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NEW ENGLAND DISTRICT**

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**Final 2010 Bathymetric Survey of Pilot Underwater Cap
New Bedford Harbor Superfund Site**

New Bedford Harbor Superfund Site
New Bedford, MA

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October 13, 2010

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1.0 INTRODUCTION

This report is intended to briefly summarize the 2010 bathymetric data collected from the pilot underwater cap area at the New Bedford Harbor (NBH) Superfund Site. The pilot underwater cap was placed in 2005 over polychlorinated biphenyl (PCB) contaminated sediments near the Cornell-Dubilier mill, just south of the NBH hurricane barrier. The 2010 bathymetric data set was used to update trends on the cap area and cap thickness, which are presented in this report.

Prior to beginning an analysis of the pilot cap area it is important to define two terms used to describe the capped area. The first is the “Intended Cap Area” which is the sediment area which was originally designated to be capped (Apex, 2007). The second term is the “Full Placement Area”; the perimeter of this area is determined during data processing following each survey and signifies the 0.5 foot (ft) contour (cap thickness) around the placed material (Apex, 2007).

2.0 2010 BATHYMETRIC SURVEY

CR Environmental Inc. completed the 2010 bathymetric survey of the pilot underwater cap on Wednesday, October 13, 2010. The bathymetric data collected were referenced to Mean Lower Low Water (MLLW) vertical datum relative to control point CP4. Control point CP4 was established in 2005 by Coler and Colantonio surveyors for Apex Companies, LLC to conduct the 2005, 2006, and 2007 bathymetric surveys of the pilot underwater cap area. For the 2010 bathymetric survey, Jacobs used a rotary laser level to set a tide board on a fixed wooden pier at the East Rodney French Boulevard boat ramp relative to the MLLW vertical datum measured at control point CP4, which is adjacent to the wooden pier.

The 2010 survey, which was similar to the 2009 survey, gathered data at a line spacing of 25 ft in a northwest to southeast orientation. This survey orientation and spacing is consistent with historical post-placement surveys of the pilot cap area that were

conducted by Apex in 2005, 2006, and 2007 for the NBH Development Commission (Apex, 2007).

Weather Conditions:

Temperature: 50-60 degrees Fahrenheit

Wind: 5-15 knots from the east and northeast

Seas: 0-1 ft in AM, 1-2 ft in PM

QA/QC Checks:

A summary of quality control analysis results can be found in [Table 1](#).

3.0 DISCUSSION

A pilot underwater cap was placed in 2005 over contaminated sediments to evaluate the performance of an underwater cap in NBH. The cap was placed by split hull dump scows which dropped evenly spaced rows of dredged material [clean “bottom-of-confined aquatic disposal (CAD)” material from navigational CAD cell #1] over the outlined area in [Figure 1](#). Bathymetric surveys have been performed in 2005, 2006, and 2007 by Apex; and in 2009 and 2010 by CR Environmental to monitor the area and thickness of the placed material. The bathymetric survey results were used to compare the pre- and post-placement bathymetry for each year survey data was collected (2005, 2006, 2007, 2009, and 2010).

These comparisons generated the following cap statistics for each of these years.

- full placement area ([Figure 2](#)),
- percent of Intended Cap Area with thickness greater than 1 ft ([Figure 3](#)), and
- percent of Intended Cap Area with thickness greater than 2 ft ([Figure 3](#)).

The Apex report presenting these statistics for the 2005, 2006, and 2007 bathymetric surveys are presented as [Attachment A](#) (Apex, 2007). It should be noted that the statistics presented in [Attachment A](#) for 2005 and 2006 are for an area Apex defined as the “Placement Area.” In 2007 the statistics were recalculated for the “Intended Cap

Area” and documented in the 2007 report ([Attachment A](#)). The areas presented in [Figure 3](#) are relative to the Intended Cap Area. The Jacobs report documenting the 2009 bathymetric survey performed by CR Environmental is presented in [Attachment B](#).

The following figures summarize the statistics for the pilot cap area based upon the 2010 bathymetric survey.

[Figure 1](#) illustrates the bathymetry relative to MLLW as surveyed in 2010 over the Intended Cap Area. [Figure 2](#) illustrates each surveyed boundary of the Full Placement Area. The Full Placement Area is determined following each survey by identifying the 0.5 ft contour (cap thickness) around the placed material. The Full Placement Area for 2010, determined to be 20.31 acres, is a 7.2 percent difference (increase) in area from 2005 (18.90 acres), but less than 1 percent difference (decrease) in area from that measured in 2009 (20.41 acres). Based on the available data it would appear that following placement of the cap material the Full Placement Area expanded relatively rapidly within the first year or two. Following the initial expansion of the Full Placement Area, survey data suggests that any expansion or contraction has slowed. [Figure 4](#) graphically depicts changes in the Full Placement Area over time. The Full Placement Area for all years are as follows:

- 2005 = 18.90 acres (Apex, 2007),
- 2007 = 20.76 acres (Apex, 2007),
- 2009 = 20.41 acres (Jacobs, 2010), and
- 2010 = 20.31 acres.

The percentage of area within the Intended Cap Area covered by at least 1 ft of cap material increased from 2009 to 2010. Similarly, the percentage of area within the Intended Cap Area covered by at least 2 ft of cap material also increased from 2009 to 2010. This is a continuation of the general trend observed where the high ridges of cap material (originally up to 6 ft above the base of the cap as placed) are settling into the valleys between the ridges. Cap thicknesses and coverage percentages for the Intended Cap Area are presented on [Figure 3](#).

In the 2009 bathymetry it was noted that two sub-areas of the Intended Cap Area, Areas A and B on [Figure 3](#), had experienced a reduction in cap thickness between 2007 and 2009 (Jacobs, 2010). This thickness reduction was of particular concern as the 2009 cap coverage in Areas A and B were less than 1 ft thick. The 2010 survey results still present the cap coverage in these areas as relatively thin; however, it appears that the majority of Areas A and B have increased cap thicknesses of greater than 1 ft ([Figure 3](#)).

4.0 SUMMARY

Overall the pilot underwater cap continues to behave as expected, with the area of cap which is at least 1 ft thick currently reported at 98.1 percent of the Intended Cap Area.

All surveys by all bathymetric contractors have illustrated the process of ridge and valley leveling over time. This process causes ridges to decrease in thickness and valleys to increase in thickness, resulting in the general trend of measured increases in percentage of cap areas with thicknesses greater than 1 and 2 ft. The leveling process is assumed to be occurring from the natural behavior of sediment redistribution in a tidal environment; however, it cannot be confirmed without collection of core samples and observation of redistribution of cap material.

5.0 REFERENCES

- Apex Companies, LLC (Apex). 2007 (October). *Bathymetric Survey – EPA Operable Unit #3 (OU#3) New Bedford Harbor Superfund Site*.
- Jacobs Engineering Group, Inc. (Jacobs). 2010 (March). *Final 2009 Bathymetric Survey of Pilot Underwater Cap, New Bedford Harbor Superfund Site*. ACE-J23-35BG0702-M17-0009.

FIGURES

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TABLE

Table 1
Summary of Quality Control Analysis Results
Pilot Underwater Cap;
October 13, 2010

QC Parameter	Result	Description
<u>Cross-Tie Comparisons</u>		
Number of Comparisons	806	
Arithmetic Mean of Comparisons (feet)	0.06	Measurement bias within data set. ACOE EM 1110-2-1003 (Ch. 3) spec = +/- 0.25 feet)
Standard Deviation of Comparisons (feet)	0.18	
Arithmetic Mean of Absolute Values (feet)	0.15	Overall accuracy within data set
Confidence Level (95.0%)	0.01	Confidence in accuracy assessment
RMS 95 th Percentile Confidence Level (feet)	0.19	ACOE EM 1110-2-1003 (Ch. 3) spec = +/- 0.5 feet
<u>Bar/Staff Check</u>		
Number of Comparisons	2	Pre- and Post-Survey
Depth of Comparisons	5', 15'/5'	Suitable for Project Depth
Echo Sounder vs. Bar Plate	5.0, 15.0 / 5.0	Bar check plate on stainless cable
<u>Sound Velocity Comparisons</u>		
Number of Comparisons	2	Pre- and Post-Survey
Depth of Comparisons	Surface, 13'	Suitable for Project Depth
Range of Values	1505-1506	meters/second
Velocity Utilized	1505	meters/second (raw data adjusted)

ATTACHMENT A

APEX 2007 SURVEY REPORT

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ATTACHMENT B

JACOBS 2009 SURVEY REPORT

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