels, which, depending on their lateral and vertical extent, may likely be preferential flow paths. There are no proposed soil boring locations placed in these buried channels to confirm the results of the seismic study or attempt to confirm the possibility of these channels being preferential flow paths. It is recommended that additional borings be placed in areas to assess the possibility of these channels acting as preferential flow paths. These additional borings should include the same chemical analysis as the other soil borings. Additionally, specific rationale for each soil boring location should be provided to better evaluate the adequacy of the soil boring locations with respect to achieving the intended objectives of the investigation.

Specific Comments (Issue 1):

5. **Section 1 Introduction and Objectives, Page 1:** This section identifies three objectives: 1) provide data for design of shoreline revetment, 2) obtain chemical data, and 3) provide data to confirm previous geophysical studies. Further clarification is recommended.

6. Objective 2 appears to be more representative of an action to achieve an objective, than it is an objective. The intended purpose and use of the chemical data should be clarified and considered as the objective. Clarifying the intended use of the chemical data will allow for a more thorough evaluation as to whether the intended sampling scheme proposed is adequate to meet the intended objective.

7. With respect to Objective 3, a review of the soil/sediment boring locations (13 total) indicates that only one of the boring locations is located in an area designated as a magnetic anomaly or designated as a “possible” buried channel. The specific aspects of the geophysical studies which this investigative effort is intended to verify should be clarified (ie. stratigraphy, magnetic anomalies, etc.) in order to accurately evaluate the effectiveness of the intended investigation in meeting these objectives.

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8. One aspect of the geophysical studies of particular importance which does not appear to be addressed with the proposed sampling scheme (soil/sediment locations and analytical parameters) is the identification of preferential flow paths, specifically, the three “possible” buried channels identified in the seismic study. One possible buried channel was identified along the 100 ft. traverse line from shore between seismic dip lines F to F’ and G to G’ approximately due east of monitoring well cluster MW09-23. Another possible buried channel was identified along both the 100 ft and 200 ft seismic traverse lines from shore between seismic dip lines G to G’ and H to H’ approximately 75 to 100 feet north of the above buried channel. The third possible buried channel was identified along both the 100 and 200 ft traverse lines from shore between seismic dip lines H to H’ and I to I’. It appears that none of the proposed soil/sediment boring locations are designed to confirm the presence of these buried channels. Additional borings should be proposed and chemical analysis performed to confirm the presence or absence of these channels, and to evaluate the lateral and vertical extent of these channels. The objectives of these additional borings should be to evaluate the possibility of these channels acting as conduits (preferential flow paths) for contaminant migration.

9. **Section 2.1.3 Sample Identification, Handling, and Analysis, Geotechnical Test Table, Page 4.** The engineering classification of soils (ASTM D2487) utilizes the results of Atterberg Limits tests (ASTM D4318) and particle size analysis (ASTM D422). The proposed geotechnical tests do not include the performance of particle size analysis. Five particle size tests should be performed at the sample locations of the Atterberg tests.

10. **Section 2.1.3 Sample Identification, Handling, and Analysis, Geotechnical Test Table, Page 4.** The names of the tests in the last two rows of the table are incomplete and possibly misleading: both compression tests in the last row (CU and UU) are triaxial strength tests, which is also the name of the test in the second row from the bottom. It is suggested that the complete names of the proposed tests be used:

Triaxial Strength Test (ASTM D5311) is “Load Controlled Cyclic Triaxial Strength of Soil.”

CU Compression Test (ASTM D4767) is “Consolidated Undrained Triaxial Compression Test for Cohesive Soils.”

UU Compression Test (ASTM D2850) is “Unconsolidated, Undrained Compressive Strength of Cohesive Soils in Triaxial Compression.”

10. **Section 2.1.3 Sample Identification, Handling, and Analysis, Geotechnical Test Table, Page 4.** It is not clear as to what is the intended use of the Load Controlled Cyclic Triaxial Strength of Soil (ASTM D5311) or the other two triaxial tests (ASTM D4767 and D2850). It is recommended that the purpose of these tests be clarified.

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11. **Section 2.1.3 Sample Identification, Handling, and Analysis, Geotechnical Test Table, Page 4.** The basis for calculating the settlement is not apparent from the proposed geotechnical tests proposed. The coefficient of consolidation needs to be calculated in order to evaluate settlement. It is recommended that this issue be clarified and that the performance of One-Dimensional Consolidation Tests (ASTM D2435) for each different type of clay encountered during the geotechnical exploration be considered.

12. **Section 2.3 Geophysical Investigation Confirmation.** The shortcomings with respect to the soil boring locations and their ability to confirm the presence or absence of the "possible" buried channel as noted in the comments above.

General Comments (Issue 2):

13. With respect to issue 2 above, the subject document does not include the majority of the sampling regimens that were included in the Pre-Design Sampling Plan prepared July 5, 1996 with subsequent EPA comments (which were not addressed). The goals/objectives of the Pre-Design Sampling Plan, as documented in the July 5, 1996, revision are to generate the necessary environmental data to assess the following:

1. Contribution of groundwater to sediment COC concentrations;
2. Collect and evaluate temporal water quality data for groundwater migrating to Allen Harbor;
3. Evaluate sediment/subsurface soil/sediment quality within the shoreline intertidal and potentially subtidal zones;
4. Evaluate the harbor stratigraphy between Site 09 and the harbor habitat, and select depths of intertidal zone sediment/subsurface soil samples; and
5. Expand the environmental data base for decision-making.

While it is noted that some of the objectives for the Pre-Design Sampling Plan are no longer applicable, several objectives still apply and will need to be addressed either during the performance of this sampling phase or later, but prior to the design of the remedy and development of the Long Term Monitoring Plan. Further evaluation of the Pre-Design Sampling Plan goals/objectives is warranted to determine their applicability to the current status of the Site 09 remediation process. The issues with respect to the goals/objectives of the Pre-Design Sampling Plan and their applicability to the current state of investigation at Site 09 are discussed in the Specific Comments section for Issue 2.

Specific Comments (Issue 2):

Provided below is an evaluation of the goals/objectives of the Pre-Design Sampling Plan and their relevance to this investigation.

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14. Contribution of groundwater to sediment COC concentrations: This goal/objective, as stated, is designed to assess the contribution of groundwater contamination attributable to Site 09 to sediment contamination found primarily within the intertidal harbor sediments near Site 09. The result of this evaluation was to determine the need to either treat or contain contaminated groundwater emanating from Site 09. The immediate need to address this issue in the pre-design stage has been eliminated as a result of subsequent negotiations between EPA and the Navy which concluded in agreements to remove the contaminated sediments in the intertidal zone of the harbor near Site 09 and the evaluation of contribution of contaminated groundwater to sediment during the implementation of the Long-Term Monitoring Plan. However, in order to effectively evaluate the contribution of contaminated groundwater to sediment, a thorough understanding of flow paths and discharge points are needed to ensure that the Long-term Monitoring Plan is effectively monitoring trends in contaminant levels. The other goals/objectives of the Pre-Design Sampling Plan were developed to better understand the movement of contamination from the site.

15. Collect and evaluate temporal water quality data for groundwater migrating to Allen Harbor: This goal/objective of the Pre-Design Sampling Plan was to assess and evaluate temporal variations in groundwater concentrations as a result of changes during high and low groundwater level conditions. This requirement is still applicable in that the data will be used to further assess the selection of long-term monitoring points; establish a baseline for which long-term data can be compared; and, evaluate the effects of groundwater level conditions on contaminant concentrations. The latter will help to establish the frequency, and time of sampling for LTM. The proposed sampling scenario including well locations, sampling parameters, and sample frequency, as proposed by the Navy in the July 1996 revision to the Pre-Design Sampling Plan, to include revisions as specified in the EPA Response to the July 1996 Pre-design Sampling Plan, dated July 31, 1996, should be initiated to avoid any potential delay, and allow sufficient time to adequately evaluate the data collected. This includes the development of a hydrograph to accurately verify the time frame of seasonal highs and lows of the groundwater table, and the collection and analysis of 29 groundwater samples at 15 wells or well clusters for TCL VOC, Semi-VOC to include PAHs, TAL metals, pesticide/PCB, pH, nitrate, redox potential, specific conductance, dissolved oxygen, and sulfate/sulfur.

16. Evaluate sediment/subsurface soil/sediment quality within the shoreline intertidal and potentially subtidal zones: This goal/objective of the Pre-Design Sampling Plan was designed primarily to assess and evaluate the contribution and distribution of contamination from the landfill (specifically groundwater) to the sediment. As stated previously, the proposed remedy agreed to by EPA and the Navy includes the removal of contaminated sediment in the intertidal zone near the landfill and the monitoring and evaluation of contaminant contribution to the sediment during the LTM. Therefore the need to assess, qualitatively, the contribution of contaminated groundwater to sediment is not critical at this time; however, the need to understand the preferential flow paths and migration of contaminated groundwater to the sediment is needed in order to evaluate and develop an accurate LTM. As a result, the collection of sediment data to identify and attribute contamination of sediment to the landfill groundwater

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directly helps in identifying preferential flow paths from the landfill to the harbor sediment and is therefore useful in developing a LTM. The Navy is planning to collect a limited number of sediment samples while conducting the Geotechnical Sampling and Confirmation Study. Limitations concerning the locations of these soil borings are detailed in Issue 1.

17. The Navy has proposed limited sediment evaluation during the performance of this geotechnical sampling and confirmation study. The exact objectives of this sampling are not entirely clear since the rationale for each sediment sample location was not provided. The Navy plans on utilizing a barge to collect the sediment samples because of the location of the sediment samples and access problems to the locations. Since contaminated sediment removal is part of the proposed remedy for this site, the Navy should consider expanding the sediment sampling proposed in the geotechnical sampling and confirmation study in order to roughly quantify the limits of contaminated sediment removal to take advantage of the Navy already having the barge mobilized for this study. However, a factor to consider is the time lag between the sampling and delineation of contaminated sediment and the actual removal. If the time between the two is considerable, the effects of sediment transport due to the forces of wave action and tides may need to be considered. However, for quantitative purposes only the issue with the time lag between sampling and removal is less of an issue and the data collected may be useful in developing the LTM. The performance of this additional sampling is essentially equivalent to the expanded sediment sampling proposed in the second-phase sampling of the Pre-Design Sampling Plan. However, since the issue concerning a cleanup goal for the sediment has not been resolved with the EPA proposing the use of ER-Ms and the Navy preferring to perform toxicity tests, the Navy should also consider the collection of sediment samples to perform the required toxicity tests at this time in the interest of expediting the remedial process and eliminating any unnecessary delays.

18. Evaluate the harbor stratigraphy between Site 09 and the harbor habitat, and select depths of intertidal zone sediment/subsurface soil samples: This goal/objective is designed to better understand conditions affecting groundwater movement from the landfill to the harbor, and attempt to identify preferential flow paths of contaminant movement. The Navy has initiated efforts to address this objective by conducting geophysical surveys (magnetometer and seismic reflection), and by the proposed collection of soil borings during the performance of this geotechnical sampling and confirmation study. As identified in Issue 1 above, the seismic reflection survey identified three areas where "possible" buried channels exist. The soil borings proposed for the Geotechnical Sampling and Confirmation Study do not attempt to verify the presence of these channels. Additional borings should be proposed to evaluate and confirm the presence, and lateral and vertical extent of these buried channels.

19. Expand the environmental data base for decision-making: This goal/objective is a compilation of the data collected and proposed in the above goals/objectives.