Superfund Records Center
SITE: New Bedford
BREAK: 5-4
OTHER: 479471

March 2011 FINAL - FOURTH EXPLANATION OF SIGNIFICANT DIFFERENCES FOR USE OF A LOWER HARBOR CAD CELL (LHCC) NEW BEDFORD HARBOR SUPERFUND SITE OPERABLE UNIT #1 NEW BEDFORD, MASSACHUSETTS

I. Introduction

A. Site Name and Location

Site Name: New Bedford Harbor, Upper and Lower Harbor Operable Unit #1 (OU1)
Site Location: Bristol County, Massachusetts

B. Lead and Support Agencies

Lead Agency: United States Environmental Protection Agency (EPA) - Region I
Contacts: Elaine Stanley, Co Remedial Project Manager (617) 918-1332
David Dickerson (617) 918-1329

Support Agency: Massachusetts Department of Environmental Protection (MassDEP)
Contact: Joseph Coyne, Project Manager (617) 348-4066

C. Legal Authority for Explanation of Significant Differences

Section 117(c) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and Section 300.435(c)(2)(1) of the National Contingency Plan (NCP) requires that, if any remedial or enforcement action is taken under Section 106 of CERCLA after adoption of a final remedial action plan, and such action differs in any significant respect from the final plan, the EPA shall publish an explanation of the significant differences (ESD) and the reasons such changes were made. While not required by Section 300.435(c), EPA held a public comment period on this proposal from June 25 to September 24, 2010 to ensure that all interested parties had an opportunity to provide input to EPA before its final decision on this modification to the remedy.

D. Summary of ESD

The Record of Decision (ROD or ROD 2) for OU1 was issued on September 25, 1998. The ROD's cleanup plan called for approximately 450,000 cubic yards (cy) of PCB-laden *in situ* sediment to be dredged from the harbor bottom and surrounding wetlands, and to be disposed in perpetuity in four shoreline confined disposal facilities (CDFs). The CDFs were to be located in contaminated areas to avoid the need for dredging an additional approximately 126,000 cy of PCB-contaminated sediment; thus the total volume of sediments above the ROD 2 action levels was estimated in 1996 to be 576,000 cy. See ROD 2, Figure 12 (available at

SDMS DocID 479471

http://www.epa.gov/region1/superfund/sites/newbedford/38206.pdf). Since that time EPA has gathered additional site information and refined the cleanup approach for the upper and lower harbor areas. Two prior ESDs, issued in September 2001 and August 2002, refined five elements of the cleanup process and increased the estimated volume of contaminated sediments to approximately 800,000 cy (the 2001 ESD) and eliminated CDF "D" in favor of off-site disposal of the sediments that would have been disposed in it (the 2002 ESD). A third ESD was issued in March 2010 to address temporary storage of dredged material in a lined sediment storage cell at EPA's Sawyer Street facility in New Bedford.

This fourth ESD for ROD 2 modifies the upper and lower harbor remedy to include the construction and use of a confined aquatic disposal (CAD) cell in the lower harbor for disposal of approximately 300,000 cy of mechanically dredged sediments with PCB levels above the ROD 2 action levels.[1] The volume of *in situ* sediments to be placed in this lower harbor CAD cell (LHCC) shall not be greater than the volume of *in situ* sediments slated for CDF D (approximately 725,000 cy) minus the volume of *in situ* sediments disposed or to be disposed offsite pursuant to the 2002 ESD (approximately 176,000 cy as of 3/1/11). See further discussion in Section II.C below. This ESD also notes that, based on an assessment of sediment volume performed in 2003, and including an allowance for over-dredging (i.e., allowing for the fact that dredging equipment/operation is not precise to the inch), the total *in situ* sediment volume above the ROD 2 action levels is currently estimated to be approximately 900,000 cy.

As described in more detail in section III.B below, the time and cost to complete the ROD 2 remedy, as modified by the subsequent ESDs, depends entirely on annual funding rates. See Table 1. Nevertheless, based on current estimates use of the LHCC is expected to significantly decrease both the time and cost to complete the ROD 2 remedy. For example, at a funding rate of $15 million per year the time and cost to complete the remedy pursuant to this fourth ESD is estimated to be 40 years and $1.2 billion, compared to 46 years and $1.7 billion under the previous version of the ROD 2 remedy as modified by the three previous ESDs. At a funding rate of $80 million per year, the time and cost to complete would be 6 years and $422 million with an LHCC, compared to 7 years and $464 million without an LHCC.

E. Public Comment Period

A draft of this ESD was issued publicly on June 25, 2010. A formal public comment period regarding the draft ESD was held from June 25, 2010 to September 24, 2010. EPA accepted written and e-mailed comments on this ESD which are included in the administrative record.

EPA specifically sought public comment on EPA's finding under the federal Clean Water Act (CWA) that mechanical dredging; passive dewatering; and the siting, construction, filling, and long-term operation and maintenance (O&M) of the LHCC represents the least

[1] The mechanically dredged sediments would be placed into the LHCC without going through the hydraulic dredging, desanding and dewatering process described in the 2001 ESD.

environmentally damaging practical alternative to addressing potential impacts from PCB-contaminated sediments to wetlands and aquatic habitats within NBH (for further discussion see Section IV below). In addition, EPA requested public comment on EPA's risk-based finding under the Toxic Substances Control Act (TSCA) that the mechanical dredging, passive dewatering, and permanent disposal of PCB contaminated sediment into the LHCC will not pose an unreasonable risk of injury to health or the environment. Attachment B contains the final TSCA finding with further details regarding these issues.

F. Public Record

EPA considered and responded to all formal comments received during the comment period before issuing this final ESD. EPA's responses to these comments are attached as Attachment A. The public comments and EPA's response to them are part of the public administrative record for the site that is available for public review at the two locations listed below.

EPA New England Records Center
5 Post Office Square
Boston, MA 02109-3912
(617) 918-1440
Monday-Friday: 9:00am - 5:00pm; (closed first Friday of every month and federal holidays)

New Bedford Free Public Library
613 Pleasant Street, 2nd floor Reference Department
New Bedford, MA 02740
(508) 961-3067
Monday-Thursday: 9:00am - 9:00pm
Friday-Saturday: 9:00am - 5:00pm

EPA has supplemented the public administrative record file to reflect the three previous ESDs as well as this fourth ESD.

II. Summary of Site History, Contamination Problems and Selected Remedy

A. Site History and Enforcement Activity

Identification of PCB (polychlorinated biphenyl) contaminated sediments and seafood in and around NBH was first made in the mid-1970s as a result of EPA region-wide sampling programs. The manufacture and sale of PCBs was banned by TSCA in 1978. In 1979, the Massachusetts Department of Public Health promulgated regulations prohibiting fishing, shellfishing and lobstering within the site due to elevated PCB levels in area seafood. Due to these concerns, the site was proposed for the Superfund National Priorities List (the NPL) in

1982, and finalized on the NPL in September 1983. Pursuant to 40 CFR 300.425(c)(2), the Commonwealth of Massachusetts (the Commonwealth) nominated the site as its priority site for listing on the NPL.

EPA's site-specific investigations began in 1983 and 1984. Site investigations continued throughout the rest of the 1980s and early 1990s, including a pilot dredging and disposal study in 1988 and 1989, a baseline public health risk assessment in 1989, and computer modeling of site cleanup options and an updated feasibility study for the site completed in 1990. Thousands of additional environmental samples have been taken since then to support the implementation of the remedy.

Collectively, these investigations identified the former Aerovox manufacturing facility on Belleville Avenue in New Bedford as the primary source of PCBs to the site. PCB wastes were discharged from the facility's operations directly to the upper harbor through drainage trenches and discharge pipes, or indirectly throughout the site via CSOs (combined sewer overflows) and the City's sewage treatment plant outfall. PCBs were also released to the harbor from the Cornell Dubilier Electronics, Inc. (CDE) facility just south of the hurricane barrier in New Bedford.

Based on the results of these investigations, state and federal enforcement actions were initiated against both the Aerovox and CDE facilities as well as the City of New Bedford (though the City is not a Potentially Responsible Party for this site) pursuant to CERCLA, Massachusetts General Law c.21E, and other federal and state environmental statutes. For a summary of these enforcement actions and resulting settlements please see Section II of the 1998 ROD (available at http://www.epa.gov/region1/superfund/sites/newbedford/38206.pdf). The site cleanup is being managed by EPA, in partnership with the U.S. Army Corps of Engineers and MassDEP.

In April 1990, EPA issued a ROD for the hot spot operable unit of the site (ROD 1). The hot spot ROD called for dredging and on-site incineration of those sediments above 4,000 ppm (parts per million) PCBs in the vicinity of the Aerovox facility. Dredging and temporary disposal of these sediments - about 14,000 cy in volume and 5 acres in area - began in April 1994 and was completed in September 1995. Pursuant to an April 1999 amendment to the 1990 Hot Spot ROD, the sediments were dewatered and transported to an offsite landfill for permanent disposal. This final offsite disposal phase of the hot spot remedy was completed in May 2000.

As summarized above, EPA issued ROD 2 for cleanup of the upper and lower New Bedford Harbor areas in September 1998. Again, ROD 2 originally included four shoreline CDFs but has been been modified with ESDs issued in 2001, 2002 and 2010. Section II.C below describes the ROD 2 remedy in more detail.

B. Contamination Problems

As noted above, the main site concern is the widespread PCB contamination in New Bedford Harbor sediments, especially in the upper harbor. PCB levels in sediment generally decrease in a southerly trend. Because of this sediment contamination, PCBs are also found in

elevated levels in the water column and in local seafood. In addition to the PCB contamination, harbor sediments also contain high levels of other contaminants including heavy metals (e.g., cadmium, chromium, copper and lead). High levels of solvents (e.g., trichloroethylene) have also been identified more recently in sediments adjacent to the Aerovox facility. However, because many of these other contaminants are co-located with PCBs, ROD 2 contains action levels only for PCBs.

As described more completely in Sections V and VI of the 1998 ROD, EPA found the PCB contamination to result in unacceptable risks to human health and the environment. The biggest human health risk was found to be from frequent (e.g., weekly) ingestion of local seafood, although unacceptable risks were also found from frequent human contact with PCB-contaminated shoreline sediments or soils. Ecologically, EPA's investigations concluded that the harbor's marine ecosystem is severely damaged from the widespread sediment PCB contamination.

C. Summary of Remedy Originally Selected in the 1998 ROD as Modified by the 2001, 2002 and 2010 ESDs

Due to the sediment PCB contamination and resulting risks to human health and the environment, EPA in the 1998 ROD 2 selected a cleanup remedy for the entire upper and lower harbor areas. The ROD called for the dredging and containment of approximately 450,000 cy of PCB-contaminated sediment spread over about 170 acres (this original volume estimate has been revised upwards, as described herein). It is important to note that the four original proposed CDFs were sited so as to avoid dredging approximately 126,000 cy of PCB-contaminated sediments within their footprints; thus the volume of *in situ* sediments above the ROD 2 cleanup levels was estimated, in 1996, to be 576,000 cy (450,000 cy plus 126,000 cy). Additionally, the required storage volume of the four CDFs was estimated to be 40% greater than the estimated 450,000 cy needing dredging (i.e., 630,000 cy) to account for the anticipated bulking or expansion of the sediments due to the hydraulic dredging and CDF disposal process.

The ROD 2's cleanup levels are summarized as follows. In the upper harbor north of Coggeshall Street, subtidal and mudflat sediments above 10 parts per million (ppm) PCBs are to be dredged, while in the lower harbor and in salt marshes, sediments above 50 ppm PCBs are to be dredged. To protect human health against risks due to dermal (i.e., skin) contact with PCBs, intertidal sediments or soils in areas adjacent to residences are to be removed if PCB levels are above 1 ppm, while those adjacent to parks or recreational shoreline areas are to be removed if PCB levels are above 25 ppm.

The ROD also requires that institutional controls, such as the state-sanctioned fish closure areas, be in place until PCB levels in seafood reach acceptable levels for human consumption.

Also, as part of the 1998 ROD 2, Section XI (available at http://www.epa.gov/region1/superfund/sites/newbedford/38206.pdf) the Commonwealth petitioned EPA to allow the inclusion of navigational dredging in NBH as an enhancement of the remedy (state enhanced remedy or SER). Such enhancements are envisioned in the implementing

regulations of CERCLA at 40 CFR 300.515(f). The enhancement requested by the Commonwealth linked the dredging and disposal of sediments dredged from the harbor's navigational channels (located in the lower and outer harbors) with CERCLA and the Superfund program. Although these navigational sediments primarily fall below the 50 ppm lower harbor cleanup level (and thus have minimal or no overlap with sediments slated for remedial dredging) they are nevertheless contaminated with heavy metals and lower levels of PCBs. Under the SER, which is implemented using state and local funding (not Superfund money), CAD cells have been approved and developed for the permanent disposal of dredged navigational sediments within the harbor. The New Bedford Harbor Development Commission (HDC) has, with MassDEP oversight, constructed and filled three navigational CAD cells[2] created through the SER, with additional navigational CAD cells anticipated in the future.

The September 2001 ESD set forth five refinements of the remedy that arose as the design phase progressed following the 1998 issuance of ROD 2. These changes included the use of mechanical dewatering for the dredged sediments (to, among other things, reduce the volume of processed sediments needing disposal), the incorporation of a rail spur and a revised dike design at CDF D, ongoing use of the pilot CDF at EPA's Sawyer Street facility in New Bedford, and identification of additional intertidal cleanup areas near residential areas. The 2001 ESD also noted that the estimate of *in situ* sediments requiring disposal pursuant to ROD 2 could be as high as 800,000 cy.

The August 2002 ESD eliminated CDF D in favor of off-site disposal for those sediments that otherwise would have been disposed in it. CDF D had a planned disposal volume or "air space" of approximately 435,000 cy (Foster Wheeler, 1996). Since the hydraulic dredging, desanding and dewatering process results in a significant decrease in the volume of processed sediment (Jacobs, 2008) this 435,000 cy of air space is estimated to translate to approximately 725,000 cy of *in situ* sediments that could have been disposed in CDF D (using a ratio of 0.6 cy of processed sediment or filter cake per 1 cy of *in situ* sediment).

The March 2010 ESD allowed for the temporary storage of PCB- and VOC-contaminated sediments in a lined and covered storage cell ("Cell #1") at EPA's facility at the foot of Sawyer Street in New Bedford.

III. Description of Significant Differences and the Basis for These Differences

As summarized in Section I, EPA has evaluated the benefits of using an LHCC for disposal of a portion of the sediments that, pursuant to ROD 2, would have been disposed in CDF D, but as modified in the 2002 ESD, would have been disposed off site. Based on the evaluation described below, EPA believes that use of an LHCC is a protective and cost-effective approach compared to offsite disposal for these sediments.

[2] The excavation for the first CAD cell, called the "borrow pit" CAD cell, occurred decades ago during the mining of underwater sand.

A. Siting, construction and long-term O&M of the LHCC can be performed protectively.

CAD cell technology is a recognized, protective contaminated sediment disposal approach that is being used more and more frequently, especially for navigational dredged material that is unsuitable for open water disposal. CAD cells have been used in recent years for navigational dredging in major New England ports such as Boston, New Bedford and Providence, and have also been used (or selected for use) at contaminated sediment Superfund sites in Washington, Minnesota and Maine (EPA, 2010).

The preferred location for navigational CAD cells in New Bedford (between the Route 195 and Route 6 bridges) was determined in the October 2003 final Environmental Impact Report (FEIR) for the New Bedford/Fairhaven Harbor Dredge Material Management Plan (DMMP) prepared by the Massachusetts Office of Coastal Zone Management (MassCZM, 2003). The FEIR, prepared to comply with the Massachusetts Environmental Protection Act and its implementing regulations (M.G. L. c. 30, ss. 61-62H; 301 CMR 11.00) concluded that this area, referred to as "Popes Island North" was the preferred location for CAD cells due to, among other factors, its greater depth to bedrock and thus higher disposal capacity, its location outside of main navigational channels, its lower potential for cap disruption, and its higher potential for benthic recolonization (FEIR, pp. 4-15 – 4-17). Subsequent to the FEIR, the exact boundary of the DMMP CAD cell area has been modified twice, in January 2005 and April 2008, but remains bounded by the Route 195 bridge to the north and the Route 6 bridge to the south (Figure 1). EPA, after reviewing the FEIR and additional site information, will locate the Superfund LHCC within this state-approved DMMP area.

For the SER CAD cells in NBH and as is typical for CAD cells in general, the CAD cells were constructed by first removing the top few feet of contaminated organic silts since this material is unsuitable for open water disposal (i.e., contamination levels are too high for open water disposal). This unsuitable material has been disposed of within the navigational CAD cells.[3] For the Superfund LHCC, disposal of the unsuitable top-of-CAD material may be in an existing navigational CAD cell, if available; other disposal options such as appropriate shoreline CDFs or licensed landfills will be considered and the most cost-effective and protective option will be used. Once the unsuitable material is removed, the underlying clean glacial sandier material is then excavated and either disposed at permitted open water disposal sites or routed for beneficial reuse.

Excavation of the CAD cell will be conducted using best management practices that will minimize environmental impacts, including maintaining water quality performance standards. Benthic marine habitat removed during CAD construction is expected to reestablish itself in the area once the CAD cell is filled and capped with clean material. The cap, consisting of 3 feet of clean sandy material will prevent contact with, and the release of, contaminants from the underlying deposited Superfund sediments, EPA will also investigate whether adding activated

[3] The unsuitable contaminated sediment from the top of navigational CAD cell #1 was disposed in the borrow pit CAD cell. The unsuitable top-of-CAD material from CAD cell #2 was disposed in CAD cell #1.

carbon or other supplements to the CAD cell would further limit the mobility of the contaminants within it.

Sediments placed into the Superfund LHCC will be dredged using mechanical dredging equipment similar to that used for the navigational dredging to date. The dredged sediments will be placed into a scow for transport to the LHCC. The dredged sediment will not be mechanically dewatered prior to placement, although some passive dewatering will occur during material handling and transport. Depending on the type of equipment used, the dredged sediments will be placed into the LHCC by either opening the bottom of the scow (if a "split-hull scow is used) or by using an excavator or cable-suspended bucket to remove the sediments from the scow and to place them into the LHCC. A silt curtain and oil boom will be placed around the perimeter of the LHCC. Best management practices, including water and air quality monitoring, will occur during the mechanical dredging, transportation and placement processes to ensure that no exceedances of project performance standards occur and that the placed sediments stay within the LHCC.

EPA will either implement the remedy itself or will work with a third party to carry out the remedy. EPA may enter into a cooperative agreement, pursuant to 40 CFR Part 35, Subpart O, with the HDC to have the HDC, utilizing its experience with creating navigational CAD cells within the harbor, design and excavate the Superfund CAD cell. Depending on the timing of both the Superfund and state enhanced remedy dredging, the CAD cell may be excavated so that it is large enough to accept both Superfund and navigational dredged sediments. Whether the CAD cell contains just Superfund sediment or if it also includes navigational dredge material, long-term O&M of the entire CAD cell will be a permanent component of the Superfund remedy, conducted by MassDEP[4]. This O&M will include bathymetric surveys to determine elevation changes in the harbor bottom, sediment chemistry to evaluate whether contamination is remaining in place and not posing any site risks, biological monitoring to track the benthic recolonization of the CAD cell cap, and compliance monitoring to ensure that institutional controls remain in place and are enforced.

As of June 2010, two CAD cells for navigational dredged material disposal have been successfully constructed and filled in NBH (CAD cells #1 and #2), in addition to the filling of an existing underwater "borrow pit," as part of the state enhanced remedy. These three disposal cells are functioning effectively to contain approximately 200,000 cy of dredged sediments. Section III.B.1 below describes the plume tracking, toxicity testing, and water quality monitoring that was performed in 2009 during placement operations at navigational CAD cell #2. EPA has reviewed this information as part of its evaluation of whether the placement of contaminated sediments within a CAD cell could be conducted in a manner that is protective of human health and the environment.

B. Evaluation of short and long term impacts from an LHCC

[4]Under Section 104(c)(3)(A) of CERCLA, the Commonwealth assumes the responsibility of performing long-term oversight of CERCLA remedies.

The following information was evaluated to determine the protectiveness of the proposed change to the remedy:

1. 2009 plume tracking and toxicity testing during placement operations at navigational CAD cell #2

The most recent phase of navigational dredging in 2009 included CAD cell disposal of sediments dredged from areas in close proximity and with physical characteristics similar to areas slated for Superfund dredging. EPA therefore commissioned extensive water quality monitoring of the navigational CAD cell disposal process to document the efficacy of the operation (Battelle, 2009). In summary, this monitoring did not detect any acute or sub-lethal aquatic toxicity inside or outside of the CAD cell (CAD cell #2) during placement and found that the silt curtain around the CAD cell was successful in containing plumes of turbidity from the placement activities. Only small filaments of turbidity in close proximity to the silt curtain were detected, likely escaping from a seam in the silt curtain. Plumes inside the CAD cell were found to dissipate to near background levels within 1 to 1-1/2 hours (Battelle, 2009). The reader is encouraged to review the report, available at http://www.epa.gov/region1/superfund/sites/newbedford/299744.pdf and in the ESD #4 administrative record, since many color-coded "snapshots" over time of these turbidity plumes are included. One of these snap-shots is included herein as Figure 2.

2. Computer modeling of short and long term water quality impacts

In order to estimate the short and long term water quality impacts of using an LHCC, EPA commissioned the U.S. Army Corps of Engineers' Engineer Research and Development Center (ERDC) in Vicksburg, Mississippi to perform state-of-the-science computer modeling (ERDC, 2010). Sediment and water column samples were collected from appropriate geographic areas of NBH to ensure the accuracy of the modeling effort. The model's conclusions are as follows:

a. A 650-foot square CAD cell excavated 47 ft below the existing sediment surface is sufficient in size to hold and cap the sediments proposed for a lower harbor CAD cell and to contain the lateral spread and collapse of the dredged material discharge during placement.

b. About ten feet of water will be entrained in the dredged material during placement, but all of this water is predicted to be expelled from the consolidating dredged material during the three years of placement assumed by the model.

c. An additional eleven feet of settlement and pore water expulsion is predicted to occur in the first 40 years after cap placement.

d. Dredged material resuspension will occur during placement, resulting in predicted total suspended solids (TSS) concentrations ranging from 20 to 150 mg/L and both dissolved and particulate-associated contaminant release to the water column overlying the CAD cell.

e. The resuspension predictions appear to be a reasonable and conservative representation of the behavior of actual plumes observed during similar dredged material placement into navigational CAD cell #2 in 2009.

f. Dissolved contaminant concentrations in the CAD cell water (but not the overlying water) during filling will become approximately equal to the sediment pore water being placed in the CAD cell.

g. About 2.4 kg of PCB are predicted to be lost during dredged material placement in the lower harbor CAD cell, 85% of which would be dissolved. About 44 kg of copper are predicted to be lost during dredged material placement, 50% of which would be dissolved. These losses represent about 0.038% of the total PCB mass and 0.020% of the total copper mass being placed into the CAD cell.

h. Hydrodynamics modeling yielded only low velocities in the water column above the CAD cell, typically less than 0.3 feet per second (fps). The velocity is sufficiently great to rapidly exchange the water above the CAD cell, typically in one to three hours. The velocity is sufficiently low to limit any mixing in the CAD cell water, mostly in the top few feet. However, higher resolution hydrodynamic modeling of the CAD cell environ performed using the 3-D EFDC (Environmental Fluid Dynamic Code) model set up for sediment transport modeling showed the potential to set up a slow vertical eddy in the CAD cell. The eddy could provide slow mixing to a depth of ten feet below the lip of the CAD cell. Therefore, contaminants in the top ten feet of the CAD cell are assumed to undergo turbulent diffusion and exchange with the water column above the lip of the CAD cell.

i. Additional losses due to potential turbulent diffusion and thermally induced displacement over the winter between dredging seasons could result in about 2.7 kg of additional PCB being lost from the CAD cell water prior to capping, resulting in a total loss from placement operations of 0.08% (5.2 kg) of the total PCB mass (approximately 6,500 kg) disposed in the cell. Similarly, an additional loss of about 18 kg copper could be lost by these mechanisms, resulting in a total placement loss of about 0.03% (63 kg) of the total copper mass (approximately 225,000 kg) disposed in the cell.

j. Placement losses are predicted to be one to two orders of magnitude less than typical losses from mechanical dredging operations.

k. After capping, the contaminants expelled from the dredged material by consolidation would be contained in the lower foot of the cap.

l. Without consideration of burial (i.e., the additional sediment deposition that will take place over time into the bowl-shaped CAD cell depression formed by consolidation after the cap is placed) contaminant breakthrough will take more than 1800 years. Breakthrough, as used in this modeling, is defined as the condition when the contaminant flux or surficial pore water concentration increases to levels of 0.01% of the original flux or sediment bed concentration

before dredging and disposal. With burial promoted by the estimated eleven feet of post-cap dredged material settlement, the transport of contaminants through the cap and burial material will take tens of thousands of years to achieve the breakthrough. Without considering burial, the model predicted that 50 years after being capped, the cap would contain 7 ng/kg (parts per trillion) PCB and 100 ng/l copper - levels that are well below levels of concern.

m. A stable 3-ft cap would be highly effective in isolating the contaminated dredged material. As required by this ESD, long-term monitoring and institutional controls to prevent disturbance will ensure the stability of the cap.

n. Reducing the placement schedule from three years to one or two years would increase the size of the CAD cell needed to contain the approximately 300,000 cubic yards of sediment proposed for placement in the lower harbor CAD cell while maintaining conditions to promote settling and stability. The increase in storage requirements is due to shortening the time available for consolidation. Schedule acceleration is also predicted to decrease the contaminant losses due to the reduction in the exposure of contaminated CAD cell water for losses to occur.

It should also be noted that the Superfund sediments slated for the LHCC are the less contaminated remaining Superfund sediments (average PCB levels of dredge areas generally less than 100 ppm) from approximately the Sawyer Street area south. It is these sediments that the ERDC modeling is based upon.

In addition, EPA and ERDC will be performing large-scale laboratory studies to evaluate the ability of activated carbon to "strip" PCBs in the water column within a CAD cell, thereby minimizing PCBs that might otherwise be released to the surrounding environment. If this evaluation proves successful, placement of activated carbon into the water column within the LHCC's silt curtain would be incorporated into the remedy.

3. Computer modeling of air quality impacts

Since the mechanical dredging and LHCC disposal process uses different dredging and disposal methods than currently employed by the Superfund cleanup, EPA commissioned an air modeling effort to evaluate potential air quality impacts from the revised approach (Jacobs, 2010a). Results of this modeling indicate that the predicted maximum annual impacts from the mechanical dredging and LHCC disposal, even with background sources included, would remain far below the risk-based ambient air concentrations established for nearby children, residences or commercial workers. As required by this ESD, the material will be handled in a manner that will minimize any air emissions.

4. Performance standards and engineering controls will be used to ensure protectiveness

Section IV below discusses the various performance standards and engineering controls that will be used to ensure that use of an LHCC for disposal of Superfund sediments is performed in a manner that is protective of human health and the environment.

C. Disposal into an LHCC is estimated to significantly reduce the time and cost to complete the harbor cleanup

Because of the large scope and magnitude of the ROD 2 remedy, both the time and total cost to complete the remedy is dependent on the level of annual funding. Nevertheless, as summarized in Table 1 below, EPA's updated evaluation (Jacobs, 2010b) concludes that use of an LHCC would take significantly less time and money to complete the harbor cleanup compared to the existing ROD 2 remedy as modified by the three previous ESDs. This is due to the fact that the sediments going to the LHCC would be mechanically dredged and placed into it, thereby avoiding the desanding, dewatering and offsite transportation and disposal costs that would otherwise be associated with the hydraulic dredging of these sediments. Note that O&M costs are not included in Table 1, but are included in Jacobs, 2010b, and are included in the administrative record file.

To facilitate the cost comparison of the two cleanup approaches and the three annual funding levels evaluated ($15, $30 and $80 million per year) the estimated costs in Table 1 include both the Net Present Value (NPV) cost and the "actual" cost. The NPV cost represents the sum of money that, if invested at the start of a project, could fund the project - taking into consideration both the annual funding outlays and interest earned on the unused balance. The NPV cost was calculated by having all forecasts of future costs made in 2010 dollars, and then discounting by the appropriate discount rate to reflect the year of implementation of each cost. These NPV values do not account for inflation. The "actual" cost is the sum of all annual costs, assuming 3.5% inflation per year. Also note that the time and cost to complete estimates in Table 1 are for 2010 forward.

	Current Remedy (3 CDFs and Offsite T&D)			**ESD #4 Remedy (3 CDFs, interim T&D, LHCC)**		
Funding level	**Time to complete**	**Cost to complete (NPV)**	**Cost to complete (actual)**	**Time to complete**	**Cost to complete (NPV)**	**Cost to complete (actual)**
$15m/year	46	$413m	$1.7B	40	$362m	$1.2B
$30m/year	40	$477m	$1.2B	26	$401m	$767m
$80m/year	7	$464m	$536m	6	$393m	$422m

Table 1 - Comparison of the Current ROD 2 Remedy to the ESD #4 Remedy

D. Collaboration with navigational dredging may reduce environmental impacts and increase cost-effectiveness

Since additional navigational dredging is anticipated for NBH, EPA will continue to coordinate with the relevant local, state and federal navigational dredging stakeholders to determine if economies of scale and reduced environmental impacts can be achieved by combining the Superfund LHCC with other navigational dredging and disposal activities. As also discussed in Section III.A above, if funding is available in a timely fashion for additional navigational dredging, a large combined Superfund/navigational dredging CAD cell rather than a series of smaller CAD cells would likely be less expensive, have a smaller benthic footprint and cause less environmental impacts. If implemented, operation and maintenance of a single combined Superfund/navigational dredging CAD would be fully included in the CERCLA remedy, including long-term monitoring and institutional controls for the entire CAD area. EPA would not allow implementation of the Superfund LHCC to be significantly delayed, however, due to a lack of timely navigational dredging funding for adding to the size of the LHCC to hold navigational dredge material.

E. Potential for beneficial use of clean CAD cell sand

Including an LHCC into the Superfund remedy would provide the opportunity to make use of the clean sandy material excavated from the "bottom-of-CAD" to improve the protectiveness of the harbor cleanup. Potential beneficial uses of this material include, but are not limited to:

- use as a clean cap material to complete the pilot underwater cap south of the hurricane barrier near the Cornell-Dubilier facility;

- use as clean cap material for the existing navigational dredging CAD cells in the lower harbor (located between the Route 6 and Route 195 bridges).

- use as clean "backfill" in areas dredged to date north of Coggeshall Street (i.e., mudflat restoration)

Conceptual beneficial reuses will be evaluated during project implementation to determine the efficacy and cost-effectiveness of the various disposal and reuse options. However, should beneficial reuse not be feasible at the time the material is generated, the material would be disposed of at an approved disposal site.

IV. Applicable or Relevant and Appropriate Requirements (ARARs) for CAD Cell Siting and Construction, Mechanical Dredging and Sediment Disposal in a CAD Cell

The modification of the remedy to replace off-site disposal of a certain volume of contaminated sediments with mechanical dredging and onsite disposal in an LHCC requires the addition and/or modification of a number of ARARs that have been identified in ROD 2 and the

subsequent three ESDs that have modified it.

The selected remedy will comply with all federal and any more stringent state ARARs that pertain to the remedial action (see Table 2). In making this determination, EPA has made the following specific findings:

- Pursuant to regulations under the federal Clean Water Act, 40 CFR Part 230, Subpart B, EPA has made a final determination that the remedy is the least environmentally damaging practicable alternative with respect to potential impacts to federal jurisdictional wetlands and aquatic habitats and has solicited public comment concerning the draft determination. The final determination is based on the following findings;

    1. The use of CAD cells in the harbor will permit the remedy to sequester PCB-contaminated sediment, currently posing a risk to federal jurisdictional wetlands/aquatic habitats, significantly faster than either the original ROD 2 remedy of on-site disposal in CDFs or the ESD-modified remedy of dewatering and off-site disposal.

    2. CAD cells are a proven technology for sequestering contaminated sediments, although the levels of PCBs within the Superfund sediments to be disposed of are higher than other sites where CAD cells have been used.

    3. Monitoring data from the pilot underwater cap area of the outer harbor has, to date, shown that an underwater cap can successfully isolate underlying PCB-contaminated sediments, even in an open water area significantly less protected from environmental disturbance than the lower harbor area where the LHCC will be sited.

    4. Siting of the Superfund CAD cell north of Pope's Island is based on an extensive review by the State of potential CAD sites in NBH, which took into account potential environmental impacts and included public involvement in the process.

    5. The CAD Site was determined to be the preferred location for siting CAD cells in NBH due to, among other factors, its greater depth to bedrock and thus higher disposal capacity, its location outside of main navigational channels, its lower potential for cap disruption, and its higher potential for benthic recolonization.

    6. Short-term impacts from the construction of the CAD cell can be addressed by best management practices during excavation operations to address water quality issues, proper handling and disposal of excavated material, and proper closure of the cell.

7. Mechanical dredging, passive dewatering, and placement of contaminated sediment within the CAD cell will be conducted using best management practices and monitoring to prevent/limit releases during the mechanical dredging, passive dewatering, transportation and placement that would impair wetland/aquatic resources. EPA has already worked with the HDC during its filling of the navigational CAD cells in NBH to optimize placement and monitoring techniques.

8. CAD cell closure includes capping with clean material (which replaces the contaminated sediment formerly in the area) which will allow the benthic environment to become reestablished; and long-term O&M, monitoring, and institutional controls to ensure that contaminated sediment within the CAD cell remains sequestered.

9. Activated carbon or other supplements placed within the CAD cell may be used to further demobilize contamination within it.

- EPA has made a finding pursuant to TSCA PCB Regulations at 40 CFR § 761.61(c), that the mechanical dredging, passive dewatering, and disposal of PCB-contaminated sediment from the "top-of-CAD" during CAD cell construction and the disposal of PCB-contaminated sediment from the Superfund remedy into the CAD cell will not pose an unreasonable risk of injury to health or the environment as long as certain conditions are met concerning dewatering and disposal practices; O&M, including long-term monitoring; and institutional controls. These conditions are listed in a TSCA finding attached to this ESD (Attachment B). This finding was made after considering all public comments received by the Agency during the public comment period.

Ambient air monitoring will also be performed to ensure that nearby workers and residents are not adversely impacted by the mechanical dredging, passive dewatering, barge-transport, or cell disposal operations. In addition to the current set of ambient air monitoring locations for the harbor cleanup, additional monitoring location(s) will be established specifically to evaluate potential emissions from the LHCC. The harbor cleanup's Public Exposure Tracking System (PETS) will be used to evaluate the air monitoring results and ensure that use of an LHCC does not endanger human health. Results of the monitoring will be published on EPA's NBH website – www.epa.gov/nbh.

V. Supporting Agency Comments

The MassDEP has reviewed the draft and final ESD and supports the changes to the 1998 ROD. The MassDEP has evaluated all of the public comments on the draft ESD, and concurs with issuance of the final ESD. See the state's final concurrence letter in Attachment C.

VI. Statutory Determinations

As discussed above in Section IV, this ESD includes a determination under TSCA 40 CFR §761.61(c) that mechanical dredging, passive dewatering and the creation and use of the lower harbor CAD cell does not pose an unreasonable risk of injury to health or the environment. This determination is attached as Attachment B.

EPA has also determined, in compliance with Section 404 of the Clean Water Act and Executive Order 11990 (Protection of Wetlands) that modification of the ROD 2 remedy to change, for a certain amount of sediments as discussed herein, hydraulic dredging, mechanical dewatering and off-site disposal of contaminated sediment to mechanical dredging, passive dewatering and onsite disposal in the LHCC is the least environmentally damaging practicable alternative to preventing contaminated sediments in the harbor from impairing federal jurisdictional wetlands/aquatic habitats. The determination takes into account the remedy's ability to mitigate short-term impacts to aquatic resources from the construction of the LHCC and the mechanical dredging, passive dewatering, barge-transport and disposal of contaminated sediments into the cell. The determination is also based on the long-term benefits from being able to expedite sequestration of contaminated sediments in the LHCC that are currently posing a risk to wetland and aquatic resources in the harbor. In comparison, off-site disposal of these sediments will take significantly longer and will cost significantly more to address site risks. The higher costs effect how quickly the harbor remedy will be able to achieve sediment cleanup standards and the protection of wetland/aquatic resources within NBH.

The remedy as modified herein remains protective of human health and the environment, complies with all Federal and State requirements that are applicable or relevant and appropriate to the remedy as modified herein (and which were not waived in the 1998 ROD), and is cost-effective. In addition, the revised remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this site.

VII. Public Participation

EPA, the Army Corps of Engineers and MassDEP meet regularly with site stakeholders to keep them up to date with the site's cleanup status, including the issues described herein. For example, monthly update meetings open to all interested parties are held (typically the last Thursday of the month at 7pm at the New Bedford National Park Service Information Center, 33 William Street) as well as other periodic meetings with abutting neighborhood groups. Additional meetings and outreach efforts with other groups occur as necessary to successfully implement the cleanup program.

As explained above in Section I.E, EPA held an informational public meeting on June 24, 2010 specifically to discuss the draft ESD's proposed modifications to the remedy, and to answer questions about it. In addition, EPA held an informational public meeting on January 28, 2010 which focused on the proposed use of an LHCC for Superfund sediments and EPA's on-going evaluation of it. Discussion of the LHCC concept has also occurred as part of the monthly update meetings discussed above, and the field monitoring and computer modeling reports that evaluated

the LHCC have been posted on the harbor cleanup's website (www.epa.gov/nbh) well in advance of the start of the comment period. Public comments received are addressed in the Responsiveness Response to Comments attached to this ESD as Attachment A.

VIII. Changes to ESD Since the Draft ESD

A. Accuracy of Cost Estimates Supporting the ESD Further Clarified

Since the cost estimates supporting the ESD (Jacobs, 2010b) are based on actual costs experienced to date in NBH for both hydraulic dredging/offsite disposal and mechanical dredging/CAD cell disposal, EPA clarifies that it believes these estimates are much more accurate than the agency-accepted "plus 50%, minus 30%" accuracy range for feasibility-stage cost estimates (USEPA, 1988). Consistent with sound engineering practice, EPA believes that use of a contingency factor of 15% for these estimates is appropriate to account for any unforeseen costs that could be experienced over the remaining timeframe of the OU1 cleanup.

In addition, EPA notes that one (and only one) line item cost in these cost estimates has been identified as in error in the draft ESD, but that this line item error has no bearing on the associated final cost. The line item in question is for "Alternative 1" at $80 million/year, p.4 of 11, which incorrectly lists a total for "fixed costs" of $67,325,174. Fixed costs are those project-related costs that are required each year, regardless of the budget for actual dredging, and include activities such as, but not limited to, project management and reporting, mobilization/ demobilization, USACE oversight, and operations and maintenance of the Area C and Area D treatment facilities. The correct value for total fixed costs for this alternative is $76,320,537, which is correctly listed on p.1 of 11 of the cost estimate for this alternative. Theerrant value on p.4 of 11 was due to a spreadsheet formula that was incorrectly carried over from a previous draft version. Again, however, EPA stresses that the correct value on p.1 of 11 was used for totaling this alternative's costs, so that there was no impact on the accuracy of the cost estimates as listed in Table 1 above.

B. Enhanced Stakeholder Outreach

To provide harbor cleanup stakeholders the opportunity to develop a deeper understanding of the LHCC's implementation, and to provide more detailed feedback to EPA, EPA will be enhancing it ongoing stakeholder outreach. One such potential measure will be forming a Stakeholder Coordination Committee (SCC). The SCC will be open to those stakeholders who desire more detail about the LHCC's design and construction. EPA anticipates that participants on the SSC will include MassDEP, NBHDC, the City of New Bedford, Town of Fairhaven, local environmental advocacy groups, and other interested stakeholders. EPA would chair the SCC, and would accept feedback from it for consideration regarding LHCC implementation. EPA is also planning to issue a technical advisory grant to assist community stakeholder's understanding of technical issues regarding implementation of the LHCC.

C. LHCC Silt Curtain

To maximize the performance of the LHCC silt curtain, the following criteria shall be met, to the extent practicable (performance standards may require modification based on experience during implementation):

1. The silt curtain shall be extended around the complete perimeter of the LHCC. The only opening shall be a "door" to allow vessel traffic into and out of the LHCC area; this "door" shall be returned to the closed position during all dredged material placement into the LHCC. The silt curtain shall extend from the water surface to within approximately six inches of the harbor bottom at mean lower-low water, unless it is determined via monitoring that the curtain needs to be deepened (for higher tides) to better contain dredged material in the CAD cell. Note that a deeper curtain would rest on the harbor bottom at lower tides and could thus generate water column turbidity as a result.

2. The silt curtain shall be securely anchored by using sheet pilings (or equivalent) at appropriate spacing, and be of sufficiently strong material construction, to withstand high winds, storm-driven waves, large vessel wake, etc. The silt curtain shall be anchored along its bottom as necessary to maintain its position. Sheet piles shall be fitted with lighted navigational aids to avoid vessel strikes.

3. The separate sections making up the perimeter silt curtain shall be sufficiently overlapped (minimum of five feet) to prevent releases of any turbidity plumes or oil sheens between sections. The top foot of the curtain shall be a solid material to similarly prevent/minimize releases of oil sheen. The mesh size opening of the rest of the silt curtain shall be the smallest commercially available for such applications (typically an Equivalent Opening Size (EOS) of 100 - 0.0059 inch or 0.15mm mesh opening).

4. An oil-absorbent boom shall be placed along the entire interior of the silt curtain during placement operations. This boom shall be overlapped as in VIII.C.3 above, and shall be replaced per manufacturer's direction or as needed to retain the ability to absorb any oil sheens that may be present.

D. Use of an Environmental Bucket

For the mechanical dredging of Superfund sediments to be placed into the LHCC, an environmental bucket shall be used, to the extent practicable, that is specifically designed for environmental rather than navigational dredging. The environmental bucket shall be designed to minimize sediment resuspension and the loss of dredged material and related seawater during dredging. If an environmental bucket cannot be used due to site restrictions (such as the pre-dredging removal of debris) water quality controls and monitoring will maintain the protectiveness of the operation. The environmental (or other) bucket shall be rinsed in a wash tank after release of each bucket load into the scow/hopper. The dredging process will be operated in a careful, well-designed manner so that the project-specific turbidity criterion of 100 neptholometric turbidity units (ntu) above background measured 300 feet down-current of the dredge area is not exceeded (see section VIII.E below).

Free-standing water collected in the scows/hoppers shall be decanted and filtered using activated carbon to ensure compliance with this same 100 ntu turbidity criterion.

During placement of dredged material into the LHCC, if the material is to be placed via bucket (rather than split-hull scow) the bucket shall be lowered into the water column as far as possible (if mechanically-armed) or a minimum of 10 feet (if cable supported) prior to release to minimize sediment resuspension. If additional measures are required to completely empty sediments from the scow (e.g., for the final scow load), they will be conducted in a manner that maintains compliance with the project turbidity criterion.

E. Water Quality Performance Standards

All in-water activities associated with the LHCC (e.g., installing the silt curtain, excavating the cell, dredging Superfund dredge areas, passive sediment dewatering, placing material into the cell, capping the cell) shall comply with the NBH Site-specific turbidity-based water quality performance standard of 100 ntu above background measured 300 feet down-current of the management activity. Compliance and implementation of this standard shall follow the approach outlined on Figure 5 of the Water Quality Monitoring Summary Report for the 2009 dredge season (WHG, 2010).

In addition, in order to compare the actual performance of the LHCC to that predicted by modeling (ERDC, 2010), turbidity, TSS, PCB and copper levels in the CAD cell water will be monitored prior to capping; turbidity shall be correlated to TSS (see Battelle, 2009) and this correlation periodically reconfirmed/adjusted to provide an effective real-time monitoring tool. If the actual levels of these field parameters are significantly greater than predicted (see Figures 16 – 20 in ERDC, 2010) corrective measures shall be taken to eliminate such significant difference(s). Bathymetric sampling will also be performed during this period to monitor LHCC performance and to enable comparison to modeled predictions. Water quality monitoring results will be posted on EPA's NBH web site.

F. Air Quality

As described above in section IV, the Site-specific air monitoring and tracking program will be continued for LHCC dredging and placement activities, and additional air monitoring location(s) will be used to account for the lower harbor locus of these activities. In addition, to avoid generation of airborne dust, mechanically dredged sediment placed in hoppers/scows and awaiting placement into the LHCC will not be allowed to dry out prior to placement. Additional measures to reduce the potential for airborne PCBs will be implemented, depending on the results of the air monitoring and tracking program. Again however, as discussed herein, significant air quality impacts from LHCC activities are not expected. Air monitoring results will be posted on EPA's NBH web site.

G. CAD Cell Cap

Consistent with the computer modeling used to evaluate the LHCC (ERDC, 2010) the total organic carbon (TOC) level in the cap material shall be a minimum of 0.3%. The cap

material shall be sampled at regular intervals, approximately every 5,000 cy, to ensure that this criteria is maintained.

In addition, as required in the draft and final TSCA determination (Attachment B), placement of the LHCC cap shall not take place until a minimum of six months after the final placement of dredged material, to allow sufficient consolidation and development of bearing capacity. EPA will consider usage of settling/reflector plates as part of the cap monitoring system to help differentiate between cap consolidation and potential cap erosion.

H. Institutional Controls

As described in the draft and final TSCA determination (Attachment B) EPA, in collaboration with appropriate harbor stakeholders, will develop guidelines for mooring and anchor designs that will ensure that the integrity of the cap is not damaged by moorings and anchors. EPA will also assist these stakeholders in developing and implementing regulations requiring that such mooring and anchor designs are used within the cap area.

EPA will also coordinate with the U.S. Coast Guard and the National Oceanic and Atmospheric Administration (NOAA) to establish a regulated navigation area that will prohibit activities that could disturb the seabed within the LHCC and also delineate the LHCC footprint on marine navigational charts for the NBH area. These charts will note the anchorage restrictions for mariners in the harbor.

IX. Declaration

For the foregoing reasons, by my signature below, I approve the issuance of an Explanation of Significant Differences for the New Bedford Harbor Superfund Site located in New Bedford, Acushnet, Fairhaven and Dartmouth, Massachusetts and the changes and conclusions stated therein.

James T. Owens, III

James T. Owens, III
Director, Office of Site Remediation and Restoration
USEPA – Region 1 New England

March 14, 2011

Date

References Cited

(Copies of all references are available in the ESD #4 Administrative Record.)

Battelle, 2009. Turbidity Monitoring and Plume Sampling Results for City Dredge Disposal at the New Bedford Harbor CAD Cell #2. Technical Memorandum dated 12/15/09. (http://www.epa.gov/region1/superfund/sites/newbedford/299744.pdf)

ERDC, 2010. Assessment of Contaminant Loss and Sizing for Proposed Lower Harbor Confined Aquatic Disposal (CAD) Cell, New Bedford Harbor Superfund Site. US Army Engineer Research and Development Center, May 2010. (http://www.epa.gov/region1/superfund/sites/newbedford/299753.pdf)

Foster Wheeler, 1996. Draft Phase 2 Cost Estimates. June 1996. Available in the Administrative Record for the 1998 ROD, document number 4.4.4, p.89.

Jacobs, 2008. Email from Anita Rigassio-Smith (Jacobs Engineering) to Dave Dickerson (USEPA Region 1) dated 4/18/08.

Jacobs, 2010a. Final Evaluation of the Impact of Dredging and CAD Cell Disposal on Air Quality, New Bedford Harbor Superfund Site. June 2010. (http://www.epa.gov/region1/superfund/sites/newbedford/466822.pdf)

Jacobs, 2010b. ESD Cost Estimates, Jacobs Engineering. June 2010.

MassCZM. 2003. Final Environmental Impact Report for New Bedford and Fairhaven's Dredge Material Management Plan. Massachusetts Office of Coastal Zone Management. October 2003. (http://www.mass.gov/czm//dredgereports/2003/feirnb-f.htm)

USEPA, 1988. *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*. Interim Final. EPA/540/G-89/004. OSWER Directive 9355.3-01. October 1988.

USEPA, 2010. Presentation Given at the January 2010 Public Meeting, New Bedford Harbor Superfund Site. (http://www.epa.gov/region1/superfund/sites/newbedford/299745.pdf)

WHG, 2010. *Water Quality Monitoring Summary Report, 2009 Remedial Dredging, New Bedford Harbor Superfund Site, OU #1.* Prepared by Woods Hole Group for USACE-New England District. July 2010. (http://www.epa.gov/region1/superfund/sites/newbedford/299757-2009-NBH-WQ-Report.pdf)

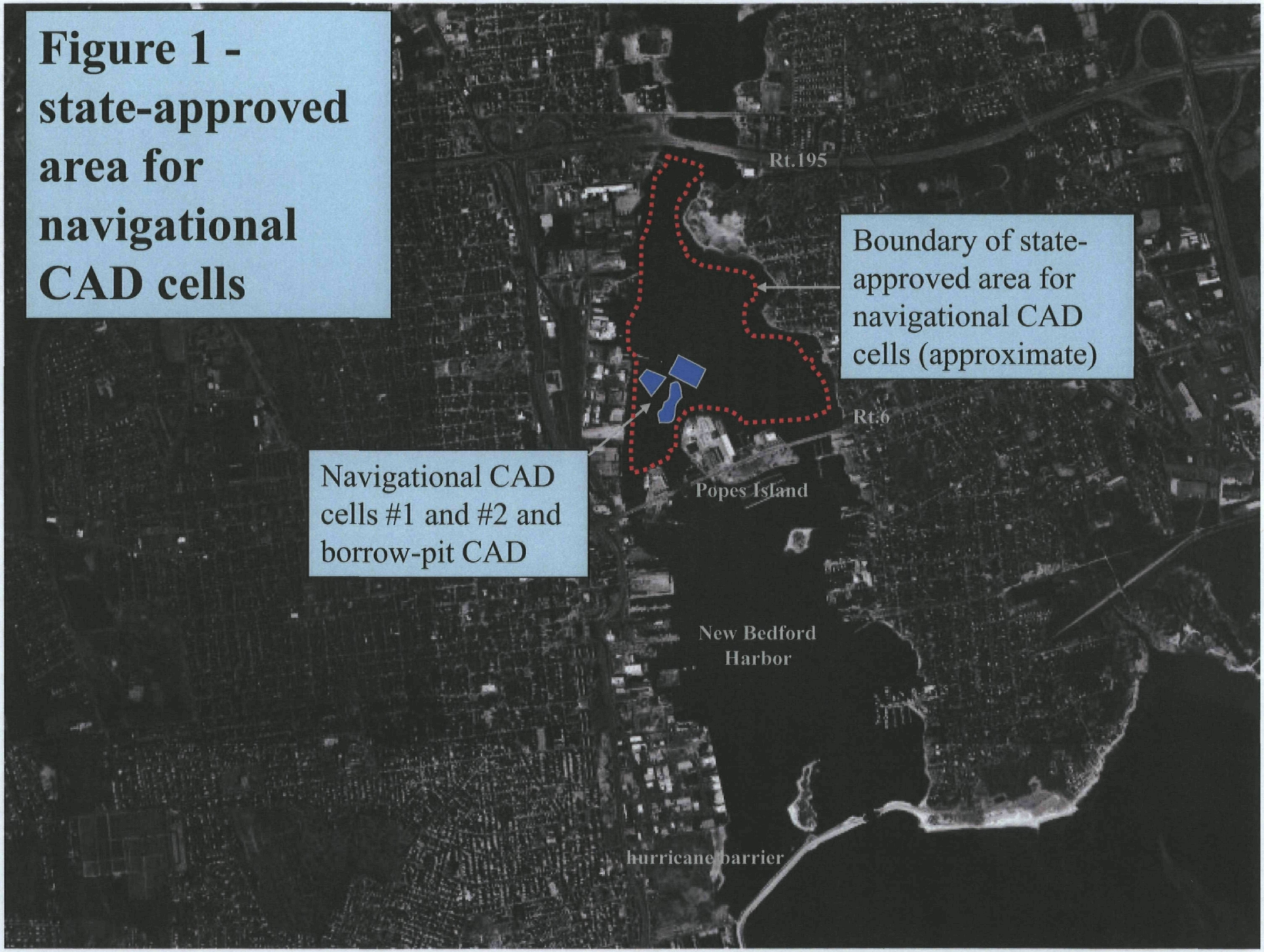


Figure 1 - state-approved area for navigational CAD cells
Rt.195
Boundary of state-approved area for navigational CAD cells (approximate)
Rt.6
Navigational CAD cells #1 and #2 and borrow-pit CAD
Popes Island
New Bedford Harbor
hurricane barrier

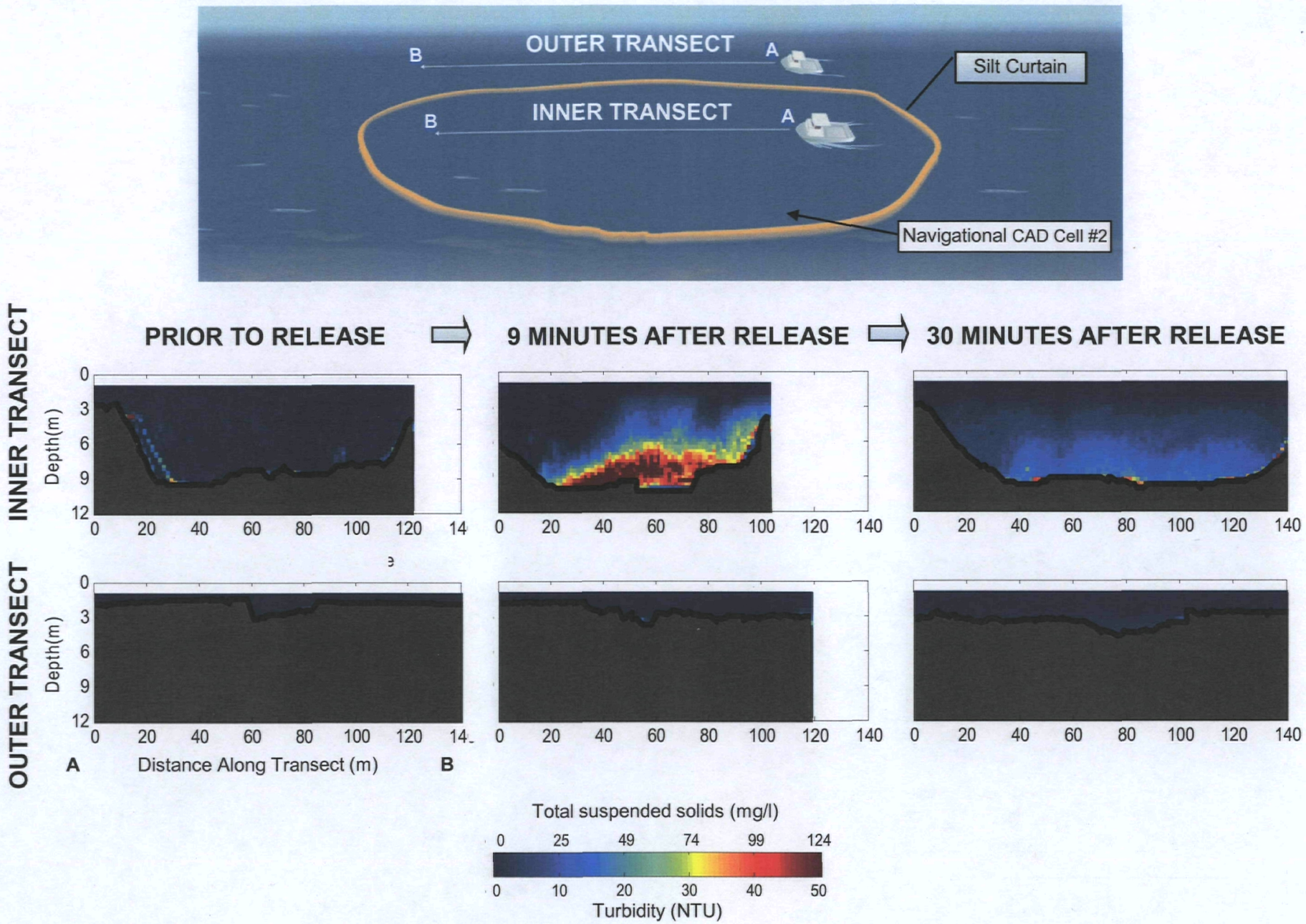


Figure 2 - Turbidity Measured Inside and Outside of CAD Cell #2 - 2009

Table 2

Location-Specific ARARs and TBCs for OU1 ESD #4: Siting and Construction of a Confined Aquatic Disposal (CAD) Cell, Mechanical Dredging with Passive Dewatering, and Disposal of Contaminated Sediment into the CAD

Regulatory Authority	Location Characteristic	Requirement	Status	Requirement Synopsis	Action to be Taken to Attain Requirement
Federal	Navigable waters	Rivers and Harbors Act of 1899 (33 U.S.C. § 403 *et seq.*; 33 C.F.R. Parts 320-323)	Relevant and Appropriate	Section 10 of the Rivers and Harbors Act prohibits unauthorized obstruction or alteration of navigable waters. No activity that impacts waters of the United States shall be permitted if a practicable alternative that has less adverse impact exists. If there is no other practicable alternative, the impacts must be mitigated.	Site activities will be designed and implemented to avoid obstruction and minimize alteration of navigable waters during CAD construction and mechanical dredging, transportation and disposal. Disturbed areas may be restored, if natural restoration does not occur.
Federal	Wetlands and aquatic habitats	Clean Water Act, Sec 404 (33 U.S.C. § 1344); Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 C.F.R. Part 230, 231 and 33 C.F.R. Parts 320-323)	Applicable	These regulations outline the requirements for the discharge of dredged or fill materials into surface waters including Federal jurisdictional wetlands and aquatic habitats. No activity that impacts waters of the United States shall be permitted if a practicable alternative that has less adverse impact exists. If there is no other practicable alternative, the impacts must be mitigated.	Disposal of PCB-contaminated sediment in a CAD cell has been identified as the least environmentally damaging practicable alternative (LEDPA) as it achieves the remedial action objectives with the lowest degree of long-term contaminant impairment of federal jurisdictional wetlands and aquatic habitats in New Bedford Harbor. Mechanical dredging, passive dewatering, transportation, and deposition of material into the CAD cell will also comply with these standards regarding the filling of aquatic habitats, since best management practices and monitoring will ensure that water quality will not be impaired during the dredging, passive dewatering, transportation, and deposition operation. Furthermore, since the CAD cell will be capped with clean material it is expected to become reestablished as a marine benthic community. Long-term monitoring and institutional controls will ensure that the remedy remains protective of wetland and aquatic resources. Public comment on EPA's LEDPA was solicited and EPA's responses to relevant comments are in the Response to Comments section of this ESD.

Table 2

Location-Specific ARARs and TBCs for OU1 ESD #4: Siting and Construction of a Confined Aquatic Disposal (CAD) Cell, Mechanical Dredging with Passive Dewatering, and Disposal of Contaminated Sediment into the CAD

Regulatory Authority	Location Characteristic	Requirement	Status	Requirement Synopsis	Action to be Taken to Attain Requirement
Federal	Wetlands and Floodplains	Floodplain Management and Protection of Wetlands (40 C.F.R. 9)	Relevant and Appropriate	FEMA regulations that set forth the policy, procedure and responsibilities to implement and enforce Executive Order 11988, Floodplain Management, and Executive Order 11990, Protection of Wetlands.	Remedial alternatives conducted within the 500-year floodplain of New Bedford Harbor or within federal jurisdictional wetlands/aquatic habitats will be implemented in compliance with these standards. EPA has solicited public comment on the measures taken through the remedial action to protect floodplain and wetland resources and responded through a Response to Comments in this ESD
Federal	Surface waters and wetlands	Fish and Wildlife Coordination Act (16 USC 661 *et seq.*)	Applicable	Requires Federal agencies involved in actions that will result in the control of structural modification of any stream or body of water for any purpose, to take action to protect the fish and wildlife resources that may be affected by the action. USEPA must consult with appropriate Federal and State resource agencies to ascertain the means and measures necessary to mitigate, prevent, and compensate for project-related losses of fish and wildlife resources and to enhance the resources.	Measures to mitigate or compensate adverse project-related impacts to fish and wildlife resources will be taken, if determined necessary. The appropriate Federal and State resource agencies will be consulted.

Table 2

Location-Specific ARARs and TBCs for OU1 ESD #4: Siting and Construction of a Confined Aquatic Disposal (CAD) Cell, Mechanical Dredging with Passive Dewatering, and Disposal of Contaminated Sediment into the CAD

Regulatory Authority	Location Characteristic	Requirement	Status	Requirement Synopsis	Action to be Taken to Attain Requirement
Federal	Essential Fish Habitat	Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1855(b)(2)	Applicable	This Act establishes procedures designed to identify, conserve, and enhance essential fish habitat (EFH) for those species regulated under a federal fisheries management plan. Before a federal action is taken, consultation with National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) is required. All of New Bedford/ Fairhaven Harbor is designated as EFH for at least one life stage for 20 fish species.	Impacts associated with mechanical dredging, passive dewatering, and the disposal of sediments into the LHCC are considered temporary and reversible. Measures to mitigate or compensate adverse project-related impacts to EFH, including the use of Best Management Practices will be taken, as determined necessary. The appropriate Federal and State resource agencies will be consulted.
Federal	Coastal Zone	Coastal Zone Management Act (16 U.S.C. 1451 *et seq.*)	Applicable	Require activities in the designated coastal zone be conducted in a manner consistent with coastal zone management plans.	The entire area is in a coastal zone management area. The CAD cell was sited based on meeting CZM standards. The remedy is consistent with the state coastal zone management program to the maximum extent possible.

Table 2

Location-Specific ARARs and TBCs for OU1 ESD #4: Siting and Construction of a Confined Aquatic Disposal (CAD) Cell, Mechanical Dredging with Passive Dewatering, and Disposal of Contaminated Sediment into the CAD

Regulatory Authority	Location Characteristic	Requirement	Status	Requirement Synopsis	Action to be Taken to Attain Requirement
Federal	Historic Protection	National Historic Preservation Act of 1966 (16 U.S.C. § 470 *et seq.*); Protection of Historic Properties (36 C.F.R. Part 800)	Applicable	Section 106 of the NHPA requires Federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment.	EPA has performed archeological surveys for all areas impacted by the proposed mechanical dredging and LHCC. EPA has also consulted with tribal representatives (THPO) and the state historic preservation officer (SHPO) and Massachusetts Board of Underwater Archaeology (MBUA). Based on the previous survey work and these consultations, subtidal areas impacted by the mechanical dredging and LHCC are not indicated as areas of interest or of significance. Additional surveys will be conducted if determined necessary in consultation with state and tribal officials. If historic resources are encountered (such as marine artifacts) during dredging or the construction of the CAD cell, procedures established under these standards will be followed to address the historic resource.
Federal	Endangered Species	Endangered Species Act; 16 U.S.C. Part 1531 *et seq.*	Applicable	Requires consultation with appropriate agencies if a threatened or listed species or their habitat may be affected by a federal action.	EPA will coordinate with appropriate agencies to consider mitigation measures if either the dredging or construction/ filling of the CAD cell affect the feeding habitat of the listed Roseate Tern.

Table 2

Location-Specific ARARs and TBCs for OU1 ESD #4: Siting and Construction of a Confined Aquatic Disposal (CAD) Cell, Mechanical Dredging with Passive Dewatering, and Disposal of Contaminated Sediment into the CAD

Regulatory Authority	Location Characteristic	Requirement	Status	Requirement Synopsis	Action to be Taken to Attain Requirement
State	Wetlands	Wetlands Protection Act and Regulations (131 M.G.L. 40, 310 C.M.R. 10)	Applicable	Standards regulate dredging, filling, or polluting of coastal resource areas. Protected resource areas within or adjacent to the proposed CAD cell area are: Land Under Ocean (10.25(5)(6)); Designated Port Area (10.26(3)(4)); Land Containing Shellfish (10.34(5)(7)); Land Under the Ocean, Ponds, Streams, Rivers, Lakes, or Creeks that Underlie an Anadromous/Catadromous Fish Run ("Fish Run") (10.35), Estimated Habitats of Rare Wildlife, Coastal Wetlands (10.37)	Best available measures will be used to minimize adverse effects on identified resource areas from the dredging, passive dewatering, transportation, and construction and filling of the CAD cell. Siting of the CAD cell area took into account these standards to locate the area of NBH best suited for siting the cell. The project will be managed to minimize short-term adverse effects on the feeding habitat of the local populations of state-listed rare species (Common and Roseate Tern) and will cause no long-term adverse effects.

Table 2

Location-Specific ARARs and TBCs for OU1 ESD #4: Siting and Construction of a Confined Aquatic Disposal (CAD) Cell, Mechanical Dredging with Passive Dewatering, and Disposal of Contaminated Sediment into the CAD

Regulatory Authority	Location Characteristic	Requirement	Status	Requirement Synopsis	Action to be Taken to Attain Requirement
State	Subtidal, tidal, and filled tidal lands	Public Waterfront Act (91 M.G.L. 1.00 *et seq.*, 310 C.M.R. 9.00)	Applicable	The statute establishes the State's ownership and management of submerged, intertidal, and filled tidal land throughout the State. Applicable provisions are Restrictions on Fill and Structures 9.32(1)(a)(2)(b)(4)(b); Conformance with Harbor Plans 9.33(2); Preserving Water-Related Public Rights 9.35(1),(2)(a)(1) and 3 (a and b); Preserving Water-Related Public Rights 9.35(1), (2)(a and b) and (3)(b), 3(a); Protecting Water-Dependent Uses 9.36(3); Engineering and Construction Standards 9.37(1)(c); and Dredging and Dredged Material Disposal 9.40(2),(3)(a),(4)	Temporary unavoidable impacts to water dependent users will occur during CAD cell construction and sediment dredging, transportation, and placement. The substantive environmental requirements of this standard will be achieved, including the development of land use restrictions for State submerged lands to protect the CAD cell, if required by the remedy.
State	Endangered Species	Endangered Species Act and Regulations (M.G.L c.131A, 321 CMR 10.00)	Relevant and Appropriate	Standards pertaining to the protection of State-listed endangered, threatened, or special concern species and their habitats. Specific standards for activities occurring within designated priority habitats.	Although not within a designated priority habitat, EPA will coordinate with appropriate agencies to consider mitigation measures if either the dredging or construction/ filling of the CAD cell affect the feeding habitat of the listed Roseate Tern.
State	Coastal zone	Coastal Zone Management (310 C.M.R. 21, 90)	Applicable	Require activities in the designated coastal zone be conducted in a manner consistent with coastal zone management plans.	The entire area is in a coastal zone management area. The CAD cell was sited based on meeting CZM standards. The remedy is consistent with the state coastal zone management program to the maximum extent possible.

Table 2

Location-Specific ARARs and TBCs for OU1 ESD #4: Siting and Construction of a Confined Aquatic Disposal (CAD) Cell, Mechanical Dredging with Passive Dewatering, and Disposal of Contaminated Sediment into the CAD

Regulatory Authority	Location Characteristic	Requirement	Status	Requirement Synopsis	Action to be Taken to Attain Requirement
State	Coastal Zone	Coastal Zone Management Policies	To be Considered	Policies for coastal zone areas which are implemented through identified ARARs, particularly the Wetlands Protection Act and the Public Waterfront Act. Policies to be considered are Habitat 1; Coastal Hazard 2,3; Ports 1,2,3; Port Management Principles 1;Protected Areas 3; and Growth Management Principle 1.	These policies were considered when siting the CAD cell location. They will be considered throughout construction and long-term management of the CAD cell as well as during the sediment dredging, transportation, and placement process.

Table 2

Chemical-Specific TBCs for OU1 ESD #4: Siting and Construction of a Confined Aquatic Disposal (CAD) Cell, Mechanical Dredging with Passive Dewatering, and Disposal of Contaminated Sediment into the CAD

Regulatory Authority	Chemical Medium	Requirement	Status	Requirement Synopsis	Action to be Taken to Attain Requirement
Federal Criteria, Advisories and Guidance	Sediment	U.S. Environmental Protection Agency (USEPA) Risk Reference Doses (RfDs)	To Be Considered	RfDs are estimates of daily exposure levels that are unlikely to cause significant adverse non-carcinogenic health effects over a lifetime.	This alternative will meet these standards by removing contaminants that pose non-carcinogen risks in sediments and disposing of them in the CAD. A long-term monitoring program and institutional controls will ensure the sediment and associated contaminants remain within the CAD cell.
Federal Criteria, Advisories and Guidance	Sediment	Guidelines for Carcinogen Risk Assessment EPA/630/P-03/001F (March 2005)	To Be Considered	Guidance for assessing cancer risk.	This alternative will meet these standards by removing contaminants that pose carcinogen risks in sediments and disposing of them in the CAD. A long-term monitoring program and institutional controls will ensure the sediment and associated contaminants remain within the CAD cell.
Federal Criteria, Advisories and Guidance	Sediment	Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens EPA/630/R-03/003F (March 2005)	To Be Considered	Guidance of assessing cancer risks to children.	This alternative will meet these standards by removing contaminants that pose carcinogen risks to children in sediments and disposing of them in the CAD. A long-term monitoring program and institutional controls will ensure the sediment and associated contaminants remain within the CAD cell.
Federal Criteria, Advisories and Guidance	Sediment	USEPA Carcinogen Assessment Group, Cancer Slope Factors (CSFs)	To Be Considered	CSFs are used to compute the incremental cancer risk from exposure to site contaminants and represent the most up-to-date information on cancer risk from USEPA's Carcinogen Assessment Group.	This alternative will meet these standards by removing contaminants that pose carcinogen risks in sediments and disposing of them in the CAD. A long-term monitoring program and institutional controls will ensure the sediment and associated contaminants remain within the CAD cell.

Table 2

Action-Specific ARARs and TBCs for OU1 ESD #4: Siting and Construction of a Confined Aquatic Disposal (CAD) Cell, Mechanical Dredging with Passive Dewatering, and Disposal of Contaminated Sediment into the CAD

Regulatory Authority	Action	Requirement	Status	Requirement Synopsis	Actions to be Taken to Attain Requirement
Federal	Cleanup and disposal of polychlorinated biphenyl (PCB) remediation waste	Toxic Substances Control Act (TSCA); PCB Remediation Waste (40 C.F.R.761.61(c)	Applicable	This section of the TSCA regulations provides risk-based cleanup and disposal options for PCB remediation waste based on the risks posed by the concentrations at which the PCBs are found. Written approval for the proposed risk-based cleanup must be obtained from the Director, Office of Site Remediation and Restoration, U.S. Environmental Protection Agency (USEPA) Region 1.	The construction of the CAD cell (removal and disposal of sediment) and the dredging, dewatering, transportation, and disposal of PCB-contaminated sediment into the CAD cell will be performed in a manner to comply with TSCA. This ESD includes a finding by the Director, Office of Site Remediation and Restoration, EPA Region 1, that the CAD cell remedy will not pose an unreasonable risk to human health or the environment.
Federal	TSCA Decontamination	40 C.F.R. 761.79	Applicable	Sets decontamination standards for removal of PCBs from non-porous surfaces and non-porous surfaces covered with porous surfaces. Allows for alternative methods of decontamination.	Equipment and personal protective gear will be decontaminated in accordance with these substantive requirements.
Federal	Surface Water Quality	Clean Water Act (33 U.S.C. § 1251 *et seq.*); National Recommended Water Quality Criteria ("NRWQC") (40 C.F.R. § 122.44)	Relevant and Appropriate	Used to establish water quality standards for the protection of aquatic life.	Standards to be used for monitoring water quality during CAD cell construction and dredging, passive dewatering, transportation, and disposal of material into the CAD cell; long-term water quality monitoring of the CAD cell; and other remedial activities.

Table 2

Action-Specific ARARs and TBCs for OU1 ESD #4: Siting and Construction of a Confined Aquatic Disposal (CAD) Cell, Mechanical Dredging with Passive Dewatering, and Disposal of Contaminated Sediment into the CAD

Regulatory Authority	Action	Requirement	Status	Requirement Synopsis	Actions to be Taken to Attain Requirement
Federal	Air	Clean Air Act (CAA), National Emissions Standards for Hazardous Air Pollutants (42 U.S.C. 7401 *et seq.*, 40 C.F.R. Part 63)	Relevant and Appropriate	NESHAPS are a set of air emissions standards for specific chemicals, including PCBs, from specific production activities.	Monitoring of air emissions during the construction of the CAD cell; dredging, passive dewatering, transportation, and placement of contaminated sediment; and final closure will be performed to assess compliance with these standards. Operation and maintenance activities will be carried out in a manner which will minimize potential air releases.
Federal Criteria, Advisories and Guidance	PCBs	EPA's Polychlorinated Biphenyl (PCB) Site Revitalization Guidance Under the Toxic Substances Control Act (November 2005)	To Be Considered	Provides information on characterizing, cleaning up, containing, and disposing of PCB waste (e.g., debris generated as a result of any PCB cleanup) and guidance in complying with the PCB regulations at 40 C.F.R. Part 761.	The cleanup and off-site disposal of PCB contaminated debris not disposed of in the CAD will be performed in a manner to comply with TSCA.
Federal Criteria, Advisories and Guidance	PCBs	Guidance on Remedial Actions for Superfund Sites with PCB Contamination (OSWER Dir. 9355.4.01 – Aug. 1990)	To Be Considered	Describes the recommended approach for evaluating and remediating CERCLA sites with PCB contamination.	This guidance was considered will be considered during remedial design and when implementing the long-term management controls for the CAD cell. Activated carbon or other supplements placed within the CAD cell may be used to address PCBs.
Federal Criteria, Advisories and Guidance	Sediment	Contaminated Sediment Remediation Guidance for Hazardous Waste Sites (EPA-540-R-05-012 OSWER 9355.0-85 December 2005)	To Be Considered	Guidance for making remedy decisions for contaminated sediment sites.	This guidance will be considered in addressing contaminated sediments during the construction, long-term monitoring, and institutional controls for the CAD cell, as well as during mechanical dredging, passive dewatering, and placement of the contaminated sediments.

Table 2

Action-Specific ARARs and TBCs for OU1 ESD #4: Siting and Construction of a Confined Aquatic Disposal (CAD) Cell, Mechanical Dredging with Passive Dewatering, and Disposal of Contaminated Sediment into the CAD

Regulatory Authority	Action	Requirement	Status	Requirement Synopsis	Actions to be Taken to Attain Requirement
Federal Criteria, Advisories and Guidance	Generation of investigation derived waste	USEPA OSWER Publication 9345.3-03 FS, January 1992	To Be Considered	Management of Investigation-Derived Waste (IDW) must ensure protection of human health and the environment.	IDW will be managed in a manner to protect human health and the environment.
Federal Standards Not Yet Promulgated	Institutional Controls	Coast Guard Anchorage Ground and Regulated Navigation Area Rules (33 CFR Part 110; 165)	To Be Considered (Applicable once a Rule for the LHCC area is promulgated)	The Coast Guard may promulgate site-specific rules to establish federal anchorage areas and regulated navigation areas (RNAs). Once promulgated such a rule is also the basis for the National Oceanic and Atmospheric Administration (NOAA) to revise navigation charts to show the restricted area.	EPA will coordinate with the Coast Guard and harbor stakeholders in the promulgation of a Rule to establish an RNA for the area of the LHCC to create federally enforceable restrictions to protect the LHCC from disturbance and to delineate the area of the LHCC on local navigation charts.
State	Cleanup and disposal of hazardous waste	Hazardous Waste Management - Identification and Listing of Hazardous Wastes (21C M.G.L. 4 and 6, 310 C.M.R. 30.100)	Applicable	Massachusetts is delegated to administer RCRA through its State regulations. These standards establish requirements for determining whether wastes are hazardous based on either characteristics or listing. 30.105 Provides that PCB Waste that would be subject to hazardous waste regulation due to the presence of PCBs are exempt from the hazardous waste regulations provided certain conditions are met.	Wastes generated as part of remedial activities that will be disposed of off-site (material excavated while constructing the CAD cell and during mechanical dredging – including dewatering filters) will be characterized as hazardous or non-hazardous. PCB Waste will be handled in accordance with the conditions set out in the TSCA Determination unless otherwise noted in this Table.

Table 2

Action-Specific ARARs and TBCs for OU1 ESD #4: Siting and Construction of a Confined Aquatic Disposal (CAD) Cell, Mechanical Dredging with Passive Dewatering, and Disposal of Contaminated Sediment into the CAD

Regulatory Authority	Action	Requirement	Status	Requirement Synopsis	Actions to be Taken to Attain Requirement
State	Cleanup and disposal of hazardous waste	Hazardous Waste Management - Requirements for Generators (31C M.G.L. 4 and 6, 310 C.M.R. 30.300)	Applicable	These regulations contain requirements for generators of hazardous waste.	Wastes generated as part of remedial activities that will be disposed of off-site (material excavated while constructing the CAD cell and during mechanical dredging/passive dewatering), if characterized as hazardous, will be managed in accordance with these standards.
State	Cleanup and disposal of hazardous waste	Hazardous Waste Management Rules - General standards for hazardous waste facilities (31C M.G.L. 4 and 6, 310 CMR 30.500)	Relevant and appropriate	Establishes standards for the treatment, storage, and disposal of hazardous waste. Sec.30.501(3)(a) exempts facilities that treat, dispose or store hazardous waste containing 50 ppm or more of PCBs if they are adequately regulated under TSCA, 40 C.F.R. 761.	Any hazardous waste generated will be managed in accordance with the substantive requirements of these regulations and sent off-site to a licensed hazardous waste disposal facility.
State	Dredge Disposal	Certification for Dredging, Dredged Material Disposal and Filling in Waters (21 M.G.L. 26-53, 314 C.M.R. 9.06(1-2)	Applicable	Establishes procedures and criteria for the administration of Section 401 of the federal Clean Water Act for discharge of dredged or fill material in waters of the United States within the Commonwealth.	The remedy represents the best practicable alternative for remediating contaminated sediments impairing aquatic resources in the harbor. Any adverse impacts to water quality from the construction of the CAD cell and the dredging, passive dewatering, transportation, and deposition of contaminated sediments will be addressed using best management practices, monitoring, and institutional controls.

Table 2

Action-Specific ARARs and TBCs for OU1 ESD #4: Siting and Construction of a Confined Aquatic Disposal (CAD) Cell, Mechanical Dredging with Passive Dewatering, and Disposal of Contaminated Sediment into the CAD

Regulatory Authority	Action	Requirement	Status	Requirement Synopsis	Actions to be Taken to Attain Requirement
State	Actions that may degrade surface water quality	Rules for the Prevention and Control of Oil Pollution in the Waters of the Commonwealth (21 M.G.L. 26-53, 314 C.M.R. 15.03(1),(3-5), 15.06(1-5)	Applicable	Regulates the discharge of oil or sewage, industrial waste or other material containing oil into waters of the Commonwealth. PCBs are found in oil, some of which released from contaminated sediments into surface waters.	The remedy, particularly during mechanical dredging, passive dewatering, transportation, and placement of contaminated sediments into the CAD cell, will comply with the substantive requirements of these standards.
State	Monitoring	Surface Water Quality Standards (27 M.G.L. 27, 314 C.M.R. 4.03, 4.04, and 4.05	Applicable	State surface water quality standards incorporate the federal NRWQC as standards for surface waters of the state. Standards establish acute and chronic effects on aquatic life for contaminants including PCBs, cadmium, chromium, copper, and lead.	Standards to be used for monitoring water quality during CAD cell construction and dredging, passive dewatering, transportation, and disposal of material into the CAD cell; long-term water quality monitoring of the CAD cell; and other remedial activities.
State	Air	Ambient Air Quality Standards (111 M.G.L. 142D, 310 C.M.R. 6.04(2)	Applicable	Establishes ambient air levels for contaminants and pollutants.	Monitoring of air emissions during the construction of the CAD cell; dredging, passive dewatering, transportation, and placement of contaminated sediment; and final closure will be performed to assess compliance with these standards. Operation and maintenance activities will be carried out in a manner which will minimize potential air releases.
State	Air	Air Pollution Control (111 M.G.L. 142A-J, 310 C.M.R. 7.09(1-4), 7.10(1-2)	Applicable	Standards for, among other things, dust, odor, and noise at construction sites. Pollution abatement controls may be required.	Construction of the CAD cell and dredging, passive dewatering, transportation, and disposing of contaminated sediments into the cell will be implemented so as to avoid air pollution. Engineering controls will be used as necessary.

Table 2

Action-Specific ARARs and TBCs for OU1 ESD #4: Siting and Construction of a Confined Aquatic Disposal (CAD) Cell, Mechanical Dredging with Passive Dewatering, and Disposal of Contaminated Sediment into the CAD

Regulatory Authority	Action	Requirement	Status	Requirement Synopsis	Actions to be Taken to Attain Requirement
State	Air	MADEP – Recommended Threshold Effect Exposure Limits (TELs) and Allowable Ambient Limits (AALs)	To Be Considered	Establishes exposure concentrations for air contaminants to protect public health	Evaluation of air emissions will consider TELs and AALs.
State	Noise	Allowable Sound Emissions (DAQC policy 90-001, Feb. 1, 1990)	To Be Considered	Establishes guideline where sources of new noise should not emit more than 10 decibels above the existing (background) level.	Site operation noise levels will be minimized and will follow the suggested noise limit to the extent practicable.
State	Monitoring	Massachusetts Water Quality Standards Implementation Policy of Toxic Pollutants in Surface Waters	To Be Considered	Recommends surface water quality standards for specified contaminants and implementation measures to achieve standards.	This implementation policy and appropriate standards will be considered when evaluation impacts to surface water quality from the remedy.

Notes:

ARAR = Applicable or Relevant and Appropriate Requirement
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
C.F.R. = Code of Federal Regulations
C.M.R. = Code of Massachusetts Regulations
IDW = Investigation-Derived Waste
MassDEP = Massachusetts Department of Environmental Protection
M.G.L. = Massachusetts General Law
OSWER = Office of Solid Waste and Emergency Response
U.S.C. = United States Code
USEPA = U.S. Environmental Protection Agency

ATTACHMENT A - RESPONSE TO COMMENTS

Table of Contents

I. Introduction - p.1

A. Summary of Comments - p.1

II. Response to Comments - p.2

A. Comment Overview - p.2
B. Detailed Comments (other than those from AVX Corporation) - p.6
C. AVX Comments - p.24

I. Introduction

EPA received comments from 46 separate stakeholders[1] on its draft OU1 Explanation of Significant Differences (ESD) #4 for the New Bedford Harbor (NBH) Site during the public comment period held from June 25, 2010 through September 24, 2010. These included comments from the following:

New Bedford Mayor Scott Lang
New Bedford Harbor Development Commission/Economic Development Commission
New Bedford City Council
Town of Fairhaven
Buzzards Bay Coalition
New Bedford Community Rowing
Area residents
Area businesses
AVX Corporation, a Settling Party for the New Bedford Harbor Site
Massachusetts Dept. of Environmental Protection (MassDEP)

A. Summary of Comments

The majority of comments supported the draft ESD, citing concerns about the slow pace of the current cleanup approach and the adverse impacts that unremediated PCB-contaminated sediments have on human health, via consumption of PCB-contaminated locally caught seafood, and on the marine ecosystem. These commenters urged EPA to expedite the cleanup timeframe,

[1] If identical e-mailed and written comments were received by the same stakeholder, EPA considered this to be one comment. If duplicate (i.e., identical) e-mailed comments were received by the same stakeholder, EPA considered this to be one comment. If more than one e-mail containing different comments were received from the same stakeholder, EPA considered this to be one comment.

and agreed with EPA that a lower harbor confined aquatic disposal (CAD) cell (LHCC) would be a safe and effective approach to do so.

Other commenters did not support the draft ESD, believing that the ongoing off-site disposal approach was a better alternative. One commenter requested that the draft ESD, while proposing a technically feasible approach, should be reissued to include greater detail about the LHCC proposal. Another commenter, while encouraging EPA to use CAD cells for disposal of *all* future Superfund[2] dredge material, nevertheless requested that ESD #4 be withdrawn in favor of further investigations and feasibility studies to support a ROD amendment for the entire upper and lower harbor area.

All comments received are included in the final Administrative Record for ESD #4. EPA's responses to these comments are described below.

II. Response to Comments

A. Comment Overview

1. Thirty-four (34) commenters agreed with EPA's proposal to include an LHCC as part of the Superfund remedy, citing concerns about the pace of the current cleanup approach and the adverse impacts that unremediated PCB-contaminated sediments have on human health, via consumption of PCB-contaminated locally caught seafood, and on the marine ecosystem. These commenters urged EPA to expedite the cleanup timeframe, and agreed with EPA that an LHCC would be a safe and effective approach to do so.

EPA Response:

EPA agrees with these comments, and notes that risks to human health from site contamination, in addition to those from seafood consumption referred to by these commenters, include dermal contact risks from unremediated PCB-contaminated shoreline areas, especially in the upper harbor. Shortening the overall remedial timeframe by use of a LHCC will thus remove these dermal contact/public access risks, as well as the contaminated seafood consumption risks, that much sooner.

2. Ten commenters disagreed with ESD #4's proposal to establish an LHCC as part of the OU1 remedy, believing that the current off-site disposal approach is a safer approach than in-harbor disposal of contaminated sediments.

[2] "Superfund" is the popular name given to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9601 *et seq.*

EPA Response:

EPA agrees that an LHCC will have minor *short-term* risks that the current off-site approach does not have (e.g., release of a conservatively estimated 11.4 lbs of PCBs to the water column over three years prior to capping (ERDC, 2010)), but believes that the significant improvements in *long term* risk reduction that the LHCC would provide greatly outweigh this minor short term increase in localized risk. For example, by shortening the OU1 cleanup timeframe, long term releases of PCBs to Buzzards Bay due to the ongoing seaward flux of PCBs from harbor sediments are preliminarily estimated, using simplifying assumptions, to be reduced by roughly 215 to 445 lbs (Dickerson, 2011).[3]

Furthermore, as described in ESD #4 and in this responsiveness summary, EPA believes there are four distinct lines of evidence to support the conclusion that the use of an LHCC will be protective to human health and the environment in both the short and long term, in addition to its positive impacts in accelerating the overall harbor cleanup. These four lines of evidence are summarized below:

The Lower Harbor's Ecological Quality Has Improved Since the Three Navigational CAD Cells Have Been Implemented

The first line of evidence is the observed statistically significant improvement in lower harbor benthic quality over the approximately ten year period when three *navigational* CAD cells have been constructed and filled in the lower harbor[4]. These three navigational CAD cells are all in the same general locale as, and include sediments similar to, those slated for the LHCC. Environmental metrics for the lower harbor (surficial PCB levels, biodiversity, EMAP benthic index) indicate significant improvement in the ecological quality of the lower harbor benthic environment over this time frame (Nelson and Bergen, 2011). See also the April 2010 monthly meeting presentation (http://www.epa.gov/region1/superfund/sites/newbedford/299752.pdf) and slides 26-28 of the June 2010 monthly meeting presentation (http://www.epa.gov/region1/superfund/sites/newbedford/299754.pdf) for more detail on these data. The findings indicate that CAD cells can be used in the lower harbor to contain PCB-

[3]This projection is estimated using the following simplifying assumptions: 1) the measured ongoing PCB flux from the hurricane barrier to Buzzards Bay measured in 2010 to be 95 pounds per year (with no remediation underway) is used to represent an annual average; 2) the OU1 remedy without the LHCC will take 20 more years to complete (at 2030); 3) PCB flux will be reduced by 50% thirty years from completion of the OU1 remedy; and 4) use of an LHCC will shorten the remedial timeframe by five to ten years. EPA notes that this simplified projection is for purposes of illustration only, and that a more precise estimate of this reduction in long term flux using computer modeling is currently underway. EPA will make this updated estimate available to the public as soon as it is finalized.

[4] The navigational CAD cells were constructed and filled as part of a State Enhanced Remedy under CERCLA, through which the State's disposal of contaminated sediments that do not exceed CERCLA cleanup levels into three CAD cells was overseen under the CERCLA review process.

contaminated sediments without negatively affecting the environmental quality of the lower harbor.

Water Quality Monitoring of NBH Navigational CAD Cell #2 Did Not Observe Adverse Impacts

The second line of evidence is the water quality monitoring field study that Battelle performed for EPA in 2009 at navigational CAD cell #2 in NBH (Battelle, 2009). This field study did NOT observe any aquatic toxicity inside OR outside of the CAD cell, and found that turbidity plumes were "nearly completely contained within the CAD cell silt curtain" with only minor and short-lived "small filaments of plume which appear to have escaped the silt curtain at one of its seams." The final ESD #4 requires that the LHCC's silt curtain system be more robust than that used for navigational sediments (note that such robust silt curtains were included in the cost estimates included in the draft and final ESD's administrative record).

Computer Modeling Concludes an LHCC Would be Effective

The third line of evidence is the site-specific computer modeling of estimated impacts to water and air quality from an LHCC (ERDC, 2010 and Jacobs, 2010a, respectively). In summary, the water quality modeling predicted only minor PCB releases - orders of magnitude less than that currently occurring - over the first three years prior to capping, and that a three foot cap with sufficient organic carbon content (0.3%) would isolate PCBs over the long term. Similarly, the air quality modeling predicted maximum airborne PCB levels from LHCC operations to be over an order of magnitude LESS than the protective level for residents.

The Pilot Underwater Cap Near Cornell-Dubilier Continues to be Protective

The fourth line of evidence is that there has been six years of post-cap monitoring data from the pilot underwater cap near the Cornel-Dubilier mill that demonstrates that PCB-contaminated sediments can be safely managed in place. Located just south of the hurricane barrier in the open water of Buzzards Bay, this cap was placed in 2005 over sediments with PCB levels up to 130 ppm. The post-cap monitoring has consistently shown that the cap is effective at isolating the underlying PCBs: the 2010 bathymetric survey concluded that "Overall, the pilot underwater cap continues to behave as expected" (Jacobs, 2011). The post-cap monitoring has also shown that PCB levels in the top six-inches of the cap continue to *decrease* and averaged less than 1 ppm at the 17 stations monitored in late 2010 (Woods Hole Group, 2011) - well below pre-cap levels. EPA believes that if such a "mounded" cap over similarly-contaminated sediments is protective in the open water of Buzzards Bay, then it is reasonable to assume that the LHCC cap, which would by design be below the surrounding harbor bottom and behind the hurricane barrier, would also be protective.

Again, these four lines of evidence support the conclusion that an LHCC will be safe and protective in the short and long term. Moreover, the LHCC will create significant benefits by accelerating the overall completion of the OU1 remedy. These benefits are summarized below:

a - from a volume standpoint, the LHCC approach would, in only two to three years of dredging and disposal, safely dispose of a full third (300,000 cy) of the entire volume of OU1 sediments. In comparison, after seven years of dredging in the upper harbor, two of which had longer dredging seasons due to supplemental funding, only about 20% of all OU1 sediments have been removed with the offsite disposal approach[5];

b - from an areal or spatial standpoint, the LHCC approach would address all of the OU1 dredge areas in the lower harbor, as well as nearby areas in the upper harbor (about 95 acres of contaminated sediment total) during only two to three years of dredging. This is about a third of the total OU1 area requiring remediation. As a result, current impediments to public use and enjoyment of many areas of the harbor due to Site contamination, including but not limited to the proposed Sawyer Street rowing facility, the north terminal area, and the Popes Island area, could be quickly removed;

c - again, the overall timeframe to complete the OU1 remedy will be shortened significantly by up to 14 years (see ESD #4 Table 1);

d - the cost to complete the OU1 remedy will be decreased significantly, by up to $500 million (see ESD #4 Table 1).

For these reasons EPA disagrees with the commenters that oppose adding the LHCC to the OU1 remedy, since there are sufficient lines of evidence to show that a LHCC can be constructed, filled, and managed in perpetuity in a manner that will remain protective of human health and the environment and will facilitate a faster cleanup of the entire OU1 area with significant health and environmental benefits to the entire harbor.

3. One commenter requested that EPA reissue ESD #4 to include more details of the LHCC proposal and an alternatives analysis.

EPA Response:

EPA believes that the LHCC analysis, monitoring and computer modeling performed to date is consistent with that required by the National Contingency Plan (NCP)[6] - EPA's regulations under CERCLA governing Superfund cleanups - for remedial decision making, and disagrees that more detail and analysis is necessary in order to proceed with issuing this ESD. EPA also

[5] This is because the hydraulic dredging and offsite disposal process includes extensive processing and handling of the dredged slurry, including but not limited to booster pumping, chemical addition, desanding, dewatering, water treatment, loading, transportation and off-site disposal. As a result the overall unit cost for hydraulic dredging and off-site disposal is much more expensive than that for mechanical dredging and CAD cell disposal, and given a limited annual budget only a limited volume of sediments can be dredged and disposed off-site each year.

[6] 40 C.F.R. Part 300

notes that another commenter, a nationally recognized expert in sediment remediation, concluded that "The technological description of the LHCC in ESD #4 is relatively comprehensive and complete and consistent with the state-of-the-practice." (Engler, 2010). Given the ten-plus years of alternatives analysis that preceded the OU1 ROD, EPA believes that the most critical issue at this point is the length of time required to complete the cleanup. The sooner the remedy is complete, the sooner the ongoing risks to human health and the environment will be eliminated. For example, as discussed above in footnote #3, use of a LHCC is projected to reduce the ongoing PCB flux to Buzzards Bay by an amount on the order of 215 to 445 pounds.

EPA also notes that many of the details of remedy implementation (e.g., exact location and geometry of the LHCC) are not typically finalized until the engineering and design phase, which under the NCP occurs after a decision document (in this case, the ESD) is issued. However, for a number of project details that can be articulated at this time (e.g., organic content of the cap material, silt curtain standards, water quality performance standards, enhanced stakeholder outreach), EPA has included these additional details in the final ESD #4 and this responsiveness summary.

4. One commenter, while encouraging EPA to use CAD cells for disposal of all future Superfund dredge material, nevertheless requested that ESD #4 be withdrawn in favor of further investigations and feasibility studies to support a ROD amendment for the entire upper and lower harbor area.

EPA Response:

As further discussed in section II.C below, EPA disagrees that a ROD amendment is required at this time and notes that the commenter's sediment remediation expert found that "ESD #4's approach for chemical and physical isolation of contaminated sediments in the … (LHCC) to be technically sound, pragmatic and cost-effective" (Engler, 2010). Furthermore, use of a LHCC is consistent with the commenter's overall theme that CAD cells should be used for the *entire* cleanup.

EPA is developing a focused feasibility study (FFS) for the remainder of the OU1 cleanup that is expected to lead to a re-evaluation of the current OU1 remedy. Any changes to the current OU1 remedy will be addressed under one or more CERCLA decision documents. There is no requirement under CERCLA or the NCP that modifications to Superfund remedies cannot be phased over time nor that individual changes cannot be addressed through separate decision documents.

B. Detailed Comments (other than those from AVX Corporation)

1. Comments from The Coalition for Buzzards Bay (the Coalition)

a. The Coalition commented that use of an LHCC is technically feasible, but that ESD #4 did not provide adequate information to satisfy the federal Clean Water Act (CWA) or the federal Toxic Substances Control Act (TSCA). It further commented that EPA should reissue the ESD to provide additional detail explaining why the LHCC is a better alternative than the current off-site disposal method.

EPA Response:

EPA believes that sufficient information exists, as described in ESD #4, to allow for sound decision-making in this regard. As explained in the ESD, the existing information supports the finding that use of an LHCC represents the least environmentally damaging practical alternative (LEDPA) pursuant to the CWA, since most importantly it provides a faster solution to the significant on-going risks to the aquatic environment posed by the PCB-contaminated sediments and water column in the harbor - including the ongoing non-attainment of the nationally recommended marine water quality standard for PCBs. This standard cannot be attained without completion of the OU1 remedy, and ESD #4 provides an expedited approach to do so.

In response to the Coalition's comparison of the ESD #4 remedy to the current hydraulic dredging and off-site disposal approach, EPA notes that such a comparison involves trade-offs between short-term and long-term risks. For example, as noted above, while mechanical dredging and disposal into the LHCC would have minor short-term risks that the off-site approach does not (e.g., release of an estimated 11 pounds of PCBs over three years during placement into the CAD cell), an LHCC would have a vastly greater impact on reducing long term risks compared to the current approach considering the shortened remedial timeframe it would provide and the projected 215 to 445 pound reduction in seaward PCB flux to Buzzards Bay under a LHCC scenario (see footnote #3 above). As previously discussed, environmental metrics in the lower harbor have improved during the period that navigational dredging and CAD cell disposal have occurred in the lower harbor. An accelerated cleanup due to implementation of the LHCC component to the remedy is expected to further foster the observed environmental improvements.

EPA again notes that another outside expert commenter concluded that "(t)he technological description of the LHCC in ESD #4 is relatively comprehensive and complete and consistent with the state-of-the-practice" (Engler, 2010), and that the LHCC evaluation used some of the most sophisticated evaluation tools currently available - including real-time turbidity monitoring/mapping and aquatic toxicity testing of similar CAD cell operations in NBH, computer modeling of estimated emissions to both water and air; and cost estimates that make use of actual costs experienced at the Site previously for specific tasks wherever possible in order to maximize the accuracy of the estimates.

There is no significant difference in the degree of aquatic habitat disturbance between the present hydraulic dredging technique and the proposed mechanical dredging that will be used to fill the LHCC. The use of an environmental dredge bucket and turbidity controls will limit contaminant releases during the dredging process. While the areas dredged will be temporarily disturbed, it is

expected that the aquatic habitat in the dredged areas will re-establish in sediments with significantly lower PCB levels. Aquatic habitat in the LHCC area will also only suffer short-term disruption during CAD cell construction and filling as currently contaminated sediments are removed from the surface habitat and replaced with clean cap substrate.

Regarding the draft finding pursuant to Section 761(c) of TSCA attached to the draft ESD #4, the final TSCA finding attached to the final ESD #4 has been modified to reflect comments received from the Coalition, as well as others. For example, the timing of when monitoring reports will be due has been revised to one month after receipt of all validated data to provide faster feedback regarding the progress of the revised remedy. Based on the lines of evidence previously cited discussing how mechanical dredging and disposal in the LHCC would be protective, EPA has found that the remedy changes proposed in the ESD will not pose an unreasonable risk of injury to health or the environment. The finding is further based on the implementation of sufficient controls during the dredging, filling and capping stages of the remedy to control releases of PCBs as well as long-term monitoring and institutional controls.

b. The Coalition commented that it supports EPA's efforts to find and assess innovative alternatives which expedite cleanup objectives, that a LHCC may be one such alternative, but that EPA must demonstrate that the "ultimate remedies applied are the most protective of human health and the environment."

EPA Response:

EPA appreciates the Coalition's shared objective of expediting the harbor cleanup, but notes that, per the NCP remedies have to be protective, but not necessarily the *most* protective alternative given the additional remedy selection criteria in the NCP. Per the NCP, remedies have to balance nine criteria,[7] including protectiveness. For the reasons explained in the ESD and this responsiveness summary, EPA believes the remedy called for in ESD #4 is protective of human health and the environment, as well as providing the best balance for addressing all of the NCP criteria.

c. The Coalition commented that the ESD must include an alternatives analysis "to conclusively determine that the proposed LHCC is the least damaging practical alternative", noting that "it is possible that an earlier cleanup of the lower harbor will result in less impact to the public's health due to a decrease in exposure time, EPA must prove this, along with any other benefits, in the ESD."

EPA Response:

[7]The NCP criteria are: 1. Overall protection of human health and the environment; 2. Compliance with ARARs (applicable or relevant and appropriate standards); 3. Long-term effectiveness and permanence; 4. Reduction of toxicity, mobility or volume through treatment; 5. Short-term effectiveness; 6. Implementibility; 7. Cost; 8. State acceptance; and 9. Community acceptance.

See response to comments II.A.2 and II.B.1.a above. EPA believes it has documented that mechanical dredging and use of an LHCC is the LEDPA under Section 404 of the Clean Water Act given the context of a large, highly PCB-contaminated site that has significantly impaired environmental resources. ESD #4 includes an alternatives analysis regarding the time and cost to complete the OU1 remedy with or without an LHCC. EPA can find no reason to refute the concept that a decreased exposure time to Site contaminants from use of a LHCC results in less impact to human health and the environment, given the lack of adverse aquatic impacts observed in the 2009 field study (Battelle, 2009) and the relatively minor short term releases predicted by the LHCC modeling as described herein. The footprint of the LHCC will also have improved benthic habitat due to the clean substrate provide by the cap. Furthermore, the areas mechanically dredged will create areas of cleaner substrate for benthic recolonization that have PCB levels below CERCLA cleanup standards. Short-term impacts to the benthic marine community will be limited, since the area disturbed both by mechanical dredging and by the LHCC is expected to recolonize with the local benthic marine community relatively quickly, and long-term monitoring and institutional controls will ensure that the disposed contaminated sediments remain safely capped on-site in perpetuity.

d. The Coalition commented that the exact location of the Superfund LHCC must be specified in the ESD.

EPA Response:

As explained in ESD #4, the LHCC will be located within the state-approved area for navigational CAD cells, which is the area between the Route 195 and Route 6 bridges. EPA disagrees that the specific sub-area within this state-approved area is needed to accurately evaluate potential impacts. Given the contaminated nature of this state-approved area in general, long term impacts from any sub-area of this area are believed to be the same as for any other sub-area, since the roughly 10 acre clean cap that will be placed on top of the LHCC will clearly have a net positive impact on benthic quality. The exact location of the LHCC will be determined during remedial design, which will occur after the ESD is issued.

e. The Coalition commented that the size of the LHCC must be determined.

EPA Response:

As noted in the ESD, the amount of Superfund sediments to be placed in the LHCC is approximately 300,000 cy. The broader definition in the ESD that the Coalition points to is the most volume that EPA believes could *legally* be disposed into an LHCC without needing a ROD amendment (the volume of sediment that would have been disposed of in the former Confined Disposal Facility (CDF) "D" less the volume disposed offsite). EPA is <u>not</u> proposing to use this larger volume for the LHCC; again, only approximately 300,000 cy of Superfund dredged material will be placed into the LHCC. The remaining material, primarily from areas north of

Sawyer Street, are to be dewatered and disposed of off-site, as called for in ESD #2. Alternative remedial scenarios for these remaining sediments are being reevaluated as part of the ongoing FFS.

The Coalition correctly points out that the size of the LHCC would need to increase if the cell is to be filled in two rather than three years. This is an implementation detail that will have to be resolved as the project unfolds, taking into account available annual resources among other factors. Here again there are trade-offs: a two year scenario would require a larger cell than a three year scenario (due to a shorter time for sediment consolidation during placement) but would be expected to have less short-term releases of PCBs than a three year scenario (due to a shorter time of placement operations which is when the releases occur.) This information is captured in the computer modeling report included in the administrative record for the ESD (ERDC, 2010).

f. The Coalition commented that the disposal method for placement of contaminated dredge material into the LHCC must be selected.

EPA Response:

Differences in releases between placement methods are expected to be minor compared to the order-of-magnitude-larger ongoing PCB fluxes at the Site - e.g., see comment II.A.2 above. The exact placement method to be used is another example of an implementation detail to be resolved as the project unfolds. EPA also notes that different marine equipment (and thus a different placement method) will likely be used for the shallow, bridge-restricted upper harbor sediments than for those in the deeper lower harbor. If it is determined that a barge-mounted excavator will be used to place dredged material into the LHCC, EPA will require that the excavator bucket be lowered as deep into the water column as possible prior to opening in order to minimize the distance to the CAD cell and potential PCB releases to the overlying water column.

Similarly, regarding the Coalition's comments on time of year and tide cycle, EPA expects that differences in releases from placement depending on time of year and tide cycle pale in comparison to the much larger ongoing PCB fluxes at the Site, and that the greater goal is to curtail this ongoing flux as soon as possible. The Coalition's expert on this matter concluded that "the benefits [of one placement technique over others] may be marginal." But EPA notes the comment and, during the design phase of the project, will consider operational requirements, such as potential tide-dependent drop locations (i.e., north side during ebb tide, south side during flood tide) that could serve to minimize potential short term PCB releases.

EPA also notes that the 2009 real-time turbidity plume monitoring from a similar CAD cell placement operation in NBH (Battelle, 2009) did not observe any significant differences between different tide cycles - a lack of turbidity outside the silt curtain was generally noted at all tide cycles. EPA notes that having the detailed mapping of tidal currents at all tidal stages in the CAD cell area that this field study provided will allow the LHCC monitoring program to know with greater precision where to search for turbidity plumes depending on the tidal stage in which

placement occurs. Again, this monitoring did NOT observe any aquatic toxicity inside or outside of the silt curtain during these 2009 operations.

g. The Coalition commented that the cap material for the Superfund LHCC must be determined.

EPA Response:

Consistent with the modeling report for the LHCC (ERDC, 2010) the final ESD #4 includes a requirement that the cap material contain at least 0.3% organic content. EPA agrees with the Coalition's hired expert that "(t)he nature of the cap is an important detail that...needs to be well-specified *in the final design*" (emphasis added). Additional specifications for the cap will be resolved during the project's design phase.

h. The Coalition commented that the capping operation must be fully described in the ESD.

EPA Response:

Regarding the Coalition's comment that "initial loss, throughout the various disposal stages, must be modeled using the final volume of contaminated sediment that will be placed in the LHCC", EPA notes that this has in fact already been done (see ERDC, 2010).

Regarding the comment that the "ESD must also provide how the cap will be layered on the CAD cell" EPA believes that this is yet another example of an implementation detail to be fully resolved during the design and construction phases of the project. EPA also notes that the Coalition appears to incorrectly attribute cap ridges to navigational CAD cell #2; EPA suspects that the Coalition is referring to ridges in the pilot underwater cap placed in 2005 near the Cornell Dubilier mill just south of the hurricane barrier. These ridges were due to the equipment that was used for this pilot capping project (i.e., large split-hull scows involved in the navigational dredging that was the source of the cap material). For the LHCC capping operation, this limitation on the type of marine plant will not be an issue, and EPA will specify capping performance standards that contractors will be required to meet. EPA again notes that the on-going monitoring of the 2005 pilot underwater cap demonstrates that the cap is performing successfully and remains protective of human health and the environment (see Comment II.A.2 above).

Regarding the potential use of activated carbon (AC) to sequester PCBs in the water column, EPA disagrees that a final determination in this regard must be made prior to the decision to use a LHCC. This is because, as explained herein, EPA believes that use of an LHCC is a protective cleanup approach even *without* use of AC. EPA is exploring use of AC in an attempt to make the LHCC approach even more protective than currently predicted by site modeling and monitoring, and will incorporate any positive results from this evaluation as appropriate.

i. The Coalition commented that the ESD must address long-term cap stability and the risk of cap disruption.

EPA Response:

EPA agrees that the cap must be designed to be stable enough to withstand or avoid damage by dragging anchors or hull strikes, and is confident based on the overall physical characteristics of CAD cells and the required three-foot minimum cap depth, that this can be successfully accomplished in the design phase. Since, due to the consolidation of placed sediments, the bathymetry within the LHCC will be bowl-shaped rather than mounded, it stands to reason that hull strikes should not be an issue. Similarly, if an anchor is dragging, it is likely to be dragging on the *surface* of the harbor bottom rather than dragging deeper than three feet *into* the harbor bottom. As indicated in the ESD, EPA agrees that it will be important to work with harbor stakeholders to develop cap-compliant designs for any moorings or anchors that might be placed within the LHCC footprint. EPA will coordinate with the Coast Guard and local municipalities regarding establishing enforceable restrictions on cap disturbance and the demarcation of the capped LHCC on marine navigation charts. EPA will also consider any other means that may become available to restrict disturbance of the LHCC and clearly identify its location to harbor stakeholders.

j. The Coalition commented that the ESD must establish and detail an immediate and long-term monitoring and operation and maintenance plan for the LHCC.

EPA Response:

The broad outline of a monitoring plan for the LHCC is included in Attachment B of the ESD, including requirements for physical, chemical and biological monitoring over time. The details of this broad outline will be established and refined as the project moves through the design, implementation and post-capping stages. In this fashion the monitoring plan can be tailored over time to best meet the needs of the project and to address specific issues as they are identified.

EPA agrees to consider the use of reflector plates in the monitoring plan to distinguish between consolidation and erosion. EPA also agrees that monitoring reports can be submitted sooner than one year after receipt of all monitoring data to provide information on the progress of the revised remedy to harbor stakeholders sooner, and the TSCA Determination has been changed accordingly. EPA also agrees to provide opportunities for harbor stakeholders to review the LHCC monitoring plan as it is developed and finalized (see next comment).

k. The Coalition commented that the ESD must require the formation of a steering committee.

EPA Response:

EPA agrees that stakeholder communication and coordination is essential, and the final ESD notes that EPA plans to enhance stakeholder outreach regarding the LHCC. The final ESD also notes that one potential measure in this regard is the formation of a Stakeholder Coordination Committee (SCC) to solicit ongoing public feedback on the implementation of the LHCC remedy.

2. Comments from Professor Henry Bokuniewicz (for the Coalition)

NOTE: many of the comments from Dr. Bokuniewicz are covered in section II.B.1 above, and as such are not repeated here.

a. Dr. Bokuniewicz commented that "the operation is feasible as described" and "can be done more-or-less as described," but that "it is not simply done and there are many important details to be decided."

EPA Response:

EPA agrees, and as described above in section II.B.1, the appropriate place in the project sequence for finalizing most of the implementation details is in the engineering design phase rather than in the decision making stage.

b. Dr. Bokuniewicz commented that "(t)he estimated losses during the operation are reasonable, although…different attempts will give different numbers, depending on assumptions."

EPA Response:

EPA agrees and appreciates the peer review that Dr. Bokuniewicz has provided. EPA will consider the suggestion to reforecast the estimated losses once the design details of the project have been decided.

c. Dr. Bokuniewicz commented that "Storms should not be expected to excavate pits; as long as the cap is properly designed, erosional loss of the cap by waves or tides should not be expected."

EPA Response:

EPA agrees with this assessment, and furthermore notes the ongoing success of the pilot underwater cap in the open waters of Buzzards Bay.

d. Dr. Bokuniewicz commented that "Monitoring should be scheduled more frequently at first and, if all goes as expected, at longer intervals."

EPA Response:

EPA agrees with this approach, as reflected in the draft and final TSCA Determinations attached to the draft and final ESD, respectively.

e. Dr. Bokuniewicz commented that "(t)here must be opportunity for adaptive management. It's not possible to anticipate all procedural problems or outcomes, but the results of monitoring need to be evaluated promptly so corrective action can be taken if needed."

EPA Response:

EPA agrees, and expects that the establishment of an LHCC SCC as discussed herein will be a key part in implementing such a process.

f. Dr. Bokuniewicz commented "that interim caps of thin, light layers of sand and charcoal would be more effective" than use of activated charcoal (AC) alone to remove PCBs from the water column within the LHCC.

EPA Response:

EPA notes the comment and will take this into consideration in the overall assessment of the potential efficacy of using AC to reduce releases from the LHCC. See also comment II.B.1.h above.

3. Comments from Mark P. Brown, Ph.D.

a. Dr. Brown commented that EPA should consider the impacts from the proposed change from hydraulic dredging to mechanical dredging that would support the proposed CAD cell.

EPA Response:

Based on current literature, EPA believes that mechanical dredging (with an environmental bucket) and hydraulic dredging are estimated to cause similar amounts of sediment resuspension. *"Technical Guidelines for Environmental Dredging of Contaminated Sediments"* (USACE, 2008), while warning that "The range in resuspension factors shows that there is no such thing as a typical resuspension factor", goes on to describe the "conservative characteristic resuspension factor for cutterhead dredges is about 0.5 percent of the fine silt and clay fraction of the sediment" and that "the conservative characteristic resuspension factor for mechanical dredges with environmental buckets without overflow is about 0.5 percent." This report adds that sources other than actual dredging, such as debris removal and barge/tug operations, contribute to resuspension

as well. The final ESD clarifies that an environmental bucket must be used for the LHCC-related dredging, as well as other protective measures described in Section VIII of the ESD.

b. Dr. Brown questioned whether 5 kg of PCB (the amount estimated by computer modeling to be released over a three year period prior to CAD cell capping) would be allowed to be discharged to the harbor pursuant to the Clean Water Act (CWA).

EPA Response:

This estimated release of PCBs from the LHCC has to be viewed in the context of the much larger on-going flux of PCBs from the site, both from the upper harbor to the lower harbor and from the lower harbor to Buzzards Bay. For example, recent sampling at the hurricane barrier as part of the "Operable Unit Three" (outer harbor) remedial investigations concludes that approximately 95 pounds (209 kg) of PCBs migrates to Buzzards Bay every year (with no remediation underway). As described above (see footnote #3) use of an LHCC is projected to reduce such seaward PCB migration by roughly 215 to 445 pounds. In this context, as described above, EPA believes that the LHCC represents the Least Environmentally Damaging Practical Alternative (LEDPA) pursuant to the CWA.

c. Dr. Brown commented that the draft ESD does not set performance standards regarding concentration levels or releases of PCBs that cannot be exceeded, and that the protectiveness of the LHCC cannot be evaluated without such standards.

EPA Response:

Attachment B of the draft ESD does include performance standards for both air and water quality that are consistent with those used for the harbor cleanup to date. These have been retained in the final ESD. In addition, water column PCB monitoring within the CAD cell has been added as a requirement to allow comparison to modeled predictions, and the final ESD requires that corrective measures be taken if actual PCB levels within the LHCC are significantly different than predicted PCB levels. Also, additional details of the monitoring program will be developed and coordinated through the enhanced stakeholder outreach as discussed in the final ESD.

d. Dr. Brown questioned whether a risk assessment for the proposed disposal has been developed.

EPA Response:

EPA has conducted and documented, in the draft and final ESD and draft and final administrative record, an assessment of risk to support the proposed Superfund LHCC. There is not one report but rather many different reports, studies and evaluations, again all of which are in the administrative record, that support use of the LHCC to mitigate risks posed by the Site. Examples of these reports include water quality monitoring of a similar CAD cell operation in NBH

(Battelle, 2009), computer modeling of water quality and air quality impacts (ERDC, 2010 and Jacobs, 2010a, respectively), monitoring reports of the pilot underwater cap (Jacobs, 2011 and WHG, 2011), and cost and schedule estimates to complete the harbor cleanup with and without use of a LHCC (Jacobs, 2010b).

e. Dr. Brown questioned why there has not been a complete reevaluation of remedial alternatives, given that the 1998 ROD did not anticipate remedial dredging to take place over a 30 to 40 year timescale.

EPA Response:

ESD #4 is the initial step of such a reevaluation of remedial alternatives for the OU1 remedy, and will serve to shorten the remedial timeframe within all funding ranges evaluated. As discussed above in section II.A.4, EPA is developing a feasibility study focused on the remainder of the OU1 remedy that is expected to lead to a re-evaluation of the current OU 1 remedy. Any changes to the current OU1 remedy will be addressed under one or more CERCLA decision documents.

f. Dr. Brown commented that ESD #4 "clearly proposes to reduce the protectiveness of PCB disposal relative to the original ROD".

EPA Response:

As described in the ESD, the LHCC would only capture a portion of the sediments that, per the original 1998 ROD, would have been disposed in CDF D. The volume of sediments slated for the LHCC is approximately 300,000 cy, compared to a current total estimated volume for OU1 of 900,000 cy.

The short term impacts to the water column from the LHCC during placement activities are expected based on computer modeling to be roughly equivalent to the short term impacts from CDF D during placement activities. See page A-86 of the 1998 ROD for the leakage estimates for CDF D. However, again based on modeling, the long term impacts to the water column from the LHCC are expected to be significantly LESS than those from CDF D for two main reasons: a) PCBs would continue to flux out of CDF D for the long term (albeit at decreasing levels) due to the continuing net infiltration maintaining leachate production, while a three foot cap would contain PCB releases from the LHCC and b) CDF D would fill-in about 20 acres of the harbor (i.e., there would not be any water column, so therefore the overall environmental impacts would be significantly greater) whereas the LHCC would create approximately 10 acres of "clean" harbor bottom habitat.

g. Dr. Brown commented that ESD #4 would reduce the protectiveness of PCB disposal relative to the off-site disposal currently underway.

EPA Response:

As described above, EPA acknowledges that there will be relatively minor short-term releases of PCBs (estimated at 11.4 pounds over three years) during the placement phase at the LHCC that the current off-site disposal approach does not have; but that the LHCC would reduce long-term PCB flux to Buzzards Bay by roughly 215 to 445 pounds due to a reduction in the overall remedial timeframe (see footnote #3 above). Once the contaminated sediments are capped in the LHCC, long-term monitoring and institutional controls will ensure that they remain safely disposed of and therefore present no further threat to human health or the environment. EPA thus disagrees with the comment.

h. Dr. Brown commented that other criteria besides time and money, such as short- and long-term effectiveness, should be considered, and questioned whether EPA presumes "that the sooner the remedy is completed the more protective it will be regardless of short-term impacts?"

EPA Response:

As demonstrated by the draft and final ESD's administrative record, EPA *has* considered all seven NCP criteria[8], including short- and long-term effectiveness of the proposed LHCC, in addition to the time and cost to complete the cleanup. This includes the Battelle study (Battelle, 2009) that observed a lack of aquatic toxicity inside and outside and containment of turbidity at the 2009 navigational CAD cell #3 in NBH, as well as short- and long-term computer modeling of water quality impacts (ERDC, 2010).

EPA does not disregard short-term impacts when evaluating protectiveness, but as described herein believes the short-term impacts of the LHCC are relatively minor and are outweighed by the significant improvements in long-term protectiveness offered by the LHCC.

i. Dr. Brown asked where else EPA has allowed disposal of PCB remediation waste in a CAD cell, and why other prominent PCB sites have not used CAD cells for sediment disposal.

EPA Response:

Other Superfund sites that have used or selected CAD cells for containment of contaminated sediments include the Puget Sound Naval Shipyard (Washington), the Commencement Bay Superfund site - St. Paul Waterway (Washington) the St. Louis River/Interlake/Duluth Tar (SLRIDT) site (Minnesota), the Callahan Mine Superfund site (Maine) and for the State Enhanced Remedy portion (i.e., navigational dredge material) of the New Bedford Harbor Superfund Site (Massachusetts). Not all of these sites have PCBs as the principle contaminant of

[8] The eighth and ninth NCP criteria, community and state acceptance, are evaluated after reviewing public and state comments.

concern, but nevertheless all of these sites have used or plan to use CAD cells as part of a Superfund remedy to safely dispose of many forms of contamination in the aquatic environment.

EPA also notes Dr. Robert Engler's comments to ESD #4, submitted on behalf of AVX Corporation, that "Capping has been used successfully at over 100 locations worldwide and 80 or more in the U.S. with CAD application at 20 locations." Dr. Engler also commented that "Capping of sediments has been successful at several sites grossly contaminated by wood treatment wastes which have NAPL (non-aqueous phase liquids – chemical fluids) in the sediment in combination with PAHs, creosote, and PCB, or other contaminants. *Such sites technically are far more complex than New Bedford Harbor contaminants*" (emphasis added). Since capping is a critical part of the LHCC, Dr. Engler's comments quoted here are responsive to Dr. Brown's comment.

EPA also notes that many PCB sediment sites are typically in river settings where CAD cells may not be physically possible (i.e., have implementibility issues) due to geography, depth to bedrock, shallow water depths or other limitations. A quick survey of some of the larger contaminated sediment Superfund sites where CAD cells have not been used or not yet selected revealed the following information in this regard:

Woonasquatucket River dioxin site in Rhode Island: CAD cells were considered but not pursued due to geographical and depth to bedrock/refusal constraints (Krasko, 2010).

Housatonic River/GE PCB site (western Massachusetts): CAD cells were not considered implementable due to deep depth of sediment PCB contamination and/or shallow water depth in pond areas most suitable for CAD cells (i.e., material handling/implementibility issues) (Svirsky, 2010).

Hudson River/GE PCB site (New York): Per Table 4-1 of the 2000 FS (TAMS, 2000): "Because of the potentially large volume of dredged material which will be generated, there is likely insufficient area in the river to place the total dredged volume without significantly changing the nature and hydraulic characteristics of the river in the vicinity of the disposal sites." As a result CAD cells were not retained for further evaluation.

Fox River sediment PCB site (Region V): CAD cells were included in the feasibility study, were considered effective for PCB disposal and retained in the screening process (Hahnenberg, 2010).

Passaic River (New Jersey): The Lower Eight Mile Early Action phase of the Diamond Alkali-Lower Passaic River project is currently in the feasibility stage, with three removal alternatives and three disposal options being evaluated in a Focused Feasibility Study (FFS). The removal alternatives are No Action, Deep Dredging and Capping with Some Dredging. Each of the dredging and capping alternatives includes three disposal options: off-site disposal, Contained Aquatic Disposal (CAD) in Newark Bay and local decontamination technology. EPA Region 2 is working to gather site-specific information on all three alternatives and disposal options to

evaluate them against the nine criteria as required under Superfund. The FFS is expected to be completed in summer 2011, with a Proposed Plan released at the same time for public comment (Yeh, 2010).

Portland Harbor (Oregon): A range of CAD cells are being considered along with upland disposal and CDFs as part of an on-going FS (Blischke, 2011).

j. Dr. Brown questioned whether EPA has considered the environmental justice aspects of PCB disposal in the New Bedford area.

EPA Response:

Yes, EPA has considered the environmental justice aspects of the proposed LHCC. One of the biggest environmental injustices in the New Bedford area is the large scale PCB contamination of its harbor. The sooner the Superfund harbor cleanup is finished in a protective manner, the sooner this large injustice will be remedied. Since the LHCC accomplishes both of these goals, EPA believes it has a positive impact in regard to environmental justice. EPA has done, and continues to pursue, significant community outreach in New Bedford to inform the public of the CERCLA cleanup process and their role in voicing their concerns to the Agency. This will continue through the implementation of the LHCC component of the OU1 remedy.

k. Dr. Brown questioned whether EPA has considered how ESD #4 relates to EPA's forthcoming dioxin reassessment.

EPA Response:

EPA acknowledges that some PCB congeners are considered dioxin-like. However, the mechanical dredging and CAD cell disposal removes PCBs, including any dioxin-like PCBs, from the active biological layer of the harbor and prevents them from re-entering the marine environment and food-chain. The long term monitoring of the LHCC, as well as for the overall site, will include sampling for PCB congeners to monitor the protectiveness of the remedy including the LHCC.

The annual seafood monitoring program provides data on PCB concentrations in several marine species. The PCB analysis used in this program includes dioxin-like PCBs. EPA periodically reviews cleanup goals for seafood, and will base that review on the dioxin reassessment the commenter refers to once it is finalized.

l. Dr. Brown commented that he is astonished that "EPA would propose such an inherently risky disposal method" and commented that none of the other major PCB sediment sites have done so.

EPA Response:

EPA disagrees that the LHCC is "an inherently risky disposal method." As described in comment II.A.2 above, EPA believes there are four distinct lines of site-specific evidence to support the conclusion that the LHCC will be protective in both the short and long term. Information regarding the evaluation of CAD cells at other Superfund sites is presented in response to Dr. Brown's comment #3.g above.

4. Additional Comments From Other Stakeholders

a. Some commented that EPA should continue the off-site disposal approach "no matter what the costs or how long it takes" and that "The children of New Bedford should not be forsaken for the sake of time and/or money."

EPA Response:

As described herein EPA continues to believe that the LHCC is a safe and protective approach which greatly reduces long term risk and remedial timeframe compared to the current off-site disposal approach. See response to comment II.B.2 above, among others. In addition, EPA notes that currently the entire harbor cleanup is paid for by Congressional appropriations to EPA and that there is no guarantee that the significant additional funding required for off-site disposal will materialize year in and year out, especially given the state of the national economy.

b. Some commented that "Without removing the contaminants completely, the threat will not be removed. Burying them deeper in the river would, clearly, be moving things in the wrong direction."

EPA Response:

Disposal into a properly engineered and monitored CAD cell removes the risks to human health and the environment because the PCB contaminated sediment is placed well below the biologically active upper layer of harbor sediment, and because such disposal results, as another commenter noted, in a geochemically and physically stable condition (Engler, 2010). The lack of oxygen at these depths in the CAD cell material results in an anaerobic "chemically-reduced" environment which further minimizes the potential for contaminant migration. Long-term monitoring and institutional controls will ensure that the remedy remains protective in perpetuity.

c. Some commenters found "it abhorrent that the US government would turn their back on New Bedford, once again, by trying to leave what was dumped on us in the 1940's – 1970's (part of which was caused by government contracts)" and that area residents "deserve an environment that is as safe as anywhere else."

EPA Response:

As EPA has spent over $300 million on the harbor cleanup to date, EPA disagrees with this characterization. As discussed herein, mechanical dredging and the LHCC, as called for in ESD #4, is a safe and protective approach for the less-contaminated remaining OU1 sediments in the lower harbor and provides significantly decreased long term risks and a shorter remedial timeframe.

EPA agrees that the harbor should be a safe environment, but the yardstick for determining this is the federal CERCLA statute and its implementing regulations, not simply "as safe as anywhere else." Given the wide range of environmental contaminants in ports and harbors around the country such a standard would be too ambiguous to allow standardized implementation. EPA has determined that the LHCC can be used for the permanent disposal of PCB sediments without posing risk to either human health or the environment. EPA has, and will continue to work with the people who live and work around the Harbor to address the significant challenges faced with removing the legacy of PCB contamination of the waterway.

d. Some commented that CAD cells are not a proven disposal method and questioned their longevity, and that "they have rarely if ever been used (f)or the purpose of containing burnt PCB's".

EPA Response:

With the beginning of their use in the 1980s, CAD cells have a proven, decades-long track-record of safely containing contaminated sediments. As discussed above in comment II.A.2, the overall ecological quality of New Bedford's lower harbor has significantly improved during the decade-plus timeframe that the three NBH navigational CAD cells have come on line. In addition, underwater capping, which would be the top layer of the LHCC, is now widely used and recognized as a highly effective approach for ensuring isolation of contaminated sediments (NRC, 2001). As discussed herein, PCB-contaminated sediments in New Bedford's outer harbor have already been successfully capped.

EPA is not proposing to use the CAD cell for "burnt PCBs," so this comment is not relevant to the proposed remedy called for in ESD #4.

e. Some questioned "the claims of time and money that would be saved under this proposal as the term of years is very vague due to various funding levels."

EPA Response:

For a project of this scale there is absolutely no question that the remedial timeframe is dependent on the amount of annual funding. In this case, EPA used three different annual funding rates - $15m/yr, $30m/yr and $80m/yr - to bracket the range of potential funding levels and corresponding remedial timeframes. EPA believes this is an appropriate approach for this site to provide realistic expectations regarding the time and cost to complete the upper and lower harbor

cleanup. Since the cost estimates are based on actual costs experienced to date on similar tasks within NBH (for both offsite and CAD cell disposal), EPA believes the cost estimates are much more accurate than required by agency guidance for remedial decision-making.

f. One commenter asked "how is it that the many years of research that lead to hydraulic dredging [and offsite disposal] has lead us to the wrong decision regarding the cleaning of the harbor?"

EPA Response:

The decision to use an LHCC does not exclude the continuation of the current off-site disposal approach, and the hydraulic dredging/offsite disposal approach should not be viewed as "the wrong decision." As is now widely recognized by EPA and interested stakeholders, there are a variety of remedial approaches for contaminated sediments. As ESD #4 makes clear, the LHCC would only be used for approximately 300,000 cy of the 900,000 cy total estimated volume of OU1. Off-site disposal will continue to be used for the more highly PCB-contaminated sediments in the upper harbor, pending a comprehensive review of remedial alternatives for the upper harbor currently in progress. Given the pilot underwater cap in the southern portion of OU1, and the LHCC in between, EPA notes that a mix of remedial approaches will now be in effect for OU1, consistent with national guidance (USEPA, 2005) and an "all tools in the toolbox" approach.

g. One commenter suggested that "Small increases in overall costs (to continue offsite disposal) should be considered the cost of a very necessary insurance policy against the possibility of repoluting [sic] the harbour."

EPA Response:

EPA is statutorily required to select remedies that are cost-effective as well as protective of human health and the environment. ESD #4 represents such a remedy, and as discussed herein provides for significantly reduced long term risk. The contamination capped in the LHCC will be subject to long-term monitoring and institutional controls to ensure the remedy remains protective. Because waste will be permanently disposed of on site, the remedy will be subject to statutorily-required reviews at least every five years to reassess the site and determine whether the remedy remains protective. EPA also disagrees that the increased costs to continue the offsite disposal approach, estimated in ESD #4 at up to $500 million, represent "small increases" in project cost.

h. One commenter noted concern about "high cancer rates" in the New Bedford area:

EPA Response:

Epidemiological research to which the commenter infers is outside the scope of EPA's mission under the Superfund program. This comment has been referred to the Massachusetts Department

of Public Health for its consideration. The change to the remedy called for in ESD #4 will reduce human exposure to PCBs in and around New Bedford Harbor, principally from the consumption of locally-caught seafood which has become contaminated with harbor PCBs.

i. Some commenters raised concerns that the change from hydraulic to mechanical dredging (at least for those sediments slated for the LHCC) would contribute air emissions that hydraulic dredging would not.

EPA Response:

EPA agrees that mechanical dredging and LHCC disposal include activities that have the potential to release airborne PCBs, and which are not present with hydraulic dredging/offsite disposal (since the hydraulic dredging maintains the dredged sediment in a contained system). However EPA disagrees that such releases would present a significant risk to human health. As included in the ESD #4's Administrative Record, computer modeling EPA commissioned to evaluate this issue in detail concluded that the maximum annual airborne PCB levels expected from mechanical dredging and LHCC activities would remain far below levels of concern for human health (Jacobs, 2010a).

The "four potential sources of airborne PCBs" outlined in the Jacobs report and repeated by the commenter are simply a listing of those activities with the theoretical potential to contribute airborne PCBs, so that they could be included in the air modeling program. Again, the modeling conservatively estimated that these activities, in total, would have a negligible impact on air quality. The report also correctly points out that airborne PCBs are being released from unremediated sediments (e.g., from mudflats during low tides) on an on-going basis regardless of remediation approach, so that the sooner the cleanup is completed the sooner these on-going releases will be mitigated.

ESD #4 requires that the site's air monitoring program be continued and expanded to include more monitoring locations in the lower harbor area. Although not expected, should airborne PCB levels approach established warning levels, corrective actions will be taken. The results of the air monitoring will be made available to the public during the course of the remedial action.

j. One commenter compared the proposal to use an LHCC to the proposal to incinerate NBH hot spot (OU2) sediment, and went on to comment "which in fact you wanted to make it a regional incinerator" which would take PCB waste "of other communities around New England".

EPA Response:

ESD #4 is part of OU1 and in no way relates to the original OU2 plan to incinerate the hot spot sediments. EPA also disagrees, as discussed herein, that the LHCC is "an unsafe way" to manage contaminated sediments.

EPA categorically rejects the baseless claim regarding a regional incinerator; the original OU2 plan to incinerate the hot spot dredged material was never intended for any material other than the dredged hot spot material.

k. One commenter said that the ESD #4 approach should not be pursued because the savings it would provide would be less than 30%, that "the cost of the monitoring over time... would match that cost" and that the monitoring costs would "become a yearly bill for the city of New Bedford for the rest of time".

EPA Response:

As Table 1 of ESD #4 shows, the savings incurred through use of an LHCC depend on the annual funding rate used in the estimate, and range from 21% to 36% ($144 million to $500 million) on a fully funded (rather than net present value) basis. These are significant savings, and EPA is statutorily required to select remedies that are protective and cost-effective. EPA disagrees that the cost of monitoring the LHCC would equal these cost savings, and notes that these monitoring costs are estimated at less than $600,000 NPV in the ESD's cost estimates (Jacobs, 2010b). EPA also notes that under CERCLA the MassDEP is the party that is responsible for the long term performance monitoring of the LHCC, and that the MassDEP has settlement proceeds that can be used for these monitoring costs.

C. <u>AVX Comments</u>

1. AVX commented that, consistent with its past comments on previous EPA decision documents, "that EPA has been and remains off-course."

EPA Response:

As described herein, EPA disagrees that ESD#4 is "off-course". Rather, it believes, in the words of AVX's own expert, Dr. Robert Engler, that "ESD #4's approach for chemical and physical isolation of contaminated sediments in the [LHCC is] technically sound, pragmatic and cost effective."

2. "AVX has no disagreement with EPA's belated adoption of [CAD] technology to streamline disposal of dredge spoils in any portion of New Bedford Harbor; indeed AVX would encourage EPA to utilize CAD technology for *all* future disposal."

EPA Response:

EPA agrees with AVX that CAD cells are a protective approach for NBH sediments, at least for those sediments evaluated as part of the LHCC alternative described in the ESD. As discussed further herein, as part of its upcoming focused feasibility study (FFS) that will re-evaluate the

remaining work required to complete the remediation of OU1, EPA will evaluate whether a CAD cell for the remaining upper harbor sediments would be protective and cost-effective.

3. AVX commented that EPA must stop its incremental approach to the remedy and embark, pursuant to CERCLA and the NCP on a full-blown re-evaluation of the most cost-effective and protective remedy for OU1.

EPA Response:

There is no requirement under CERCLA or the NCP that remedial actions, particularly at large complicated sites, cannot be addressed in stages through a series of decision documents. As previously discussed, EPA is continuing ongoing investigations to further evaluate other potential remedial alternatives for the remaining OU1 sediments.

4. AVX commented that, in light of the increased remedial costs and timeframe for OU1, that "EPA's continual adjustments to and reworking of the OU1 remedy, and its public statements that further changes are yet to come, is illegal, arbitrary and capricious and inconsistent with the NCP."

EPA Response:

As previously discussed, CERCLA and the NCP permit remedial action to be conducted in stages and for components of remedies to be reassessed during the course of a long-term, complex remediation as is present at New Bedford Harbor. EPA is continuing its evaluation of potential alternatives for the remaining OU1 sediments. EPA continues to follow the process for modifying its remedial action called for under the NCP, including providing extensive opportunities for the involvement of all stakeholders, including the Settling Party. Therefore, there are no grounds for the commenter's claim that EPA's actions are "illegal, arbitrary and capricious and inconsistent with the NCP."

5. On pages 3-5 of its comment letter, as well as in other portions of its comments, AVX provided background information about the Site.

EPA Response:

EPA believes that a response to this background information is beyond the scope of ESD #4. EPA reserves the right to dispute any statements made by AVX in this section as may be necessary in future Site proceedings.

6. AVX commented that the USACE found in 1989 that use of CAD cells was technologically feasible for NBH sediments, and that CAD cells had advantages over the use of CDFs due to the geochemically stable underwater environment.

EPA Response:

Both a pilot CAD cell and a pilot CDF were constructed as part of the first pilot study performed at the Site in the late 1980s. As noted in the final report for that pilot study, due to elevated PCB levels in surface layers of the CAD cell cap, "the capping effort was unsuccessful" (USACE, 1990; p.3-6; Table 4). This was likely due to the method and depth of placement and to insufficient time for sediment consolidation (5 days) prior to initiation of cap placement. This unsuccessful capping effort was the main reason CAD cells were not pursued by EPA as part of the ensuing feasibility studies, proposed plans and 1998 ROD for OU1. Since then, however, CAD cell technology has matured and many lessons have been learned about successful implementation, including as discussed herein from three navigational CAD cells in NBH, which EPA has taken into consideration and included in ESD #4.

7. AVX commented that "it is a virtual certainty that EPA will abandon the concept of constructing and using CDFs".

EPA Response:

This comment is not relevant to EPA's remedy in ESD #4 that calls for disposing of contaminated sediments in the LHCC rather than dewatering them and sending them to an off-site disposal facility.

8. AVX commented, in footnote #12 of its letter, that ESD #2 for OU1 "did not include costs for the three CDFs."

EPA Response:

While this comment is not specifically relevant to ESD #4, EPA disagrees and notes that on p.9 of ESD #2, ROD2's cost estimate, which included costs for CDFs A, B, C and D, was updated to reflect 2001 pricing.

9. AVX commented that "EPA is proposing to dispose approximately 40% of the remaining contaminated sediments in a CAD cell while approximately 60% have been or are likely to be shipped off site."

EPA Response:

EPA agrees that approximately 40% of remaining contaminated sediments are slated for disposal into the LHCC, but notes that any change in the current remedy regarding the remaining non-LHCC OU1 sediments has not yet been made. As discussed above, an FFS focusing on the remaining OU1 sediments has first to be accomplished before any future decision to change the current remedy can be made.

10. AVX commented "that not one element of ROD 2's disposal strategy remains in place, ESD #2 effectively will have been rescinded, and EPA has yet to consider any of these changes [to disposal strategy] so fundamental as to make it necessary to issue a ROD amendment."

EPA Response

While this comment is not specifically relevant to ESD #4, EPA disagrees that ESD #2 will effectively have been rescinded: ESD #2 modified "the remedy to include offsite disposal for the dredged sediments slated for CDF D instead of constructing CDF D and disposing PCB-contaminated sediments in it." (ESD #2, p.1). ESD #4 further modifies the OU1 remedy so that, in summary, those sediments originally slated for CDF D will be disposed EITHER offsite or in the LHCC. Thus the fundamental aspect of ESD #2 - offsite disposal for a portion of OU1 sediments originally designated to be disposed of in the former CDF D - remains in place, but with a lower volume of sediments now slated for offsite disposal.

EPA does not believe that a ROD amendment is required at this time since the most fundamental aspects of the OU1 ROD have not been changed: the sediment cleanup levels have not changed and removal of sediments above these levels has not changed.[9] It is only a portion of the disposal aspect of ROD 2 that has changed (three of the four original CDFs remain as an element of the remedy). As discussed above, EPA anticipates that a comprehensive review of alternatives and potentially a resulting CERCLA decision document is the appropriate next step for remaining unaddressed OU1 sediments. As this review progresses, the cost estimate(s) to complete the OU1 remedy will be updated.

11. AVX commented that "the process leading up to ESD #4 is flawed" since a two-CAD cell scenario that EPA had evaluated was not pursued.

EPA Response:

Once it became clear that annual federal funding would be limited for the OU1 remedy, EPA initiated preliminary evaluations of various OU1 remedial alternatives, including a two-CAD cell alterative, as work load and project staffing allowed. The upcoming FFS discussed above will complete the evaluations of these alternatives and make them fully available to the public for comment. At this point in time, however, the ESD #4 alternative, which only deals with the sediments originally slated for CDF D, and then designated to be disposed of off-site by ESD #2 (rather than the rest of the OU1 remedy), is the only evaluation that is complete and ready for public review.

---

[9] The pilot underwater cap installed in 2005 near the Cornell-Dubilier mill is the one minor exception to the sediment removal aspect of ROD 2.

With specific regard to the alternative referenced in this comment, the original two-CAD cell alternative in the upper harbor was not evaluated further due to excessive amounts of organic silt overlying the potential CAD cells sites (Apex, 2006) and the lack of cost-effective options for disposal of this silt. See also AVX comment #13 below. An upper harbor CAD cell alternative (likely to be different than the original two-CAD alternative) will likely be one of the alternatives evaluated as part of the FFS discussed above.

As shown on the project web site, the concept of a second CAD cell in the upper harbor was discussed at the October 2008 monthly community update meeting (http://www.epa.gov/region1/superfund/sites/newbedford/293637.pdf.

12. AVX commented that CAD cells have long been considered for use at the Site, dating back to the early 1980s, but that EPA has never provided a clear record explaining why it rejected them.

EPA Response:

While this comment is not specifically relevant to ESD #4 EPA notes that the record of why CAD cells were rejected from further consideration leading up to the 1998 ROD 2 could have included additional details, but that it is accurate based on the evaluations performed up to that point in time. Section 6.3.5 of the August 1990 FS (Volume II) describes the reasoning for why a CAD approach was eliminated as a separate alternative at that time.

13. AVX commented that the *2006 CAD Volume Capacity Analysis* (Apex, 2006) "concluded that the two proposed CAD cells would provide adequate capacity" to handle the estimated amount of targeted sediments at that time.

EPA Response:

To be clear, the two CAD cells in the 2006 Apex report were never "proposed" for actual use; rather they were strictly conceptual for purposes of initial evaluation. Furthermore, while the CAD cells could deliver the estimated required disposal volume, as the report makes clear approximately 289,000 cy to 306,000 cy of overlying organic material - extending down greater than ten feet - within the footprint of the CAD cells would require disposal in order to "capture" this estimated disposal volume (Alternative #1, Table 5.2-A and Alternative #2, Table 5.3-A, respectively). This volume is largely above and beyond that volume of PCB-contaminated sediment to be removed to meet ROD 2's action levels. Thus, absent a cost-effective solution to address this large volume of organic material within the top portion of the CAD cells, EPA disagrees with AVX's conclusion that these two CAD cells would have adequately addressed the problem. Instead, EPA has determined at this time that the one LHCC is an effective and protective means to address the contaminated sediments in the lower harbor and limited areas of the lower upper harbor, as one component of the overall OU1 remedy. As discussed above reassessment of the other components of the OU1 remedy is ongoing.

14. AVX, in footnote #37, notes that its original favored plan was to utilize underwater capping for all sediments in the upper harbor.

EPA Response:

While this comment is not specifically related to ESD #4, EPA notes that AVX's *original* preferred remedial approach for the upper harbor (underwater capping) has been replaced by AVX's *current* preferred remedial approach (disposal of all dredged material into CAD cells). This is similar to the way in which EPA's judgments of the best remedial approaches for NBH have changed over time, as additional site experience, new information and lessons from other sites are taken into consideration.

In addition, AVX's portrayal of an approximately 200 acre underwater cap as having much in common with a CAD cell is overly simplistic, especially given the upper harbor's very shallow water depths. An underwater cap in the shallow upper harbor would, among other impacts, significantly alter aquatic habitat by changing large areas of subtidal habitat into mudflats, as well as significantly impact flood storage volumes. A CAD cell would have no such impacts.

15. AVX commented that EPA's decision-making process lacks transparency and "fails to explain why EPA has decided to construct only one CAD cell to handle less than half the targeted sediments, part of a combined remedy that would cost about $422,000,000 (fully-funded), over $70 million more than the cost for dredging and disposing all sediments into the two CAD cells contemplated in the *2006 CAD Volume Capacity Analysis*, based upon preliminary estimates."

EPA Response:

EPA has made available to the public, well in advance of the public comment period, all elements of its evaluation for a LHCC, and thus disagrees that the ESD review process has lacked transparency.

In addition, AVX's analysis in not accurate since it has "mixed apples and oranges." The preliminary estimate it references is NOT for the two CAD cells contemplated in the 2006 Apex report, but for a draft FFS alternative with one upper harbor CAD cell and one lower harbor CAD cell. As discussed above in AVX comment #13, due to the large volumes of organic material that the 2006 Apex report identified, a cost estimate for the original two-CAD cell concept was not performed. In addition, the $422 million alternative in ESD #4 includes the three upper harbor CDFs that remain a part of the remedy. The estimate for a draft FFS alternative which AVX references does not. It is also inappropriate to cite a preliminary, incompletely-reviewed draft cost estimate obtained via the Freedom of Information Act (FOIA) with one that is final.

The upcoming OU1 FFS (which is expected to include final versions of the estimates cited by AVX) as described above will discuss the various alternatives that EPA has evaluated for the remaining OU1 sediments.

16. AVX commented that the LHCC approach would be a deviation of EPA "worst-first" approach to remedial dredging, and that EPA has not provided "a word of explanation for why EPA deems it necessary."

EPA Response:

EPA provided the public its rationale for this change in approach during the monthly community update meetings, and the presentations from these meetings were posted on the project web site. As described at these meetings, EPA's reasoning for this exception to the "worst-first" approach is as follows:

a - from a volume standpoint, the LHCC approach would, in only two to three years of dredging, remove approximately a full third (300,000 cy) of the entire volume of OU1 sediments. For comparison, after seven years of full scale dredging, two of which were at elevated funding rates due to ARRA funding, only about 20% of all OU1 sediments have been removed with the hydraulic dredging and offsite disposal approach;

b - from an area or spatial standpoint, the LHCC approach would address ALL of the OU1 sub-tidal dredge areas in the lower harbor, as well as abutting areas in the lower upper harbor, in only two or three years of dredging. This also represents about a third of the total area of OU1 sediments requiring remediation (about 95 acres out of a revised estimate of 265 acres – FWEC, 2003). As a result, impediments due to Superfund issues to the public's use and enjoyment of these harbor areas, including but not limited to the proposed Sawyer Street rowing facility, the north terminal area and the Popes Island area, would be quickly removed;

c - the long term benthic monitoring performed to date does not indicate that upper harbor dredging has increased sediment PCB levels in the lower harbor; in fact it indicates just the opposite, that lower harbor surficial sediment PCB levels are now significantly lower than prior to the start of upper harbor dredging (ESD #4 Administrative Record document 299752; Nelson and Bergen, 2011). Based on this data EPA does not believe that areas dredged as part of ESD #4 would be recontaminated as a result of future upper harbor dredging. The areas will be subject to ongoing long-term monitoring to ensure that recontamination does not take place;

d - the deeper water in the lower harbor will allow the use of commercial scale dredging vessels (modified as described in the ESD for Superfund dredging), which results in less expensive cost;

e - the timeframe in which to build a LHCC may be a limited one, as eventually the available areas for where such CAD cells may be constructed within the designated area of the harbor for CADs may be "used up" by construction of navigational CAD cells;

f - if resources allow, EPA will pursue the current offsite disposal approach, or other approaches pursuant to an FFS and subsequent CERCLA decision document, in parallel with the LHCC approach.

17. AVX commented that "In 2004, EPA embarked on a course of action that resulted in obvious and fundamental changes in costs, volume and project duration to the "existing official remedy" and that "EPA has not been fully candid with the public...as to the extent to which it engaged in a broader analysis of options".

EPA Response:

EPA disagrees; as discussed above, EPA has begun the preliminary steps necessary to evaluate remedial alternatives for a future OU1 reassessment. This has not "resulted in obvious and fundamental changes in costs, volume and project duration." Again, all alternatives evaluated for the FSS will be made public once EPA's evaluation is complete.

In EPA's judgment, as described herein, the LHCC approach does not require a ROD amendment, so the LHCC/ESD #4's evaluation was finalized and made available to the public, well in advance of the public comment period. EPA has kept the public well-apprised of this process: see the October 2008, January 2010 and June 2010 presentations made at the monthly community meetings (all available at www.epa.gov/nbh under Meetings and Events).

18. AVX commented that the cost estimates for the LHCC includes an assumption that they are accurate within a range of -30% to +50%, and that this wide a range is inappropriate for this stage of the project.

EPA Response:

While EPA does not agree with AVX that it can't base a remedy decision on a cost estimate range of -30% to +50%, EPA believes that the draft ESD #4's cost estimates are much more accurate than this -30% to +50% range recommended in agency guidance (USEPA, 1988). This is due to the fact that, as AVX correctly notes, they are based on five years or more of actual Site dredging and disposal experience, and since they take advantage of actual navigational CAD cell implementation costs in NBH, among other factors. As a result the final ESD #4 clarifies that EPA believes a contingency factor of 15%, rather than 50%, is appropriate.

19. AVX commented that the cost summary tables of the ESD's cost estimates do not always agree with the cost backup tables for the various alternatives, that the net present value (NPV) of the alternatives could be impacted as a result, and that the cost estimates should "be examined for thoroughness by EPA and its consultants."

EPA Response:

The discrepancies referenced in this comment are a result of incorrect mathematical assumptions made by AVX's reviewers. Using the example cited by AVX of Alternative #2, $80M/yr summary of fixed costs, the total fixed costs is $63,981,882. The fixed costs reported on pages 2, 3, and 4 of 12 of that estimate cannot simply be summed to come up with the total fixed costs, which is apparently what the reviewers did to reach their value of $44,538,131. The reason the fixed costs on pages 2, 3, and 4 of 12 cannot be simply summed is that some of the cost items are repeated in multiple years, and some cost items are applied proportionally based on the activity(ies) performed in a year. Notes in the comment fields for the repeating fixed costs on pages 2, 3, and 4 of 12 indicate which of the fixed costs occur in multiple years.

The one discrepancy noted (Alt#1, $80m, 7 years) where the total cost listed on the Summary Sheet ($76,320,537) did not match the total cost listed on the Backup Sheet ($67,325,174) was due to a formula on the Backup Sheet that was carried over from a previous version and which was not updated. However, the total on the Summary Sheet is correct, and the total cost on the Summary Sheet is the value used to calculate the NPV - so the ESD correctly captures the estimated NPV of this alternative. The Backup Sheet for this alternative has been corrected and the accurate Backup Sheet is included in the final administrative record.

Prior to issuance of ESD #4, EPA and its team carefully reviewed the 136 pages of detailed cost estimates supporting the ESD for thoroughness. In response to AVX's comments, the cost estimates were again reviewed for accuracy. This one line item discussed above is the *only* one of thousands of line items in the ESD cost estimates that was found to be in error - and again it has no bearing on the final cost estimate for the alternative.

20. AVX commented that it "is concerned that use of only one year's cost experience [the 2008 dredge season] may bias these [cost] estimates, since EPA has offered no evidence that 2008 was a representative year for all resources, manpower, equipment use and activities."

EPA Response:

The 2008 actual costs represent unit rates that have been refined over four years of dredging and disposal operations for a normal $15 million/year funding scenario, and as such EPA strongly believes are the best source of cost information when estimating similar future costs. The unit rates are calculated using work/cost items that are consistent from year to year and inherently include premium time and other factors typical of the normal funding scenario. The 2008 actual costs (production rates and unit rates) were pro-rated for the $30M/year and $80M/year funding scenarios using escalation factors for longer work days and longer seasons as they affect man-hours and overtime, planning, equipment and spare parts, utility costs, facility maintenance, data collection and data management.

The two bullets on page 16 of AVX's comments raise concerns over predicting unit rate changes due to weather, maintenance problems and variability in area, manpower, equipment, and fixed

costs. As stated by the reviewers, these are changing assumptions; and it would be difficult for any cost estimate to account for unanticipated factors. Because the 2008 actual costs represent production and unit rates that have been refined over four years, many of the variables experienced from year to year have been dampened. However, the possibility of unanticipated cost changes pointed out by the reviewers supports the fact that these are cost estimates, not cost absolutes and further supports use of a 15% contingency factor discussed above. Since all cost estimates were performed in the same fashion, however, EPA believes that the level of uncertainty is equivalent across all cost estimates so that the various alternatives can be effectively compared.

21. AVX commented that there is a 17% increase in the cost estimate for ESD Alternative #2 $80M compared to a 1/19/10 hybrid cost estimate that it obtained via its FOIA request - "essentially ESD #4" - with "no documentation to account for this large increase."

EPA Response:

AVX has again compared "apples to oranges" since the hybrid alternative is most decidedly NOT "essentially ESD #4." The hybrid alternative contains only two sediment disposal options: offsite disposal and LHCC disposal. No CDFs are contained in it. ESD Alternative #2, on the other hand, contains three sediment disposal options: three upper harbor CDFs, offsite disposal and LHCC disposal. Therefore, by definition the cost estimates are different.

22. AVX commented "that CAD cell technology has been proven adequate to containing sediments irrespective of the levels of contamination" and "rebuts EPA's assertion that New Bedford Harbor sediments are more contaminated than previously placed into a CAD cell."

EPA Response:

EPA agrees in general that, depending on the site, CAD cells can be an effective approach for more-highly contaminated sediments. The point of the ESD's discussion in this regard, however, and as AVX acknowledges in it comments, is that total *PCB* levels slated for the LHCC are higher than those placed in other CAD cells to date, to the best of EPA's understanding.

Overall, EPA appreciates Dr. Engler's comments referenced by AVX identifying capping and CAD cell technology as appropriate for even the most heavily contaminated sediment sites. However, EPA does take some exception to his comment that "a CAD site is a subset of the process of capping contaminated sediments". Yes, caps are an important element of CAD cells, but there are other significant differences between the two approaches, such as lateral constraint of the sediments inside the cell (which Dr. Engler refers to later in his comments) and the fact that the seafloor elevation is not raised, which otherwise could change subtidal habitat to intertidal habitat, when using CAD cells.

23. AVX commented that "Sediments capped in a CAD cell will not be at *in situ* concentrations. They will be at far lower concentrations as a result of the dredge process."

EPA Response:

EPA acknowledges, due to the potential for over-dredging as well as the potential for losses during placement, that PCB levels in a CAD cell may be lower than that measured *in situ*. However, characterizing this as "far lower concentrations" may be overstating the case. In addition, EPA will strive to limit over-dredging and losses during placement during the project's implementation, which would serve to limit this decrease in sediment PCB levels.

24. AVX commented that it is the dissolved fraction of PCBs within the CAD cell pore water "which limit the potential for transport through the cap and not the absolute bulk sediment concentration" and that, as a result, PCB flux through the CAD cell cap would be expected to be only approximately 300 grams per year and only after 1,000 years.

EPA Response:

EPA agrees that the dissolved PCB levels in pore water are an important factor in estimating PCB flux from the CAD cell, and notes that the computer modeling in the ESD's administrative record used actual pore water data collected from Site sediments when estimating long term PCB flux from the LHCC (ERDC, 2010). Similar to AVX's conclusion about low long term PCB flux rates from CAD cells, this modeling also conservatively predicted extremely low long term PCB levels (0.007 ppb or 7 parts per trillion) in the cap fifty years after capping (ERDC, 2010; p.26).

25. AVX commented that "design of an effective cap for the proposed LHCC is well within the state of the practice in management and disposal of sediments contaminated with PCBs" since they do not contain NAPL or coal tar-associated contaminants that could "lead to ebullition (release of gas bubbles) which would facilitate transport of contaminants through the cap."

EPA Response: EPA agrees with AVX in this regard.

26. AVX commented that the wording in the draft TSCA determination (Attachment B to ESD #4) does not meet the requirement at 40 CFR 761.61(c)(2) for EPA to approve a risk-based cleanup plan.

EPA Response:

EPA does not agree that the draft TSCA finding included in the draft ESD #4 did not meet TSCA requirements. The draft finding presented for public comment, was based on the extensive technical record that implementation of mechanical dredging and LHCC as new components of the OU1 remedy did not pose an unreasonable risk of injury to health or the environment. Based

on changes made to the text of ESD #4 and in response to public comments, the TSCA finding has been updated, so that it provides additional detail as to why the proposed change to the OU1 remedy meets TSCA risk-based standards.

27. AVX commented that it "is concerned that EPA's decision-making on ESD #4 is impermissibly driven as much by the SER as by the NCP", that "it appears that at least some of the stakeholders, as well as perhaps EPA, have come to see the various dredging projects in New Bedford Harbor as one single big dredging project" and that "EPA must take care that no Superfund money is spent on the SER."

EPA Response:

EPA agrees that no Superfund money can be spent to implement the SER, and notes that no such funding has been spent to do so. EPA emphatically does NOT view the OU1 remedy and the SER as the same dredging project, and is very mindful of the difference between the two. Moreover, ESD #4 was proposed entirely due to the benefits to the OU1 remedy, and was not "driven" by the SER. As the ESD notes, there may or may not be opportunities for cost-efficiency and reduced impacts to the benthic environment by collaboration between the two dredging projects, but that does not mean that ESD #4 is somehow beholden to the SER; rather only that EPA will be open to such opportunities should they develop during LHCC implementation.

28. AVX commented that the potential for mixing Superfund sediments with navigational dredge material could result in cross-contamination of the less contaminated navigational sediments, potentially creating a greater volume of sediments requiring remediation in the event of remedy failure.

EPA Response:

EPA notes the concern but believes based on, among other factors, the four lines of evidence summarized herein (see comment II.A.2 above) that the potential for remedy failure in this case is extremely small. EPA also notes that this particular AVX comment is inconsistent with the overall thrust of its comments, which is that CAD cells are a tried and true technology for highly contaminated sediments which should therefore be used for ALL remaining OU1 sediments. In this light AVX's concern for LHCC remedy failure seem more abstract and theoretical than grounded in reality.

Regarding AVX's comments on RCRA's mixture rule in this part of its comments, EPA notes that RCRA is not an ARAR for the LHCC component of the remedy, since the sediment does not exceed RCRA regulatory standards (rather TSCA is the controlling ARAR due to the sediment's PCB content).

Regarding AVX's comments on section 121 of CERCLA in this part of its comments, EPA believes that the LHCC *would* reduce the mobility and toxic effects of the Superfund sediments being placed into it: rather than having these PCB-contaminated sediments currently located over about 95 acres of harbor bottom, where they are within the active biological zone (and prone to mobility due to wind, waves and currents) these sediments would be contained within the LHCC, with its estimated footprint of less than 10 acres, and be physically and geochemically isolated from the active biological zone of the harbor bottom. Thus concerns about the mobility and toxicity to benthic organisms of these sediments will be permanently eliminated.

29. AVX commented that "now is the time for EPA to consider building not one but two CAD cells in New Bedford Harbor" and that the location of Superfund CAD cells should not be restricted to the state-approved area for navigational CAD cells discussed in the ESD.

EPA Response:

As discussed herein, EPA will continue its evaluation of an additional CAD cell, located in the upper harbor, as part of its FFS reassessment of the remaining OU1 remedy. But since this evaluation is not currently complete, while the evaluation for the LHCC is, EPA is only proceeding with the LHCC at this time.

30. AVX commented that "It appears there is some urgency if EPA is to utilize the CAD cell associated with Phase IV of the navigational dredging project" and that this urgency may be driving the decision to proceed with ESD #4 rather than a more comprehensive FFS. It also commented that EPA's "incremental changes have not expedited, and will not hasten, the completion of the cleanup."

EPA Response:

The Phase IV of the navigational dredging program does not have any bearing on the timing and issuance of ESD #4, although as noted in the ESD, once the revised remedy is implemented there may be certain efficiencies if the timing and other logistics work out so that a combined Superfund/navigational CAD can be created. EPA disagrees that the incremental changes made to the OU1 cleanup to date have not expedited the harbor cleanup. The change to mechanical dewatering by ESD #1, as well as ESD #2's change to off-site disposal to replace the creation and filling of CDF D, for example, has allowed for continued, tangible progress within the context of limited annual funding. Without these changes, and within this limited funding context, the original ROD plan to build CDF D would likely have become problematic and delayed as an incomplete or partially-filled CDF would have needed expensive interim operations and maintenance to remain protective until completely filled and capped.

31. AVX commented that "While AVX endorses the modification in ESD #4...EPA has not gone far enough" and that "the time has come for a ROD amendment" in order to reach a comprehensive cost- and time-effective solution for the OU1 remedy.

EPA Response:

As previously discussed EPA has initiated the effort to develop and evaluate other potential remedial alternatives for the remaining OU1 sediments, which will culminate in an FFS once that evaluation is complete. ESD #4 represents the first step in this process, and its addition of mechanical dredging and the LHCC has shortened the time required to finalize the OU1 remedy.

32. AVX commented that "Decisions made as to the most appropriate remedial alternatives continue to be founded on a high level of uncertainty" regarding the overall volume of OU1 sediments requiring remediation, and that "a doubling of the volume must be regarded as a fundamental change to a remedy and subject to the more rigorous standards triggered by a ROD amendment."

EPA Response:

AVX incorrectly represents the increase in estimated sediment volume requiring removal to support OU1. As the administrative record supporting the 1998 ROD 2 clearly shows, and which AVX discusses in its comments, the total volume of PCB-contaminated sediments requiring remediation was estimated in 1996 to be approximately 576,000 cy (see document 4.4.4 of the OU1 administrative record: *Draft Phase 2 Cost Estimates received from Foster Wheeler June 14, 1996*, p.89). The 450,000 cy cited in ROD 2, and apparently miscalculated by AVX to calculate a "doubling" of volume, includes a "footprint" deduction for the volume of sediment above the ROD 2 action levels that would be covered by the CDF footprints and thus not need to be dredged. Based on this original volume of 576,000 cy, the current volume estimate of 900,000 cy included in ESD #4 represents a 56% increase, not a 100% increase or doubling as AVX alleges, in estimated volume.

Unfortunately, at this site, due to the poor waste disposal practices of the past, the more one looks for PCBs in harbor sediments and marshes the more one finds. EPA has openly reported its increased volume estimates at every juncture as the remedy has proceeded from the ROD stage into implementation.

33. AVX commented that "EPA's cost estimate for actually conducting the [OU1] work has increased substantially at every juncture" and that this increase in cost "must be regarded as a fundamental change to a remedy and subject to the more rigorous standards triggered by a ROD amendment."

EPA Response:

Although AVX has used some incorrect cost values (discussed below) in its comments regarding costs, EPA agrees that its cost estimates have increased as the harbor cleanup has progressed into the implementation phase. The biggest reason for this cost increase, however, is not inadequate

site characterization nor incorrect initial cost-estimating nor some other pre-ROD problem, but rather due to limited annual post-ROD federal funding available for the remedy. For example, the difference in cost-to-complete between the ESD #4 remedy at $15 million/yr versus $80 million/yr on a fully funded basis is $778 million ($1.2 billion versus $422 million, respectively).

Also, AVX's comments on costs in general suffer from a failure to consider cost growth due to inflationary increases. With such increases considered, the acceptable OU1 ROD cost range, including the agency-accepted "plus 50%" accuracy of FS- and ROD-stage cost estimates, would be as follows:

OU1 ROD cost, fully funded basis (i.e., not NPV) at 1995 price level:	$188m
OU1 ROD cost, fully funded basis, 2010 price level (3.5% annual inflation):	$315m[10]
OU1 ROD cost, fully funded basis, 2010 price level, acceptable upper limit (1.5 x $315m):	$472m

Adding past OU1 RD/RA costs of $217 million to date to the estimated cost of $422 million to complete the OU1 remedy with ESD #4 (at $80m/yr) gives an estimated total of $639 million. This amount is $167 million greater than the $472 million acceptable upper limit listed above. However, as discussed herein, EPA believes the biggest reason for this increase is limited annual federal funding.

As mentioned above, AVX uses incorrect values in its tabulation and discussion of costs. These include the following:

- post-ROD costs, consistent with those estimated in the OU1 ROD, total approximately $217 million to date (including "undelivered orders") which is $133 million LESS than the $350 million claimed by AVX;

- the fully funded cost of ESD #1 is $325 million (ESD #1, Table1), not $330.95 million as claimed by AVX;

- the fully funded cost of ESD #2 is $317 million (ESD #2, Table 1), not $318.82 million as claimed by AVX.

34. AVX commented that the harbor cleanup is now projected to take much longer than the eight years originally projected in ROD2 ("as long as 58 years"), that this increase in project duration "must be regarded as a fundamental change to a remedy" and that the remedial changes proposed in ESD #4 should thus have been approached as a ROD amendment rather than an ESD. AVX also questioned in footnote #76 "whether it is ever

[10] This $315 million agrees well with the USACE's Civil Works Index for dredging projects, which estimates that a $188 million dredging project in 1995 would cost $319 million in 2010.

appropriate and consistent with the NCP for EPA to generate multiple time scenarios and - since cost is a function of time - cost estimates for a project in remedial action."

EPA Response:

Similar to the main reason for increases in cost estimates (see AVX comment #33 above) the main reason that the estimated time to complete the harbor cleanup has increased is due to the problem of limited annual federal funding. As a result, in this case the ruling principle is more along the lines of "time is a function of funding" rather than as AVX commented that "cost is a function of time".

Also, in more than one instance AVX seems to exaggerate the increase in project duration. AVX points to an upper bound of 58 years (no ESD #4, $15 million/yr) when one of the main benefits of ESD #4 is to reduce this upper bound to 52 years (12 years since ROD 2 plus 40 additional years at $15 million/yr). In addition, in the table on p.24 of AVX comments, AVX incorrectly lists a completion date of 2046 for OU1 using ESD #4 (Alt. 2 at $30 million/yr) when in fact this date would be 2036.

As to AVX's main point, EPA disagrees that the project's increased timeframe should trigger a ROD amendment. In this case, EPA believes that the slower dredging pace has the potential to increase implementation phase effectiveness by minimizing the potential for increases, if only temporary, in PCB residues in fish/shellfish due to remedial dredging which have been observed during remediation of other PCB sediment sites (NRC, 2007, pp. 110-118; Anchor QEA/Arcadis, 2010, Fig 5.6-4).

35. AVX commented that "A dramatic increase in the volume of dredge spoils, coupled with the low funding levels, transformed the OU1 cleanup from an approximately $130,000,000 remedy which would take 6 years to implement to a remedy that might cost over $1,000,000,000 and take more than 50 years to reach remedial objectives."

EPA Response:

The biggest problem with this statement is that AVX again compares apples to oranges by comparing a net present value cost ($130m) with a worst case, fully funded cost (>$1B). These are two significantly different cost estimating approaches and comparing one to the other is technically inaccurate.

A second problem with this statement is that AVX incorrectly characterizes the estimated time frame in the OU1 ROD as 6 years. As shown in AVX's table on p.24 of its comments, AVX is fully aware that the timeframe in that ROD was estimated at 8 years. While AVX is correct to point out that the estimated remedial time frame is now significantly greater than originally estimated in the ROD, as explained herein the biggest reason for this long timeframe is the limited

annual federal funding rate. Issuance of ESD #4 is expected to shorten the remedial timeframe significantly, no matter what federal funding levels are available over the coming years.

36. AVX commented that "Having established an internal goal of a ROD amendment, EPA should have immediately begun an evaluation of remedial alternatives under the nine criteria in accordance with the NCP and guidance. This could have been cost-effectively accomplished through the use of a focused feasibility study or similar approach."

EPA Response:

EPA *did* promptly begin an evaluation of remedial alternatives once the issue of chronic low funding had been identified, and continued this evaluation as resources would allow. As described herein, however, EPA disagrees that a ROD amendment is required for the remedial modifications proposed in ESD #4 since switching from hydraulic dredging, dewatering and off-site disposal for sediments originally slated for CDF D, to a combination of this method and mechanical dredging and LHCC-disposal for these sediments, would decrease costs and time to complete and therefore does not exceed the standard for requiring a ROD amendment. As mentioned previously, EPA has initiated an FFS, which will assess whether additional changes to the OU1 remedy are warranted under a separate CERCLA decision document.

37. AVX commented that there is little, if any, documentation or explanation of why the cost estimates for the OU1 alternatives being evaluated increased.

EPA Response:

AVX is referring to draft, internal cost estimates that it received via its FOIA request. As these are draft internal documents there is not the same level of detail and explanation of the estimates as there would be for final, public cost estimates. For a project of this scale there are a wide variety of assumptions that have to be made when developing cost estimates, and these assumptions were being refined throughout the evaluation as a result of internal deliberation. Ultimately, as part of the FFS, there will be full transparency and explanation of the OU1 alternatives' cost estimates and the assumptions used therein.

38. AVX commented that "EPA should have re-opened the FS very soon after realizing that the cleanup was foundering and initiated a formal process for finding a more timely and cost-effective solution".

EPA Response:

EPA disagrees that "the cleanup was foundering" - significant remedial progress has been made in the most egregiously contaminated areas near the Aerovox facility, despite the limited annual funding typically available. EPA also notes that federal funding levels for the harbor cleanup can vary year to year, as evidenced by the stimulus funding and the planned increase in fy2011

funding. Thus EPA believes it made sense to begin evaluating alternatives for long term remedy changes, but EPA disagrees that a curtailing of remedial progress or not completing the ESD #4 remedy change in favor of reopening the FS is required either by CERCLA or the NCP.

39. AVX commented that had EPA pursued a comprehensive remedy change with a ROD amendment rather than ESD #4 it could have achieved "remedial action objections sooner rather than later" and thereby avoid delays to the "community's goals for use and enjoyment of the harbor and its waterfront."

EPA Response:

Had EPA pursued a comprehensive remedy change rather than ESD #4 (which, as described herein, EPA does not believe was the best course of action nor required under the NCP) achievement of all remedial action objectives could nevertheless be decades or more in the making, depending on available funding resources. ESD #4, on the other hand, allows achievement of important interim goals in the short term (i.e., three to five years) such as, among others, removing Superfund issues from the public's "use and enjoyment" of the proposed Sawyer Street rowing facility area, the North Terminal area and the Popes Island area.

40. AVX commented that "No good reason has been given why EPA has not delayed ESD #4 until it can come to grips with the viability of an Upper Harbor CAD cell. Rather than letting sound science and engineering drive its decisions, EPA has side-stepped its responsibility and made decisions based upon factors unknown to the public."

EPA Response:

EPA *has* let sound science and engineering drive its decision making in this regard: the fact of the matter is that the technical evaluation for the LHCC is complete, whereas that for an upper harbor CAD cell (UHCC) or other potential remedial alternatives is not. EPA sees no reason to delay implementation of the LHCC until the evaluation of an UHCC is finished, especially given the significant short term benefits of the LHCC as described above. In addition, the two CAD cells have different respective issues (e.g., hydrodynamics, levels of PCB contamination, abutting land use) that argue for separate rather than combined public discourse and comment.

As described herein EPA also has described in public the reasons for proceeding with an LHCC in ESD #4. See for example the response to AVX comment #16 above.

41. AVX commented, in Section IV.B of its comments, that "As of 2010, the Cumulative Changes to the "Existing Official Remedy" Are So Fundamental that EPA Must Start the ROD Amendment Process Now."

EPA Response:

As described herein EPA agrees that the next step in the CERCLA process for the OU1 remedy is an FFS and re-assessment of the remedy for the remaining OU1 sediments, but disagrees that ESD #4 should have been pursued as a ROD amendment.

In its comments regarding increases in scope (i.e., sediment volume) to the OU1 remedy, AVX again incorrectly represents this increase as "The volume of contaminated sediments requiring disposal has *more than* doubled since 1998" (emphasis added). As clarified above in response to AVX comment #32, the increase in sediment volume, from 576,000 cy to 900,000 cy, represents a 56% increase, not a more than 100% increase as AVX incorrectly charges.

In its comments regarding changes in performance to the OU1 remedy, AVX again mischaracterizes the original estimated timeframe in the ROD. The 1996 Proposed Plan lists 8 years as the estimated timeframe (assuming adequate funding), not 6 or 6.5 years as claimed by AVX. Again, the increase in expected time frame is due to federal funding limitations, rather than any change in the remedial cleanup plan.

In its comments regarding costs, as explained above in AVX comment #33, AVX a) fails to account for cost growth due to annual inflation and misrepresents applicable past post-ROD costs which are $217 million in OU1 RD/RA costs to date, not $350 million. In addition, AVX incorrectly exaggerates the worst-case cost increase as potentially being "more than eleven times greater than originally estimated." The calculation used by AVX to reach this conclusion is inconsistent with its own comments that ESD #4's cost estimates are more accurate than "plus 50%" - which in response to AVX comment #18 above EPA agrees with. Using AVX's calculation protocol (see AVX footnote #99), but using the correct past-cost figure of $217 million, a 15% contingency factor instead of a 50% contingency factor, and the applicable inflation-adjusted 2010 fully funded cost of $315 million (see response to AVX comment #33 - thus comparing "apples to apples") the *worst-case* estimated cost growth is calculated to be a maximum of five, not eleven, times greater than originally estimated ($1,200m + $180m + $217m = $1,597m/$315m = 5).

42. AVX commented that in *United States v. Burlington Northern Railroad Company* the Tenth Circuit court "specifically noted that the change in handling from off-site disposal to incineration for over half of the sludge was a change in scope, noting that "both the initial plan and its amendment specifically rejected the idea of off-site incineration of the impoundment sludge.""

EPA Response:

A key difference between ESD #4 and the circuit court case cited is that EPA in ESD #4 is not changing from disposal without treatment to disposal with treatment. The ESD #4 remedy change is simply changing the form of dredging technology and utilizing a different form of disposal. The LHCC is just another form of disposal, compared with either CDF D or offsite landfilling, none of which includes an active treatment element such as incineration. Further differences

between EPA's actions in issuing ESD #4 and the *Burlington Northern* case are that in *Burlington Northern* the remedy change resulted in greatly increased costs (unlike the cost reduction under ESD #4) and that EPA was criticized in the *Burlington Northern* case for not providing public notice prior to its remedy change (unlike ESD #4, which had the same degree of public comment as for a ROD Amendment).

43. In its summary of ESD changes on p. 32, AVX commented that ESD #1 included "the use of an abandoned rail spur to move contaminated waste to an off-site disposal location".

EPA Response:

This comment, in addition to not being accurate (see discussion of rail in ESD #1) is not relevant to EPA's change to the OU1 remedy as presented in ESD #4 since it pertains to remedy modifications made under ESD #1.

44. AVX commented that per Superfund guidance the changes in shoreline land use discussed in the *First Five-Year Review Report* should mean there has been a fundamental change in the remedy. It also added that "the New Bedford/Fairhaven Municipal Harbor Plan...has emerged as a driving factor in remedy implementation and remedy selection."

EPA Response:

This comment is not relevant to EPA's change to the OU1 remedy as presented in ESD #4 since shoreline land use changes were not a factor in the remedy change made in ESD #4, except to the extent that accelerating the cleanup of the lower harbor facilitates both commercial and recreation use of the waterbody.

Nevertheless, EPA notes there are key differences between the shoreline land use changes over time at the Site and land-use changes at an upland site as discussed in the referenced guidance. At NBH, since the OU1 ROD includes separate clean-up standards for various shoreline land uses (e.g., residential, recreational/beach combing, industrial), should shoreline land use change over time it is not the scope of the remedy that is changed, but rather only the geographic area within which these respective cleanup levels get implemented. Obviously the issue of land use changes over time is completely moot for the vast majority of the site - its subtidal sediments - and this issue only could come into play at its margins. Thus EPA disagrees that this issue constitutes a fundamental change in the remedy.

EPA relied on the state's DMMP determination in siting the LHCC, not the Municipal Harbor Plan. The Municipal Harbor Plan, which incorporates the DMMP findings, is a document that EPA refers to when considering stakeholder interests in the harbor and the role of the CERCLA remedy in removing site contamination from impeding the environmental and commercial potential of the harbor.

45. AVX commented that "the critical overarching question is whether, taken as an aggregate, [all of the ESD] changes have the effect of a fundamental change", that "It is hard to imagine how anyone could characterize the totality of all of the changes…as anything less than a fundamental change" and "that there can be no question that the 2010 remedy EPA envisions for the …Site "is no longer reflective of the selected remedy in the ROD.""

EPA Response:

As discussed above EPA disagrees and believes that the 2010 remedy *does* still reflect the 1998 remedy: the main driving factor of the remedy - its sediment cleanup levels - has not changed, disposal of the removed sediments *without* active treatment has not changed, and three of the four original disposal facilities remain - CDFs A, B and C. The addition of mechanical rather than passive dewatering in ESD #1 just accomplishes the same goal via different methods. Overall the OU1 remedy with ESD #4 remains as dredging with disposal, just the dredging has changed from hydraulic to mechanical for a portion of the sediments and the disposal sites have changed from 3 CDFs and off-site to 3 CDFs, offsite and the LHCC.

46. AVX commented that "From 2004 to 2010, EPA continued to spend time and money on all the steps necessary for off-site disposal…knowing that a more cost-effective remedy was likely available", that EPA was indifferent "to this waste of time and money", that "further expenditures of time and money in the absence of a[n FFS and ROD amendment] in light of the many fundamental changes and new information…cannot be justified" and that "EPA should suspend consideration of ESD #4 and immediately commence [an FFS] to support a ROD amendment for OU1."

EPA Response:

As discussed above EPA disagrees that continuing the full scale dredging and offsite disposal of the most egregiously PCB-contaminated sediments in the upper harbor was a waste of time and money. By continuing the cleanup significant tangible remedial progress has been made in parallel with the evaluation of alternative approaches. Moreover, given the very high contaminant levels in this removed sediment (PCBs up to 190,000 ppm or 20%; total VOCs up to 24,100 ppm or 2.4%) it is questionable that other disposal scenarios would satisfy the nine criteria of the NCP.

EPA was and is not indifferent to the cost-growth and extended remedial timeframes caused by the limited annual funding experienced to date. EPA Region I initiated the "internal remedy review" on its own volition precisely because of these concerns. As described herein, due to the significant benefits in the short term from implementing an LHCC, and with its technical evaluation complete (while that for the other alternatives incomplete) EPA believes that implementation of ESD #4 is the best remedial strategy at this time.

Given the severity and scope of the PCB contamination, EPA believes it is important to continue the harbor cleanup rather than discontinue it until an FFS and a future remedy change is made. In addition, EPA notes that there are other considerations in this regard including, but not limited to the significant costs for stopping and starting remedial operations of this magnitude (estimated at $20.7 million - Jacobs, 2007) and continuity of support team resources. EPA therefore plans to continue its evaluation of remedial alternatives for the remaining OU1 areas in parallel with implementation of the modified remedy, culminating in an FFS and future decision document once those evaluations are complete.

REFERENCES CITED

Anchor QEA/Arcadis, 2010. *Phase I Evaluation Report, Hudson River PCBs Superfund Site.* Prepared by Anchor QEA and ARCADIS for General Electric Company. March 2010. http://www.hudsondredging.com/about_the_project/key_technical_reports/20100308P1ER_full.pdf

Apex, 2006. *Preliminary CAD Cell Volume Capacity Analysis*. New Bedford Harbor Remedial Action, Technical Memorandum. Apex Companies, LLC and Jacobs Engineering Group. December 2006.

Battelle, 2009. *Turbidity Monitoring and Plume Sampling Results for City Dredge Disposal at the New Bedford Harbor CAD Cell #2.* Technical Memorandum dated 12/15/09. Available at www.epa.gov/nbh under Cleanup Plans and Technical Documents.

Blischke, 2010. Email from Eric Blischke, USEPA Region 10, to David Dickerson, USEPA Region1. 1/14/11.

Dickerson, 2011. Memo from David Dickerson, USEPA-Region 1, to New Bedford Harbor Superfund site file. 3/11/11.

Engler, 2010. R.M. Engler. *Review of the June 2010 Draft Fourth Explanation of Significant Differences for Use of a Lower Harbor CAD Cell, New Bedford Harbor Superfund Site, Operable Unit #1, New Bedford, MA.* 9/3/10.

ERDC, 2010. *Assessment of Contaminant Loss and Sizing for Proposed Lower Harbor Confined Aquatic Disposal (CAD) Cell, New Bedford Harbor Superfund Site.* US Army Engineer Research and Development Center, May 2010. Available at www.epa.gov/nbh under Cleanup Plans and Technical Documents.

FWEC, 2003. *Volumes, Areas and Properties of Sediment by Management Units, New Bedford Harbor Superfund Site.* Foster Wheeler Environmental Corporation for USACE-New England District. Revision 2, September 2003.

Hahnenberg, 2010. Phone call between David Dickerson, USEPA Region 1, and James Hahnenberg, USEPA Region 5. 12/3/10.

Jacobs, 2007. Cost Estimate 1A – Complete Demobilization for 10 years Then Remobilization. Jacobs Engineering. 12/14/07.

Jacobs, 2010a. *Final Evaluation of the Impact of Dredging and CAD Cell Disposal on Air Quality, New Bedford Harbor Superfund Site.* June 2010. Available at www.epa.gov/nbh under Cleanup Plans and Technical Documents.

Jacobs, 2010b. Cost Estimates, Jacobs Engineering. June 2010.

Jacobs, 2011. *Final 2010 Bathymetric Survey of Pilot Underwater Cap, New Bedford Harbor Superfund Site.* Jacobs Engineering Group. February 2011. Available at http://www.epa.gov/region1/superfund/sites/newbedford/454690.pdf

Krasko, 2010. Email from Anna Krasko, USEPA Region 1, to David Dickerson, USEPA Region 1. 12/3/10.

Nelson and Bergen, 2011. W.G. Nelson and B.J. Bergen. *The New Bedford Harbor Superfund Site Long Term Monitoring Program (1993-2009).* Pre-publication article. February 2011.

NRC, 2001. *A Risk-Management Strategy for PCB-Contaminated Sediments.* National Research Council. National Academy Press, Washington, DC. (http://nap.edu).

NRC, 2007. *Sediment Dredging at Superfund Megasites – Assessing the Effectiveness.* National Research Council. The National Academies Press, Washington, DC. (http://nap.edu).

Svirsky, 2010. Email from Susan Svirsky, USEPA Region 1, to David Dickerson, USEPA Region 1. 12/6/10.

TAMS, 2000. *Hudson River PCBs Reassessment RI/FS, Phase 3 report: Feasibility Study.* TAMS Consultants for USEPA-Region 2 and USACE-Kansas City District. December 2000. http://www.epa.gov/hudson/fs000002.pdf

USACE, 1990. *New Bedford Harbor Superfund Pilot Study, Evaluation of Dredging and Dredged Material Disposal.* US Army Corps of Engineers, New England Division. May 1990. Available in the 1998 NBH OU1 ROD Administrative Record, document 4.6.1.

USACE, 2008. *Technical Guidelines for Environmental Dredging of Contaminated Sediments.* US Army Corps of Engineers, Engineer Research and Development Center. ERDC/EL TR-08-29. September 2008.

USEPA, 1998. *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA.* Interim Final. EPA/540/G-89/004. OSWER Directive 9355.3-01. October 1988.

USEPA, 2005. *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites.* EPA-540-R-05-012 Office of Solid Waste and Emergency Response OSWER 9355.0-85, December 2005.

USEPA, 2010. Presentation Given at the January 2010 Public Meeting, New Bedford Harbor Superfund Site. http://www.epa.gov/region1/superfund/sites/newbedford/299745.pdf

WHG, 2010. *New Bedford Harbor PCB Flux Study*. Prepared by Woods Hole Group for USACE-New England District. August 2010. http://www.epa.gov/nbh/pdfs/468398.pdf

WHG, 2011. *2010 OU3 Cap Monitoring*. Memorandum from Heidi Clark and Dave Walsh, Woods Hole Group to Mark Anderson, USACE. 2/11/11. http://www.epa.gov/region1/superfund/sites/newbedford/479436.pdf

Yeh, 2010. Email from Alice Yeh, USEPA Region 2, to David Dickerson, USEPA Region1. 12/10/10.

Attachment B – TSCA 40 CFR Section 761.61(c) Determination

Based on prior manufacturing operations in New Bedford, PCB-contaminated sediments in New Bedford Harbor likely meet the definition of a *PCB remediation waste* as defined under 40 CFR Section 761.3 and thus are regulated for cleanup and disposal under 40 CFR Part 761.

In accordance with the requirements under the Toxic Substances Control Act (TSCA) and 40 CFR Section 761.61(c), I have reviewed the Administrative Record for the site and considered the mechanical dredging, passive dewatering, and CAD cell disposal of PCB-contaminated sediment set out in the March 2011 Explanation of Significant Differences (ESD) for the first operable unit of the New Bedford Harbor Superfund Site. Under this Section, *PCB remediation waste* may be disposed of in a manner other than prescribed under Section 761.61(b) provided EPA determines that this alternative disposal does not result in an unreasonable risk of injury to health or the environment. The ESD's plan includes removal and disposal of dredged PCB-contaminated sediment in a lower harbor CAD cell (LHCC). Based on the information provided, the ESD's plan will not pose an unreasonable risk of injury to health or the environment as long as the following conditions are met:

1. Water quality monitoring shall be performed during mechanical dredging, passive dewatering and barge-transport as well as during all phases of the LHCC (i.e., construction, filling and capping) to ensure that turbidity and toxicity levels comply with the Superfund harbor cleanup performance criteria (see WHG, 2010 - Figure 5).

2. If surface sediments removed from the footprint of the Superfund CAD cell contain PCB levels greater than1 ppm they shall be disposed of in a navigational CAD cell or other navigational disposal site in the harbor that is compliant with Section 761.61(c) of TSCA or disposed of off-site in a suitable licensed disposal facility.

3. Air monitoring and, if appropriate, dust suppression measures shall be implemented to ensure that airborne PCB levels from the mechanical dredging, barge-transport, passive dewatering, and CAD cell operations are below levels of concern, as established in the Superfund harbor cleanup Public Exposure Tracking System (see www.epa.gov/nbh under Cleanup Plans and Data).

4. Should laboratory-scale studies demonstrate that placement of activated carbon into the LHCC during or between placement events can reduce and/or minimize PCB levels in the water column within and above the CAD cell, then activated carbon shall be so used in accordance with the results of the laboratory-scale study(ies).

5. The LHCC shall be capped with a minimum of three feet of clean material, with a minimum organic content of 0.3%, after waiting a minimum of six months after placement of all contaminated dredged material into the LHCC to allow for consolidation and compaction.

6. Once capping is complete, the LHCC and cap shall be monitored to ensure that the LHCC and cap are functioning as predicted and that the integrity of the cap is maintained. Monitoring shall include, at a minimum, bathymetric surveys, sediment chemistry, water quality monitoring, and evaluation of biological recolonization.

For the first two years after capping, this monitoring shall be performed semi-annually (except that the biological evaluation shall only be performed annually). For the third, fourth and fifth year after capping, this monitoring shall be performed annually. The fifth year's monitoring report shall include a recommended frequency for future monitoring, for EPA approval, but in no event shall this future monitoring frequency be less than once every five years.

Monitoring reports for each monitoring event shall be submitted to EPA no later than one month after all validated monitoring data has been received for a given monitoring event.

7. Institutional controls shall be implemented to ensure the long term integrity of the LHCC cap. These may include, but not be limited to, collaboration with appropriate harbor stakeholders, to develop guidelines for mooring and anchor designs that will ensure that the integrity of the cap is not damaged by moorings and anchors. EPA will also assist these stakeholders in developing and implementing regulations requiring that such mooring and anchor designs be used within the cap area.

In addition, EPA will work with the U.S. Coast Guard to assist with the promulgation of a rule to establish a federally regulated navigation area that will prohibit activities that could disturb the seabed within the LHCC and also delineate the LHCC footprint on National Oceanic and Atmospheric Administration (NOAA) marine navigational charts for the NBH area. These charts will note the anchorage restrictions for mariners in the harbor. This rule may specify the type(s) of moorings and anchors that will be allowed in the LHCC; these moorings and anchors shall not be allowed to penetrate into or below the bottom foot of the cap.

James T. Owens, III

Director, Office of Site Remediation and Restoration

March 14, 2011

Date

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection
One Winter Street Boston, MA 02108 • 617-292-5500

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lieutenant Governor

RICHARD K. SULLIVAN JR.
Secretary

KENNETH L. KIMMELL
Commissioner

March 14, 2011

Mr. Larry Brill, Branch Chief
U.S. EPA Region I
Office of Site Remediation & Restoration
Suite 1100 (HBO)
1 Congress St.
Boston, MA 02114-2023

Re: ESD #4, State Concurrence
New Bedford Harbor Superfund Site OU1
New Bedford, Massachusetts

Dear Mr. Brill:

The Department of Environmental Protection (MassDEP) has reviewed the U.S. Environmental Protection Agency's (EPA's) proposed Explanation of Significant Differences (ESD) #4 for Operable Unit #1 of the New Bedford Harbor Superfund Site. This ESD further modifies the remedy EPA selected for Operable Unit #1 in the New Bedford Harbor Record of Decision (ROD), signed on September 25, 1998. The original selected remedy was previously modified by ESDs #1, #2 and #3. MassDEP concurred with EPA's original selected remedy and with EPA's modifications to the selected remedy as set forth in these three ESDs. MassDEP's concurrences are set forth in letters dated September 24, 1998; September 27, 2001; July 17, 2002; and February 19, 2010; respectively.

The selected remedy originally called for hydraulic sediment dredging, water treatment, and disposal into on-site Confined Disposal Facilities (CDFs). ESDs #1, #2 and #3 modified the selected remedy, including by replacing the largest of the four planned CDFs with off-site disposal. This fourth ESD further modifies EPA's selected remedy by adding the construction of an in-water Confined Aquatic Disposal (CAD) cell, by providing for the disposal of a portion of contaminated sediments into the CAD cell rather than off-site, and by providing for the use of mechanical dredging rather than hydraulic methods, for this phase of the work. The CAD cell will be used for disposal of approximately 300,000 cubic yards of contaminated sediments that were otherwise planned to be disposed of off-site. The remaining 400,000 cubic yards of contaminated sediments are still planned to be dredged by hydraulic methods and disposed of off-site and/or placed in the potential three CDFs still in the remedy.

CAD technology is a recognized and protective approach to disposal of contaminated sediments and MassDEP has determined that the selected remedy, as modified by the ESD, would remain consistent with M.G.L. Chapter 21E and the Massachusetts Contingency Plan.

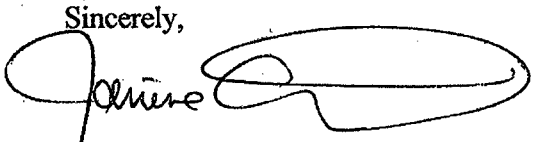
MassDEP anticipates that the use of a CAD cell in lieu of one of the CDFs would significantly reduce both the time and cost to complete EPA's selected remedy. Under the current level of funding of $15 million per year, EPA has determined that the selected remedy (as modified by ESD's #1, #2 and #3) would likely take 46 years to complete at a cost of $1.7 billion ($170 million State share). Assuming the same funding scenario, with the implementation of the changes to the selected remedy described in ESD #4, EPA estimates that the remedy would likely take 40 years to complete at a cost of $1.2 billion ($120 million State share), thus resulting in savings in time and money of approximately six years and $50 million, respectively. As an added benefit, the reduction in the time required to complete the remedy would likely result in a corresponding reduction in overall site risk.

EPA held a Public Hearing on June 25, 2010 and provided an opportunity for public comment. MassDEP subsequently reviewed EPA's proposed modification to the selected remedy as described in ESD #4 and considered public commenst received.

Based on MassDEP's review of the modification and consideration of public comment, MassDEP believes that modifying the selected remedy as described in ESD #4 would enable EPA to remediate the harbor in a more cost efficient and timely manner while still being protective of human health, public welfare and the environment. Accordingly, MassDEP concurs with the proposed modification to the selected remedy described in ESD #4.

MassDEP appreciates the opportunity to provide input on this ESD. If you have any questions on MassDEP's concurrence, please contact Joe Coyne at (617) 348-4066.

Sincerely,



Janine Commerford
Assistant Commissioner
Bureau of Waste Site Cleanup
Massachusetts Department of Environmental Protection

cc: Elaine Stanley, EPA
Cindy Catri, EPA
Man Chak Ng, EPA
Joe Coyne, BWSC, DEP
Paul Craffey, BWSC, DEP
Andy Cohen, OGC, DEP

E-file: 20110314_ESD4_ConcurrenceLetter