USEPA New England Region, Office of Site Remediation and Restoration

Technical Memorandum

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New Bedford Harbor Superfund Site

To: Site File

Subj: Operable Unit 3 Pilot Underwater Cap: Post-Cap Monitoring Update

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1. Introduction and background

This provides an update on the post-cap monitoring data collected to date at the Operable Unit (ou) 3 pilot underwater cap located just south of the New Bedford Harbor hurricane barrier. This 19 acre cap was completed in July 2005, using clean sand and gravel from a port of New Bedford navigational Confined Aquatic Disposal (CAD) cell (Figure 1). The pilot cap covers PCB-contaminated sediments near the Cornell-Dubilier mill in shallow water along the New Bedford Harbor shoreline (Figures 1 and 2).

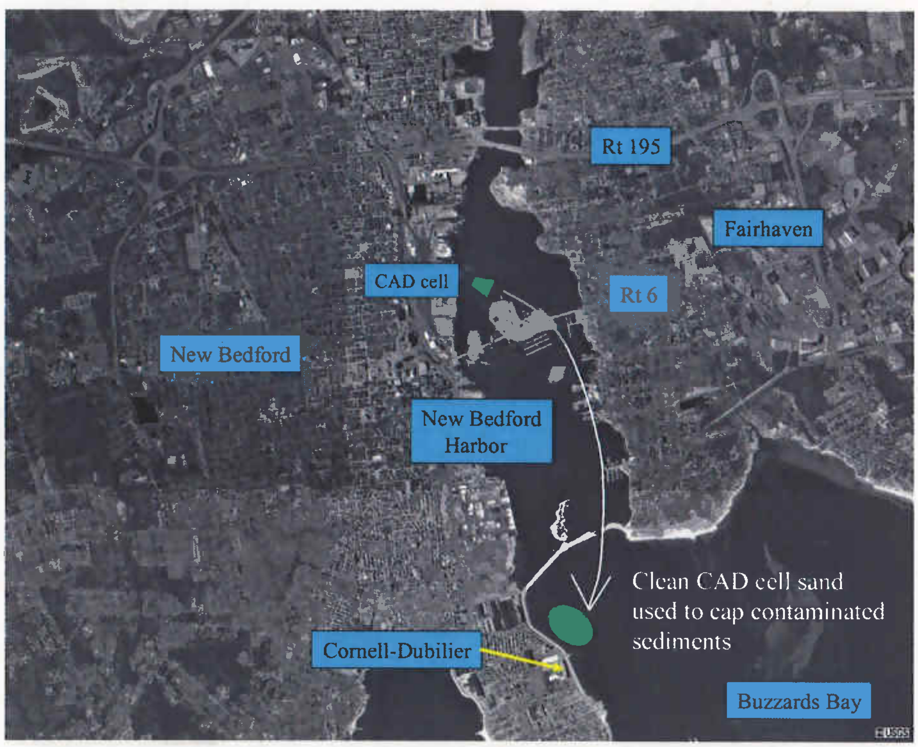
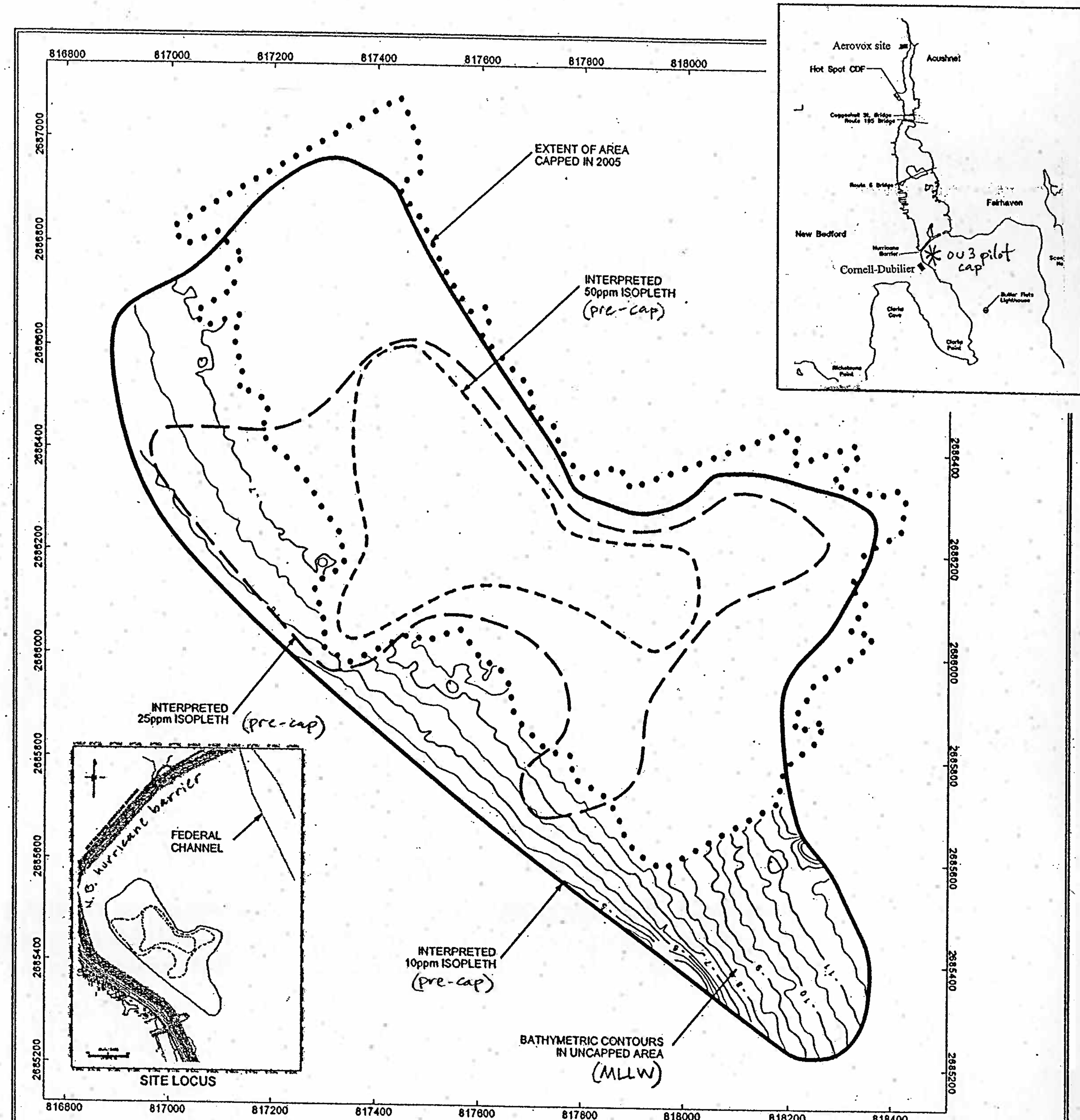


Figure 1: location of the ou3 pilot cap and port CAD cell



NOTES:

1. COORDINATES SHOWN ARE IN THE STATE PLANE COORDINATE SYSTEM, MASSACHUSETTS MAINLAND ZONE 2001, REFERENCED TO THE 1983 NORTH AMERICAN DATUM (NAD83). VERTICAL DATUM IS REFERENCED TO MLLW.

2. HYDROGRAPHIC SURVEY WAS PERFORMED BY APEX COMPANIES, LLC. ON NOVEMBER 18, 2006.

3. THE INFORMATION DEPICTED ON THIS PLAN REPRESENTS THE RESULTS OF THE SURVEY MADE ON THE DATE INDICATED ABOVE, AND CAN ONLY BE CONSIDERED AS INDICATING THE CONDITIONS AT THE TIME OF THE SURVEY AND AT THE SOUNDING POINTS NOTED ON THE PLAN.

4. THIS MAP IS FOR PLANNING PURPOSES ONLY, AND SHOULD NOT BE USED FOR NAVIGATIONAL PURPOSES.

5. MUDLINE CONTOUR INTERVAL IS 0.5 FEET.

Scale 1:1800

100 0 100 200 300

US survey foot

FIGURE 2

Apex

USACE OU#3 AREA

INTERPRETED PCB ISOPLETHS AND BATHYMETRIC DATA IN UNCAPPED AREA

New Bedford Harbor
New Bedford, MA

Apex Companies, LLC

The post-cap monitoring performed to date consists of annual bathymetric (water depth) surveys to assess cap thickness and annual sampling of the sediment PCB levels in the surface layer (top three inches) of cap sediment. This information will be supplemented by other benthic monitoring programs, for example, sediment toxicity tests, borings, benthic community enumeration, bioaccumulation studies and sediment camera profiling, both as part of the upcoming ou3 remedial investigation (RI) as well as future survey rounds of the site's Long Term (benthic) Monitoring program.

2. Cap thickness

To date, cap thickness has been measured by comparing post-cap bathymetry surveys to pre-cap bathymetry surveys. Three post-cap surveys have been performed to date, with the next survey planned for fall 2007.

Due to the shallow water depths (Figure 2) and the size of the split-hull scows used to place the cap material (Figure 3) the cap surface resulted in a series of SW/NE trending ridges and valleys corresponding to the location of each scow at the time its cap material was released (Figure 4). Loaded dump scows could not be placed immediately next to previously placed cap mounds for fear of grounding in the shallow water environment.

Figure 3: a split-hull scow begins opening to place cap material

Two key performance metrics that are being tracked regarding cap thickness are the percent area of cap covered by at least one foot of cap material, and similarly, the percent area of cap covered by at least two feet of cap material. As Table 1 on page 5 below indicates, the cap coverage was very good initially and continues to improve as the low-lying valley areas slowly "fill in" over time.

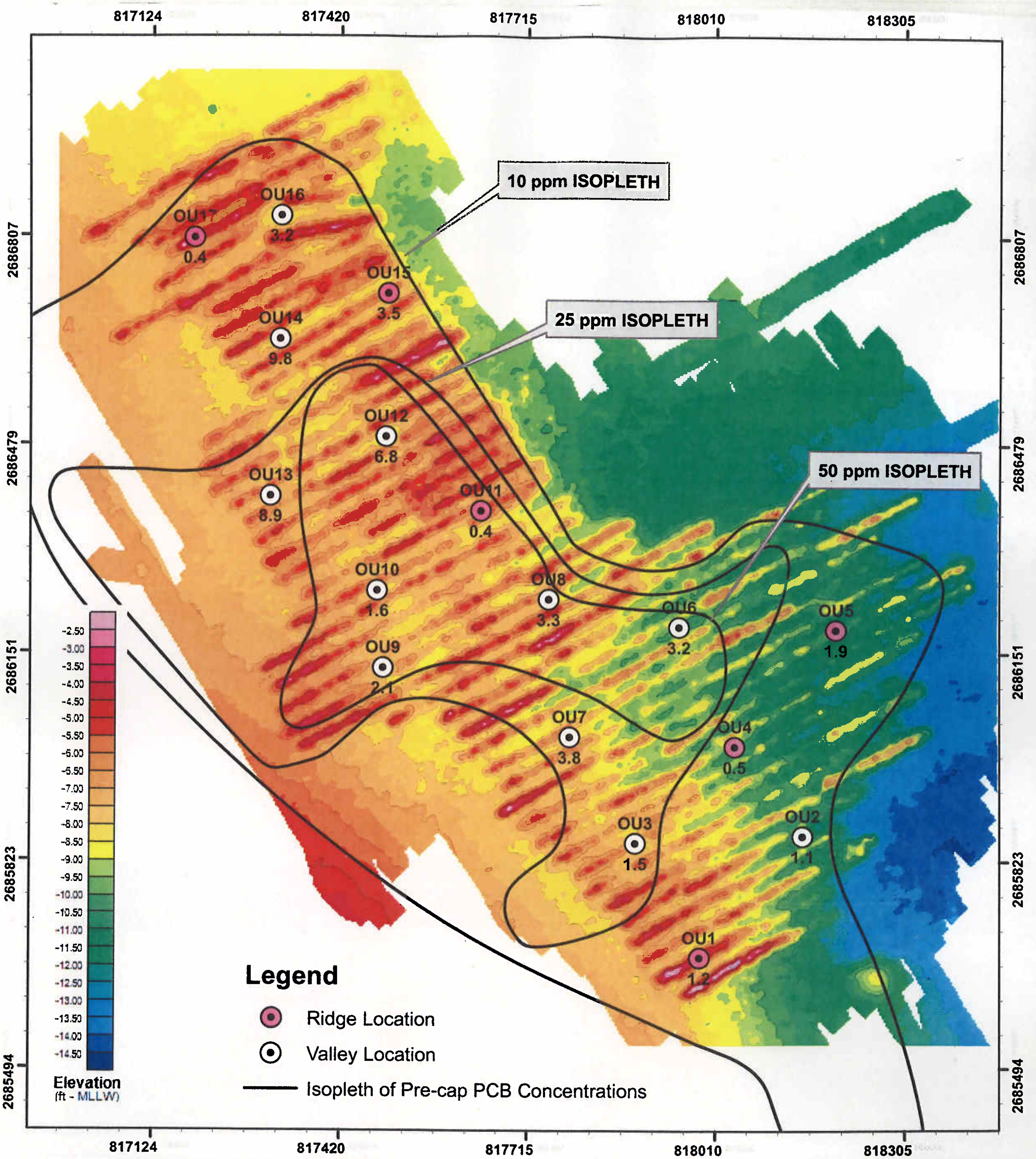


Figure 4. OU#3 Bathymetry and Post-Capping Sampling Locations w/ PCB Concentrations - 2005

Sources:
NAD 83 Mass State Plane ft
Date: 16 January 2006

ENSR

0 250 500 Feet

OU#3 Sample Locations
-Total PCB Concentration (mg/kg) based on (sum of NOAA Congeners) * 2.6

Table 1: cap thickness measurements to date

	7/26/05	10/06/05	01/12/06
Area of cap with at least **ONE** foot of cap thickness	95%	97%	98%
Area of cap with at least **TWO** feet of cap thickness	65%	68%	70%

3. Sediment Chemistry

Pre-cap sediment PCB levels from within the pilot cap area, reported as part of site characterization efforts from the 1980s through 2001, ranged from 1 to 94 ppm in the top foot of sediment. The average PCB level of 24 pre-cap sediment samples in the top foot was 32 ppm. In the second foot of sediment, PCB levels were generally but not always lower than reported for the top foot, and the maximum PCB level reported for the second foot was slightly higher than in the top foot (130 v. 94 ppm). See FWEC, 2003 (available at www.epa.gov/ne/nbh under "sediment data") for a complete data base and mapping of pre-cap sediment sampling results for the pilot cap area.

Post-cap sediment sampling was performed in August 2005 approximately one month after capping had been completed, and again in September 2006. Additional sampling is planned for fall 2007. The sampling design consists of monitoring locations equally distributed spatially over the cap area which capture both ridge and valley locations (Figure 4). With eleven valley locations versus six ridge locations, there is a conservative bias in the sampling plan towards areas where higher sediment PCB levels are expected (i.e., with a thinner cap in the valley locations, there is an increased potential for higher sediment PCB levels).

As shown below in Table 2, this post-cap sediment sampling indicates average sediment PCB levels of approximately 3 ppm. No overall trends were indicated between the two post-cap sediment chemistry surveys. Again, these data represent PCB levels in the top three inches of the cap material. As expected, the sediment PCB levels in the valley locations are currently slightly higher than in the ridge locations, but nevertheless very low compared to pre-cap conditions. It should be noted that, as a site-specific approach for the New Bedford Harbor Superfund site, total PCBs are calculated here as the sum of eighteen PCB congeners times 2.6, based on a comprehensive correlation study performed for the upper and lower harbor areas in 2001 and 2002 (FWEC, 2001 and FWEC, 2002).

Table 2: total PCBs in surface sediment (ppm)

Station	8/25/05	Sept. 2006
1 (ridge)	1.2	1.2
2 (valley)	1.1	0.46
3 (valley)	1.5	0.41
4 (ridge)	0.5	1.6
5 (ridge)	1.9	1.6
6/duplicate (valley)	3.2	0.99/0.98
7 (valley)	3.8	2.3
8 (valley)	3.3	0.8
9 (valley)	2.1	1.3
10 (valley)	1.6	1.6
11 (ridge)	0.4	3.9
12 (valley)	6.8	4.6
13 (valley)	8.9	17
14 (valley)	9.8	4.3
15 (ridge)	3.5	4.5
16 (valley)	3.2	2.2
17 (ridge)	0.4	0.041
Mean	**3.1**	**2.9**
Standard deviation	**2.8**	**3.9**

While overall the post-cap sediment PCB levels show good results, the PCB level at station #13 has almost doubled (from 8.9 to 17 ppm) between the 2005 and 2006 sampling events. As shown in Figure 4, station #13 is a valley location near the western edge of the placed cap material in close proximity to the 50 ppm pre-cap isopleth. These features may help explain the observed results. Other potential causes are analytical chemistry variability or recontamination of the cap from abutting uncapped areas (water depths were too shallow to the west of this location to allow complete coverage of the PCB-contaminated area with the available equipment). Station #13 will be closely monitored in future sampling rounds (e.g., with duplicate sampling), and future pilot capping activities will consider this area for additional cap material.

4. Conclusion

The existing cap thickness and sediment PCB measurements indicate that the pilot cap is working as intended. As discussed above, additional monitoring techniques planned during the ou3 RI will further assess the biological and physical characteristics of the capped environment, including benthic recolonization, sediment toxicity and cap/substrate mixing, among others. The annual bathymetric and sediment PCB sampling will continue, until such time as deemed to be unnecessary (i.e., if no changes are noted over periods of years, the sampling frequency can be reduced).

The cap material that was made available for the 2005 pilot capping effort was sufficient to cover approximately 19 acres of the most PCB-contaminated sediment in the pilot cap area. However, additional contaminated areas remain uncapped, especially in the shallower near-shore areas to the west of the pilot cap (Figure 2). Thus EPA will continue to pursue similar collaborative opportunities with the port of New Bedford as new navigational CAD cells come on line.

5. Questions and comments

Anyone with questions or comments on this report should feel free to contact the author at 617 918 1329 or via email at dickerson.dave@epa.gov.

6. References

FWEC (Foster Wheeler Environmental Corporation). 2001. Technical Memorandum - Comparison of PCB NOAA Congener With Total Homologue Group Concentrations, New Bedford Harbor Superfund Site. May 2001.

FWEC (Foster Wheeler Environmental Corporation). 2002. Technical Memorandum - Comparison of PCB NOAA Congener With Total Homologue Group Concentrations (Inclusion of Phase III Results), New Bedford Harbor Superfund Site. June 2002.

FWEC (Foster Wheeler Environmental Corporation). 2003. Sediment Characterization Data Collected Through April 2003. New Bedford Harbor Superfund Site. June 2003. *Available: www.epa.gove/ne/nbh.*