

GENERAL SITE INFORMATION, CHARACTERISTICS, AND STATUS

Project Name	<u>NEW BEDFORD HARBOR - PROJECT 2</u> <u>(Harbor/Upper Bay)</u>	ProjectID: 01-08
Last Updated:	06/18/04	
City:	New Bedford	
County:	Bristol	
State:	MA	
Country:	USA	
Bodies of Water:	New Bedford Harbor (Upper, Lower, and Outer Harbor); Buzzard's Bay	
US EPA Region:	I	
Status (Active, Complete, or Monitoring Only):	Active	
Date On NPL:	1983	
ROD/ESD Date:	1998	
Operable Unit:	OU-1	
Areas of Concern (length or acres):	1000-acre tidal estuary/harbor/bay; 50 acres of bordering marshland. The 187-acre Upper Harbor is the primary area of concern, along with small, localized areas in the Lower Harbor.	
Other Characteristics of Water Body:	<ul style="list-style-type: none">• The site consists of the upper estuary, or Upper Harbor (187 acres), the Lower Harbor (750 acres), and portions of the Upper Bay; about 3.8 miles total length north-to-south.• The Coggeshall Street Bridge marks the separation of the Upper and Lower Harbors; it is 110 feet wide and 18 feet deep at this location.• The Upper Harbor has a maximum width of 250 feet near the Coggeshall Street Bridge; water depth gradually decreases to six feet near the north end and decreases to two feet at the head of the Upper Harbor; sediments in the Upper Harbor are mostly organic silts and marine clays (40-80% pass No. 200 U.S. sieve, 0.074 mm).• Water depths in the Lower Harbor range between 6 and 12 feet, except in the shipping channel which is 30-50 feet deep; sediments in the Lower Harbor are mostly silty sands (60-90%).• The maximum current velocities occur at the Coggeshall Street Bridge: 6 fps maximum ebb, 3 fps maximum flood, and 1.4 fps overall average. Current velocities in the Upper Harbor average 0.3 fps, with a maximum of 0.85 fps, and in the Lower Harbor are typically <1 fps.	
Contaminants of Concern:	PCBs (1016/1242/1254); metals	
Source of Contamination:	Historical discharges from two capacitor manufacturing facilities on the Upper Harbor shoreline.	
Contaminated Area	Sediment PCB concentrations in the Upper Harbor range from nondetect to upwards of 50,000 ppm. Prior to a 1994-95 Hot Spot removal, maximum sediment PCB levels were reported to be 200,000 ppm. PCB concentrations in sediment in the Lower Harbor have been reported to be typically between nondetect and 100 ppm. In the Outer Harbor, only localized areas of PCBs in the 50-100 ppm range have been found, near the Cornell-Dubilier plant and the outfall pipes from the City's sewage treatment plant.	
Physical Characteristics:		
Type of Regulatory Action:	Superfund. Final. Fund-Lead.	
Overall Status Summary:	USEPA originally issued a proposed plan and addendum for the Upper and Lower Harbor (OU-1) in January and May 1992 (References A-110 and A-113), respectively. In response to comments received on those two documents, as well as extensive local dialogue, USEPA issued	

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a new proposed plan in October 1996 (Reference A-330) for cleanup of the Upper and Lower Harbor. The public comment period ended February 3, 1997 and the ROD (Reference A-363) was issued on September 25, 1998.

The 1998 ROD calls for dredging 433,000 cy from the Upper Harbor to <10 ppm PCBs and 17,000 cy from the Lower Harbor and Bay, combined, to <50 ppm PCBs. In addition, areas of public access and where residences abut the harbor would be dredged to <25 ppm and <1 ppm, respectively. The removed material would be deposited into four new nearshore confined disposal facilities (CDFs) totaling 43 acres. The remedial plan would take an estimated ten years to complete, two years for design and CDF construction, and eight years for removal using two dredges simultaneously. USEPA estimates it would take another ten years following remediation until PCB levels in fish are reduced to below site-specific risk levels and fish advisories can be lifted.

The status and schedule of the project as of April 2001 was as follows:

- The Corps of Engineers and USEPA signed an interagency agreement for the Corps to provide management and oversight for the project. The Corps subsequently contracted with Foster-Wheeler Environmental Corporation to implement the work.
- The majority of work in 1999 was design, survey, and engineering associated with defining CDF footprints and approaches for relocating CSOs and utilities that interfere with the CDF areas; this work is continuing. Also, effort is ongoing regarding access agreements and easements for the land for the four CDFs.
- Construction on the first of the four CDFs was originally targeted to start in June 2000, but was delayed until 2001. This would be the CDF closest to Sawyer Street. Re-evaluation of the number and configuration of the CDFs is ongoing.
- Dredging would begin following completion of the first CDF. Dredging will start at the most upstream location in the Upper Harbor and proceed downstream. At this time (April 2001), dredging was targeted to begin in 2002.
- The existing WWTP (350 gpm) would be used to support dredging; in addition, at least one more WWTP would be built, or the existing WWTP would be upgraded to increase capacity. In this regard, the Corps, USEPA, and Foster-Wheeler were continuing to review dredging technologies in an attempt to identify more efficient and less-water-producing technologies than hydraulic dredging.

In late Summer 2000, a dredge evaluation program (officially: Pre-Design Field Test Dredge Technology Evaluation [PDFT]) was implemented at the site at an estimated cost of \$1.5 to 2 million. The purpose of the PDFT was to select the optimum dredge for performing the New Bedford Harbor remediation. The Corps of Engineers provided oversight during implementation of the program. The primary impetus for the program was reportedly to evaluate the ability of removal technologies to minimize the volume of water generated during dredging and to determine the impact of each on the disposal capacity provided by the four proposed CDFs. Additionally, the program was designed to evaluate the efficiency of various dredging technologies to remove contaminated sediment from pre-selected test areas within the Upper Harbor using a common set of criteria, such as: 1) dredging accuracy to close tolerances, 2) reduced water content of dredged material, and 3) control of resuspension during dredge operation. Ultimately, a single hybrid dredge system, a Bean hydraulic excavator with slurry

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processing unit, was evaluated. This system combines mechanical removal with hydraulic transport and is similar in function to the dredge Bonacavor used by Bean at Bayou Bonfouca (Project 06-01).

Two other dredge technologies originally selected for evaluation during the study were the Canada-built Normrock Industries Amphibex Amphibious Excavator (a combination mechanical/hydraulic dredge specially designed for work in intertidal and shallow water areas) and the Ellicott 370 HP Dragon Series hydraulic cutterhead dredge. It was decided during the design phase of the program that the Amphibex would not participate in the evaluation because of the potential that operating a dredge with a foreign-made hull in U.S. waters would violate the Jones Act. The Ellicott 370 Series cutterhead dredge was not evaluated reportedly because sufficient operational and performance data were already available as a result of its previous use during both a 1988-89 Pilot Study and also for the 1994-95 Hot Spot dredging project (MCSS Database Project ID 01-02).

Results from implementation of the PDFT for the Bean dredge system are summarized below:

PDFT OVERVIEW

- Dredging occurred over a five-day period (August 14-18, 2000).
- The primary performance areas evaluated as part of the PDFT were:
 - Percent solids concentration in the dredge slurry and slurry pumping capabilities;
 - Horizontal and vertical dredging accuracy;
 - Dredge production rates in shallow water and for sediment with debris;
 - Removal of contaminated sediments to a specified depth;
 - Impacts to water quality; and
 - Impacts to air quality.

A secondary goal specified for the PDFT was to evaluate the effectiveness of the hybrid technology to achieve the site-specific cleanup level of 10 ppm PCBs in surface sediment.

- Dredging activities were performed in a single test cell in an area of the Upper Harbor approximately 3,700 ft. north of the Coggeshall Street Bridge. The test cell measured approximately 100 feet (north-south) by 550 feet (east-west), and was located about 2,800 feet from the existing Sawyer Street confined disposal facility (CDF), into which sediments were discharged. Water depth within the test area varied from approximately 0 to 5 feet mean lower low water and water depth changes averaged 3.7 feet over each tide cycle. The test cell was divided into smaller dredge cut lanes of approximately 100 feet long by 30 feet wide.
- Pre-dredge sediment PCB concentrations in the upper one-foot of sediment of the test cell ranged from 1.6 ppm to 2,700 ppm and averaged 857 ppm. The pre-dredge sediment PCB concentration in the one- to two-foot, and two- to three-foot horizons ranged from ND to 830 ppm and ND to 260 ppm, respectively. Sediment containing 10 ppm PCBs or greater would be removed to a depth of one to four feet using one-foot lifts and bucket overlaps ranging from 2 to 5 feet. The actual depth of removal across all areas ranged from 1.7 to 4.0 feet. The dredged sediment, totaling approximately 2,300 cy, was discharged as a slurry via floating pipeline to the Sawyer Street CDF. The CDF had previously been used by USEPA to receive and store sediments from the 1995 Hot Spot removal project and 1989 Pilot Dredging project.

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- The hybrid dredge system selected for evaluation comprises a 4.5 cy Horizontal Profiling Grab (HPG) bucket, the Bean patented Slurry Processing Unit (SPU), and a Crane Monitoring System (CMS). The HPG is a fully-enclosed mechanical clamshell bucket mounted to a hydraulic excavator by a 360° horizontal rotor. The SPU was used to slurry and transport the dredged sediment to the CDF via hydraulic pipeline and was also equipped with a system to re-circulate hydraulic transport water from the CDF back to the SPU as a source of make-up water. The make-up water was pumped from the CDF to the SPU through a second eight-inch HDPE pipeline. The recirculation system was intended to minimize the quantity of water requiring treatment prior to discharge back to the harbor. The CMS is a computerized positioning system used by the dredge operator during dredging for real-time monitoring of bucket position and for permanently recording dredge movements.
- The PDFT activities were implemented over about 44 days: 1) 20 days for mobilization of equipment, 2) three days for setup and calibration, 3) four days for trial dredging, 4) five days for the actual dredge test, and 5) 12 days for demobilization. The weather during this period was reported as predominantly clear and sunny with intermittent periods of light rain, temperatures between 68° to 81°F, and wind speeds between 7 and 18 miles per hour.

DREDGE REMOVAL EFFICIENCY

- Dredge removal efficiency was evaluated based on: 1) the percentage of total PCB mass removed, and 2) the post-dredge residual PCB concentration in a composite upper one-foot sediment core interval. Reportedly, an estimated mass removal of 97% and a reduction in the average PCB concentration from 857 ppm (pre-dredge) to 29 ppm (post-dredge) in the upper one-foot sediment core interval were achieved. Percent mass removal was calculated by comparing the estimated mass of PCBs in the top three feet of sediment before dredging (1,539 kg) to the estimated mass of PCBs in the top one-foot sediment interval following dredging (44 kg). The average PCB concentrations in the upper one-foot of sediment were estimated using an inverse distance weighting (IDW) approach. Pre-dredge surface sediment data are limited to composite samples of the upper one-foot core interval. However, post-dredge grab samples were collected for the upper two centimeters of sediment with results ranging from 0.47 ppm to 470 ppm and averaging 185 ppm PCBs. The elevated surface sediment PCB concentrations reportedly may have resulted from PCB-containing sediment migrating into the test area following dredging. Mechanisms possibly contributing to this migration included bucket impact on the bottom, loss through the water column, anchor wire/spud repositioning, loosened material sloughing down a dredged side slope, tidal currents, and/or wind actions.

Note: This appears to be the first time that one-foot composite core samples have been utilized for pre- and post-dredging sediment characterization at NBH. By example, the 1998 NBH ROD Responsiveness Summary states, "Also, although not specifically described in the Proposed Plan, EPA does plan to institute a conformational sampling program as part of the ROD 2 dredging program. This program, which would be similar to the one used by EPA during the hot spot dredging program ..." In an April 19, 1995 memo to USEPA (Reference B-203) regarding New Bedford Harbor Hot Spot post-dredging sediment sampling, it is stated, "The areas are then sampled when dredging is completed with composite samples analyzed for PCBs. The results represent conditions in the top 6 inches of sediment." Additionally, long-term monitoring of sediment in NBH began with a sampling program in 1993 to determine baseline conditions. The resulting report, "New Bedford Harbor Long-Term Monitoring Assessment Report: Baseline Sampling," dated October 1996, states, "Only the top 2 cm of these grabs were used in the composite for chemical analysis in this monitoring program, even though greater concentrations of contaminants may have been present deeper in the sediments. The rationale

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for using just the top 2 cm is that this program is designed to quantify changes over a 30-year time-frame, especially changes resulting from remedial activities. Because the upper 2 cm are most reflective of current sediment, including the older, deeper sediments could produce a distorted interpretation of current conditions.” Contrary to this, the most recent long-term monitoring report, “Final New Bedford Harbor Long Term Monitoring Survey III: Summary Report,” dated March 2001, presents PCB sediment concentration results for samples collected from the top four centimeters of sediment.

DREDGE PRODUCTION RATES DURING PDFT

- Final production rates were calculated based on the volume of material dredged as defined by the variance between pre- and post-dredge surveys and the net operational (effective) hours of the dredge. The average hourly production rate for the dredge was 80.3 cy/hr.

Note: This production is based on the rate of material removed during the time the dredge was operating and does not include down time for such non-operational activities as repairs, repositioning of the dredge, start up and shut down, crew mobilization to the dredge, and refueling. If these typical non-operational activities are considered, the average dredge production rate is significantly lower, 41 cy/hr once daily dredge operation began and 32 cy/hr if the total crew day (typically 13-14 hours) is utilized. Over the four days of test dredging, dredging only occurred an estimated 48% of the time the dredge was manned. The remaining 52% of the time was consumed with the non-operational activities listed above, plus back washing, flushing the pipeline, clearing obstructions, and other activities associated with operation of the SPU. An estimated production rate of 106.1 cy/hr reportedly achieved on the final day of dredging was calculated based on the total volume of sediment removed and only during the time of active dredging. This production rate is also confounded due to a significant amount of over-dredging performed on the last day.

- Nine percent (1.85 hours of 21.5 hours total) of dredge down time was associated with the removal and handling of debris.

Note: Modified operational procedures and project design are suggested by the dredge evaluation study design team if dredging to a final sediment concentration of 10 ppm in the Upper Harbor is to be attained. Operational modifications suggested include performing return sweeps, tighter overlap bucket grabs, and slower retrieval of final bucket grabs that combined would likely result in reduced amounts of residual material on the bottom following dredging and reduced sloughing of adjacent areas. These modifications could be implemented, however, most likely at the expense of production rate. A larger bucket could be used to maintain production rates while implementing the above operational modifications. However, this would require the use of a larger excavator and barge system, increasing the required draft for the equipment to operate. Because of the constraints posed by the shallow water conditions of the Upper Harbor, this option would likely be difficult to implement.

WATER QUALITY IMPACTS DURING PDFT

- Water column monitoring data show that the dredging increased the water column particulate and dissolved PCB levels by about 50 percent. Moreover, the data show that the impact on dissolved PCB levels persisted to the most down-current sampling locations, despite the return of suspended solids to baseline levels. Finally, the impacts observed are lower than would be seen at other sites because the high baseline levels of PCBs probably limited the extent of desorption from resuspended dredged material.

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- The water quality monitoring program was reportedly designed to assess the magnitude and down-current extent of elevated PCB levels attributable to the PDFT dredging activities. Water samples were collected at a reference location 1,000 ft up-current of the dredging site and from three to four locations in the dredging-induced turbidity plume at down-current distances of 50 to 1,000 ft. The samples were analyzed for TSS, filterable (“dissolved”) PCBs, and non-filterable (“particulate”) PCBs. Because the program was restricted to a single along-current transect, it did not provide information sufficient to estimate the mass of PCBs released to the water column and transported downstream.
- Both dissolved and particulate PCB levels in the turbidity plume were elevated in comparison to baseline levels. The increase was approximately 50 percent for both PCB components, 63 to 90 ppm for the particulate component and 470 to 730 ng/L for the dissolved component. Further, the dissolved concentrations remained elevated at the most downstream station in the plume, averaging 720 ng/L. The single sample taken during dredging from inside the dredging area had a dissolved PCB level ten times higher than the baseline level. The particulate PCB concentration exceeded the baseline level by about a factor of three.

AIR QUALITY IMPACTS DURING PDFT

- Twenty eight ambient air samples collected during the study indicated that the discharge of PCB-contaminated sediment slurry to the CDF resulted in emissions of volatile PCBs above background levels in and around the CDF. Three 24-hour ambient air samples each were collected from six sampling station locations: four located around the perimeter of the Sawyer Street CDF, one located upwind and north of the CDF across the cove, and one located across the harbor and just east of the dredge test cell. Additionally, one duplicate sample was collected during each event.

Note: The observed ambient air PCB concentrations may be biased low and may not be directly applicable to full-scale operations. The ambient air samples were collected over a 24-hour period, while dredging typically occurred for periods of only 5 to 6 hours each day. Although most likely not significantly affecting the stations located upwind or adjacent to the dredge, PCB emissions from the CDF would likely be much higher due to the continuous discharge of greater volumes of sediment over a much greater percentage of the 24-hour sample collection period.

END OF PDFT OVERVIEW

Planning for full-scale dredging in the harbor continues. One of the construction activities that required completion before dredging could begin included work to relocate underwater electric cables, which was accomplished in 2001.

Construction of the first full-scale CDF was to begin in Spring 2002 and construction of a second, larger CDF was to begin in Fall 2002. In addition to the construction of berms, the full capacity of this CDF was reportedly to be developed by removing base materials from inside the bermed foot print of the CDF. The upper layer of base materials in the area where the CDF was to be built were known to be contaminated with PCBs and would be disposed of in the first CDF; it was hoped that deeper sediments would be “clean,” allowing for offsite disposal of this material as “clean” fill, saving the remaining capacity in the first CDF for disposal of dredged sediment.

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Originally four CDFs were considered necessary to provide sufficient design disposal capacity for the full-scale dredging project. However, two were to be built only if needed depending on the final depth, and therefore volume, of the larger CDF and if any capacity remained in the first CDF following construction of the second CDF.

In September 2001, USEPA issued an ESD for five modifications to the cleanup plan as follows:

- Added the use of mechanical dewatering to reduce the volume of sediment requiring disposal. This was estimated to reduce the number of CDFs required from four to two.
- Revised the wall design for the largest of the four proposed CDFs (CDF D).
- Added the construction of a rail spur from the New Bedford rail depot to the CDF D area to facilitate removal of soft sediment from the area and delivery of rock and fill during construction of the CDF.
- Included removal of additional intertidal sediments found to be contaminated above action levels at a small residential area along the Acushnet River in Acushnet and an area along River Road in New Bedford where River Road Park is to be constructed. (Note: USEPA, as part of its Early Action Program as described in the 1998 ROD, removed 2,500 cy of sediment from a residential area along the Acushnet River in 2001.) No specific volume increase has been provided, but most of the material would be removed during full-scale remedial activities.
- Included the use of the existing Sawyer Street CDF as a temporary TSCA facility to store dewatered sediment. The decision to make the facility permanent would be made in the future.

By November 2001, USACE had issued a proposal and received contractor responses for a \$240 million unrestricted total environmental restoration contract (TERC) to remediate New Bedford Harbor. The contract includes a five-year base with option extensions for a potential length of ten years.

On April 5, 2002, USACE awarded the TERC contract that includes dredging of New Bedford Harbor. A protest was lodged in 2002 regarding the award of the TERC Contract, a protest that was not resolved until the end of 2003. Also in April, Foster Wheeler and subcontractor MAT Marine began removing partially sunken ships from the Former Herman Melville Shipyard in the area of proposed CDF C to allow access to the contaminated sediment beneath. This work was completed by the end of June 2002.

In August 2002, USEPA issued a second ESD that described further changes to the Harbor Cleanup Plan that would eliminate the use of CDF D as a disposal option and for the removed sediment to instead be sent to an offsite landfill for disposal. The remaining three CDFs may still be used but that decision is to be made at a later date. Reasons provided by USEPA for proposing the change include:

- The difficulty and cost of designing and building CDFs in the soft sediments common in the Upper Harbor;
- Elimination of possible project delays due to construction of the CDFs;
- Reduced environmental impacts to the harbor, now requiring that only two acres of tidelands be filled in for construction of a dewatering facility instead of the original 17 acres that

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were required for CDF D;

- A reduction in impact to local businesses and infrastructure;
- Better land use options following project completion; and
- The offsite disposal option is now estimated to be slightly less expensive than the CDF disposal option.

The 2002 ESD describes elements of the project design as follows:

- Sediment previously identified to contain greater than 50 ppm PCBs in situ will be dredged and sent to the Sawyer Street location for mechanical coarse material separation. The separated coarse fraction will be sampled, and if less than 50 ppm PCBs, sent to an offsite non-TSCA landfill for disposal. Material greater than 50 ppm PCBs will require offsite disposal at a TSCA landfill. The removed water will be treated and released back to the harbor.
- Following coarse material separation, the finer grained, organic fraction will be piped approximately 5,000 feet via double-walled underwater pipes to a dewatering facility located at Hervey Tichon Avenue where it will be dewatered using filter presses. The dewatering facility is being constructed on two of the 17 acres originally proposed for CDF D. The sediment filter cake will be sent offsite to a TSCA landfill, or to CDFs A, B, or C if determined appropriate, for disposal. The removed water will be returned to the Sawyer Street facility for treatment.
- Sediment previously identified to contain less than 50 ppm PCBs in situ will be dredged separately and processed similar to the other sediment. If confirmatory samples indicate the filter cake contains less than 50 ppm PCBs, the material will be sent for offsite disposal at a non-TSCA landfill.
- The estimated cost for the removal project is \$317 million based on removal of 507,100 cy (\$625/cy).

During the period November 2002 into March 2003, USEPA completed an accelerated cleanup of 15,500 cy of contaminated sediment in a 6.5-acre area of the Acushnet River, in the Wood Street Bridge area at the northern tip of the Upper Harbor. PCB levels in these sediments were estimated to be as high as 46,000 ppm. Temporary dams were used to bypass river flow into the Upper Harbor target area and sediment was removed by dry excavation. Most of the removed sediment was temporarily disposed at the Sawyer Street facility where these sediments will reportedly be used to start-up and debug the full-scale mechanical dewatering plant at Harvey Tichon Avenue. About 2,600 tons of "vegetated" material not appropriate for dewatering were sent to Model City for disposal. Total cost for this 15,500 cy removal project to-date is \$5.96 million.

In August 2003, USEPA began dredging an estimated 4,500 cy of sediment from an area of the harbor in the vicinity of the Herman Melville Shipyard. This work was to allow relocation of a local marine transport company to this area of the harbor to allow sufficient room for construction of a dewatering facility at the company's original location. The removed sediment is being stored at USEPA's Sawyer Street facility for processing once full-scale dredging begins.

As of June 2004, the primary contractor and dredging contractor are onsite continuing construction activities necessary to dredge a now estimated 867,000 cy of sediment from the

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harbor. The construction activities include: (1) completion of the 55,000 ft² dewatering building; it will be ready in July to accept dewatering equipment; (2) the start of construction of an underwater pipe and pump system to transport dredge slurry between the desanding facility, located at USEPA's Sawyer Street facility, and the dewatering facility; (3) near complete construction of the desanding facility; and (4) the start of construction of a rail spur to be used for transporting removed sediment for final disposal. The rail spur may not be ready to use in 2004 because of needed bridge repairs that are the responsibility of the affected rail companies; the sediment will be trucked if the rail spur is not ready in time.

Dredging is anticipated to begin in September 2004. A dredging work plan is currently being prepared by the dredging contractor. It will likely propose using three horizontal auger dredges, two actively dredging and one on standby. Discharge lines from all three dredges will be connected to a booster pump system located on shore which will then feed the dredge slurry through two pipelines to the desanding facility. Silt curtains will be the primary method used to control turbidity; sheetpile may be used in mudflat areas. The dredge area has been divided into about 40 Dredge Management Units, about five acres each, to control dredging. Resuspension will be monitored during dredging through use of turbidity monitoring at several locations related to the position of the dredges and through water quality monitoring and toxicity testing.

Verification sampling procedures have yet to be finalized. USEPA is planning to regularly collect sediment "progress samples" to monitor the effectiveness of the dredge in removing the targeted sediment. However, "official verification samples" will likely not be collected until a significant area of the harbor has been dredged. This will result in a larger data set for statistical comparison to the target cleanup level of 10 ppm PCBs in the top six inches of sediment.

The total cost of the dredging project is now estimated at \$400 million (\$461/cy based on removing 867,000 cy). This compares to the estimated \$120 to \$130 million present worth cost presented in the 1998 ROD. Dredging is targeted to begin in September 2004.

Remedial Action Planned: ☒

Risk Assessment: ☒

Remedial Action Implemented: ☐

Status of Dredging ☐

PRPs: ☒

Contacts: ☒

References: ☒

Modeling: ☒

Fishing Advisory: ☒

Key Conditions: commercial landfill, confined disposal facility, dredging, floating oil, hydrodynamic modeling, pilot/demonstration test, post monitoring, rail transport for disposal, specialty dredge, tidal fluctuations, wetlands

REMEDIAL ACTION PLANNED

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Target Sediment Cleanup Standards (TSCS):	10 ppm PCBs (Upper Harbor) and 50 ppm PCBs (Lower Harbor)	
How TSCS Established:	Higher default levels based on technical infeasibility of achieving 1 ppm PCB levels judged protective of biota and necessary to achieve FDA fish levels; the target level judged protective of biota (1 ppm) was developed after application of six different generally-accepted methodologies; the target level for shoreline sediment, protective of human health based on contact and incidental ingestion (10 ppm PCBs) was calculated by a human health risk assessment.	
Target Bank and Floodplain Cleanup Levels (if applicable):	N/A	
Other Target:	<p>Metals. Will be remediated automatically by performing the PCB remediation since the contaminants tend to be co-located.</p> <p>Water Column: The main, non-bacterial contaminants of concern in surface waters are PCBs and copper. Annual average levels at the Coggeshall Street bridge, as measured in 1994 and 1995 during the hot spot dredging operations, exceed EPA chronic ambient water quality criteria (AWQCs) by factors of 10 and 2, respectively. The AWQC for PCBs is 0.03 ppb. According to EPA, the water column data reflect the movement of PCBs from the sediment into the water column. Higher water column concentrations are found in locations with higher underlying sediment concentrations. As described by Battelle (1991), EPA's conceptual model of PCB migration at the site involves migration of PCBs from the PCB-contaminated bottom sediments into the overlying water column as a result of a) desorption from fine-grained sediment particles and upward diffusion in sediment pore water, b) erosion and resuspension by boundary layer (sea floor) currents and c) sediment turbation or mixing by benthic organisms (assumed to occur in the top 4 cm).</p> <p>It's interesting to note that EPA estimates that the AWQC would be attained approximately 10 years after cleanup. This estimate was made in 1991 based on results from Battelle's fate and transport model and an assumed cleanup level of 50 ppm PCBs in the Upper Harbor (now 10 ppm target) (pages 24 and 36 of the ROD, and page A-85 of the Responsiveness Summary).</p>	
Environmental Sample Data References:	<ul style="list-style-type: none">• Sediment: Reference A-328• Water: Reference A-328• Fish: Reference A-328	
Estimated Target Volume:	450,000 cy	
Planned Disposal Method:	<p>Total acreage to be dredged is 170 - 190 acres. EPA is proposing dredging 433,000 cy from Upper Harbor to <10 ppm PCBs and 17,000 cy from Lower Harbor and Bay, combined, to <50 ppm. Dredged material will be deposited into four newly-constructed confined disposal facilities (CDF) and capped.</p> <p>Separately, the Commonwealth of Mass. has proposed a navigational dredging project of one million cubic yards in the Lower Harbor, with disposal in a newly-constructed CDF. This project is subject to bond funding. The intent is to integrate this project with the remedial dredging</p>	

REMEDIAL ACTION PLANNED

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("remedy enhancement") by using some of the navigational dredge spoils to "preload" (act as a preliminary cap on) the dredge spoils in the four new remedial dredging CDFs.

Other factors re CDFs:

There will be four CDFs, comprising 44 total acres, extended along a 1.3 mile stretch of the western shore. Three will be in the Upper Estuary, one in the Lower Harbor. Some specifics follow (from pages 29 and 38 of the ROD and pages A-64, A-70, and A-111 of the Responsiveness Summary).

- "The four CDFs have been located in areas with PCB-contaminated sediments to avoid the need to dredge the sediments underlying these CDFs (126,000 cy). These CDFs have also been located near industrial areas to avoid potential impacts of CDF construction and operation (e.g., truck traffic, noise, air quality) on residential areas."
- "The side walls of the CDFs will be lined with a synthetic impermeable material, but not the bottom of the CDFs, since a) the existing sediments in these areas are naturally very impermeable; b) the integrity of a man-made impermeable liner constructed in saturated conditions cannot be guaranteed; and c) the dredged sediments themselves will compact into a highly impermeable material (USACE, 1997). Computer modeling indicates that leakage rates of PCBs (and metals) from the CDFs will be insignificant, estimated to total 37 kg of PCBs over thirty years (USACE, 1997). This represents approximately 0.02% of the estimated 239,000 kg (527,000 lbs.) of PCBs removed from the Harbor as a result of this remedy." (It's interesting to note that EPA has estimated that 561,000 lbs. of copper, co-located with the PCBs, will also be removed).
- "Once the first CDF is complete, sediments will begin to be dredged and placed in it. EPA expects to perform the dredging from north to south, in order to minimize the potential for recontamination of dredged areas. The dredging process will continue as the other CDFs are sequentially brought on line."
- The reason for using CDFs: "With regard to potential upland disposal, the Commonwealth of Massachusetts has indicated that it would not permit construction of a new hazardous waste facility within any part of the state. Further, the possibility of disposal of the sediment in a TSCA-permitted secure chemical waste landfill was considered but eliminated during the initial screening of alternatives in the Feasibility Study. The extremely high costs of TSCA disposal was not justifiable given the only minimal increase in performance benefits that was expected compared to the cost of shoreline CDFs with similar performance merits." And, further, "TSCA regulates disposal of PCB contaminated sediments (i.e., PCB-remediated waste). TSCA allows for risk-based disposal of PCB-remediated waste if the Regional Administrator finds the disposal will not pose an unreasonable risk to health and the environment after a review of information concerning the Site contamination and cleanup plan. Based on the Administrative Record for this Site which contains the information required under TSCA, the Regional Administrator finds that disposal of the dredged sediments from New Bedford Harbor in confined disposal facilities does not pose an unreasonable risk to health or the environment. Issuance of this Record of Decision indicates approval."
- "EPA will specify the type of material for the CDF cap during the remedial design process. However, the conceptual design for the cap developed by the U.S. Army Corps of Engineers includes a preliminary cap layer (for use until the dredged sediments consolidate to a sufficiently

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firm foundation material), a 6 to 12 inch thick "bedding" layer to provide a relatively flat and smooth surface, a flexible membrane liner system, and a vegetated top soil layer. The specific cap design for each CDF may vary somewhat but the intent is to install an impermeable barrier that will shed precipitation, prevent infiltration, allow gas venting as appropriate and require minimal maintenance. The cap for each CDF will not be designed until that facility has been filled with dredged material and the actual physical constraints and layout are known. The final caps will not be in place until approximately 3 years after the CDFs have been filled with dredged material to allow sufficient time for the material to settle."

- Regarding ability of the CDFs to withstand flooding: "In terms of impacts from a 100 year flood, this should not be an issue as long as the hurricane barrier remains in operation and is consistently maintained by the Army Corps of Engineers. In the event of flooding upstream of the barrier (i.e., in the upper and lower Harbor) during instances when the barrier is closed, the CDFs will have a very insignificant impact on increased flood water levels due to their relatively small footprint (compared to the rest of the Harbor) and because of the relatively small flow rates of the Acushnet River (which flows into the Upper Harbor at the north end)."

"Even in the unlikely event that the hurricane barrier becomes inoperable and large scale flooding occurs which submerges the CDFs, the CDFs are expected to retain their overall structural integrity. Some minor repairs to vegetated surfaces and dike walls may well be required after such an event. but the PCBs and heavy metals would remain physically isolated from the environment. There will be many layers of protection built into the CDF caps, such that EPA believes there is no danger that the sediments would "float away" during a severe flood event. During normal operating conditions a portion of the sediments within a CDF remain saturated due to tidal conditions, so that a severe flood event should only increase this degree of saturation for a relatively short period of time."

Estimated Calendar Time to Implement Remedy: Ten years, including eight years for removal.

Estimated Time to Implement Remedy: Ten years

Estimated Cost to Implement Remedy: In the Proposed Plan of November 1996, the total present worth cost was presented as \$116 million. This present worth cost is calculated from 1996, assuming 8 years of dredging and 30 additional years for CDF O&M and long-term monitoring of the harbor. Subsequently, two additional costs were identified, namely:

- \$4.3 million for underwater power cable relocation (in the Upper Estuary) and
- roughly \$10 million for relocation of CSOs which would interfere with construction and operation of CDFs B and C.

As a result, the present worth cost was estimated at \$120 to \$130 million in the ROD (page 45).

It is worth noting that the \$116 million present worth cost is derived from a capital cost of \$141.7 million (not including O&M and long-term monitoring). Add to this the two additional costs (above) of \$14.3 million, and the total capital cost estimate is \$156 million, or \$347 per cubic yard.

The capital cost of the dredging-only is estimated at \$28.6 million, or \$60 per cubic yard (which includes \$22.3 million direct costs, plus 20% for health and safety and turnkey fee).

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Stated Remedial Action Objectives (and Source):

None of the above costs include the costs for purchasing the land for the CDFs. Also, no costs are explicitly included for wetlands restoration. EPA contends that "costs for wetlands restoration are believed to be within the general magnitude of the long term monitoring cost estimate and overall contingency factor." (page A-57 of the Responsiveness Summary)

From the ROD Abstract: "The overall goals of the remedy are to a) reduce health risks due to consumption of PCB-contaminated local seafood, b) reduce health risks due to contact with PCB-contaminated shoreline sediments and c) improve the quality of the Harbor's highly degraded marine ecosystem." On page 15 of the ROD, remedial action objectives are summarized in somewhat more detail as follows:

- "To reduce risks to human health by reducing PCB concentrations in seafood, by lowering PCB concentrations in sediment and in the water column;
- To ensure that contact with shoreline sediments does not present excessive risks to human health as a result of dermal contact with or accidental ingestion of PCB-contaminated sediment in areas prone to beach combing or in areas where residences abut the Harbor, and
- To improve the quality of the seriously degraded marine ecosystem by
 - reducing marine organisms' exposure to PCB contaminated sediment while minimizing consequent harm to the environment, and
 - reducing surface water PCB concentrations to comply with chronic AWQC by reducing PCB sediment concentrations."

Objectives are implied in two sections of the Proposed Plan (Reference A-330), quoted below:

"The EPA's studies of New Bedford Harbor conclude that the highly PCB-contaminated sediment poses significant risks to both human health and the marine ecosystem. Some type of cleanup action is therefore required to prevent the continued endangerment of people and marine organisms. More specifically: High PCB levels in fish and shellfish in the Harbor and surrounding Buzzard's Bay area present unacceptable risks to human health via ingestion of PCB-contaminated seafood. . ."

"The ecological health of the Harbor continues to be severely damaged by the presence of PCBs in both the sediments and water column. Current levels of PCBs in the water are 10 to 100 times higher than EPA's chronic water quality standard for protection of marine life. Likewise, the current maximum levels of PCBs in sediment are at least 1,000 times higher than levels that are considered ecologically protective. . ."

"Repeated physical contact with PCB-contaminated shoreline sediments, especially those sediments north of the Coggeshall Street bridge, presents carcinogenic risks to human health."

"By removing or isolating the contaminated sediments from the Harbor, in time, the high levels of PCBs in the water column and in seafood will decrease to safe levels"

". . . Thus removal or isolation of the contaminated sediments addresses all of the principal threats listed above.

"Although the FDA tolerance level may not be achieved at the ten year mark for all biota in all

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Measures of Success to be Used:	<p>portions of the Site with a 10 ppm and /or a 50 ppm TCL, water quality will significantly improve and a corresponding reduction in the PCB biota levels is expected."</p> <p>Four ways:</p> <ul style="list-style-type: none">• Verification sediment samples after dredging (ROD, page 35);• Continuation of the long-term ecological monitoring program begun in 1993 and repeated in 1995 after hot spot dredging. The third round will take place just prior to construction of the first CDF. Subsequent rounds will be at 3 - 5 year intervals for 30 years once dredging is complete (ROD, pages 14 and 32);• Initiation of a long-term local seafood sampling program to track PCB and metal levels in seafood (ROD, page 32); and• Periodic water quality monitoring in the harbor, apparently initiated following completion of dredging (ROD, page 32).	
Planned Monitoring and Restoration:	Biennial 30-year long-term monitoring program (Reference A-207).	
Agency Position on Sediment Removal (and Source):	<p>Proposed Plan OU-1, October 1996 (Reference A-330):</p> <p>"To achieve the FDA tolerance level in biota in all portions of the Site, remediation to a 1 ppm TCL in all areas of the Site would likely be required. EPA has determined that a 1 ppm TCL would result in greater risk to human health and the environment due to the radical alterations of the Harbor environment that would be required as compared to other alternatives employing TCLs of 10 ppm and /or 50 ppm (the protectiveness waiver)."</p> <p>"While a 1 ppm TCL would be more protective for aquatic organisms than a higher TCL and should lead to achievement of the FDA level more quickly than alternatives with a higher TCL, a staggering 1,000 acres and/or 2.1 million cy of sediments must be dredged or capped to meet this 1 ppm TCL, including at least 47 acres of wetland areas and salt marsh. Either a capping or dredging/CDF approach for such an undertaking would have very damaging side effects. Destruction of the saltmarsh areas in particular would profoundly affect the Harbor ecosystem since it is an area of tremendous productivity and ecological importance. Furthermore, a post-dredging restoration program would not reestablish the affected saltmarshes or its associated wildlife for many years during which the ecosystem will be dramatically affected."</p> <p>"It is also important to note that the FDA tolerance level for fish tissue of 2 ppm PCBs isn't completely protective for area residents. The FDA level is based on national patterns of seafood consumption; whereas the Site specific fish tissue criteria of 0.02 ppm is based on local consumption rates which are more frequent than the national average. Therefore, even if a 1 ppm TCL were to result in fish tissue concentrations falling to the FDA tolerance level and the fishing ban in the Harbor were to be lifted, area residents would still be warned to limit their local seafood intake to acceptable levels until tissue levels reach 0.02 ppm."</p> <p>Further detailed discussion is provided as follows:</p> <p>(1) More-Harm-Than-Good (on page 16 of the ROD):</p> <p>"Although the ecological risk assessment pointed to a 1 ppm sediment PCB threshold for protection of marine organisms, achieving this TCL was believed to cause more harm than good</p>	

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due to the radical alterations to the harbor and adverse environmental impacts that would result given the widespread nature of the PCB contamination. Remediation to this 1 ppm would entail the removal or capping of huge amounts of contaminated sediment (approximately 1,000 acres and 2.1 million cubic yards of sediment). Of particular concern was the destruction of valuable saltmarsh habitat that would result. Thus sediment TCLs of 10, 50 and 500 ppm PCBs (as well as a no-action alternative) were used to establish more realistic and less damaging categories of cleanup alternatives."

And on page A-82 of the Responsiveness Summary:

"In order to avoid misinterpretations of the term, the "technically impracticable" waiver was not invoked in the reissued Proposed Plan. Rather, the Plan uses the "more harm than good" waiver (40 CFR 300.430(f)(1)(ii)(C)(2)) for not choosing a Site-wide 1 ppm TCL, based on the radical alterations of the Harbor environment and adverse environmental effects which would result from a Site-wide 1 ppm cleanup level. Briefly, approximately 1,000 acres and/or 2.1 million cy of sediments must be dredged or capped to meet a 1 ppm cleanup level, including at least 47 acres of wetland areas and salt marsh. This would result in very damaging side effects and would, it is believed, have profound negative effects on the Harbor ecosystem."

(2) Why Capping was Rejected (on page 25 of the ROD):

"Comparing this alternative to the balancing criteria, several factors make capping less favorable than the selected remedy. First, the volume of contaminated sediment could increase if the clean cap material were to mix with the underlying contaminated sediment, although a synthetic geotextile would be applied between these two layers to minimize this commingling. Second, given the relatively shallow and urban nature of the Harbor (and thus the likelihood of cap disturbance), the difficulty in monitoring and repairing such a large underwater cap over time, and the fact that highly contaminated sediment would remain in place, this alternative is believed to be less permanent and protective in the long term compared to the selected remedy. Environmental impacts would be significant as well, since approximately 97 acres of new intertidal areas would be formed from former sub-tidal areas in the upper harbor as a result of cap placement (Ebasco, 1990c). By way of comparison, the selected remedy would convert approximately 44 acres of subtidal, intertidal and upland areas for use as CDFs."

Also, on page 24 of the ROD: ". . . the 1990 FS idealized the complexities and costs associated with the many CSOs and storm drains in the areas to be capped (e.g., it assumes that all such outflows would be removed or plugged at no cost to the Superfund program). The true cost of this alternative could thus be tens if not hundreds of million dollars extra to deal with these CSOs and storm drains, if the outflow issues associated with this alternative could actually be solved at all given the elevation changes associated with capping."

Also, on page A-165 of the Responsiveness Summary: ". . . the hydrographic surveys performed by the Corps demonstrate that at low tide almost the entire northern-most one-third to one-half of the Upper Harbor (Estuary) would be out of water with a 2 to 3 foot cap in place.

(3) Dredging:

- Dredging will be accomplished by two cutterhead dredges operating simultaneously for an average of 8 hours per day, 6 days per week, nine months per year for 8 years. Although only the use of a cutterhead-type dredge and an eight year project are specifically stated in the ROD, the

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number of dredges and the probable operational schedule can be inferred from two other pieces of information presented in the Responsiveness Summary (pages A-55 and A-162). Specifically, on page A-55, EPA notes the need to treat 2 million gallons of water per day (1400 gpm). Two cutterhead dredges will pump at about 1500 - 2000 gpm each, say 2000 gpm. Two dredges at 2000 gpm each for 8 hours per day equals 1.9 million gallons per day. On page A-162, EPA notes that assumed dredging rates are 13.4 cy/hr for most of the Upper Harbor and 20 cy/hr elsewhere. Assuming an average of 17 cy/hr and removal of 450,000 cy yields 26,471 dredging hours (3309 dredging days at 8 hours per; 14.1 dredging years at 9 months per year, 6 days per week). Therefore, again this points to two dredges operating simultaneously in order to finish in 8 years.

- EPA also states on page 30: "Contaminated sediment in deeper water and in saltmarshes may have to be removed by other methods (e.g., by clamshell bucket or land-based excavation) and transported separately to the CDFs." Note: It is not apparent why this would be the case "in deeper water" and no explanation is included.
- The dredged areas will not be restored with fill (page A-57).
- In response to a comment about the need for precision in remedial dredging, EPA responds, on page A-157, "In the case of the upper Harbor remedial dredging, precision will not be the same type of problem as it is with typical navigational dredging since almost the entire area will be dredged. EPA believes that a key objective will be to avoid the need to dredge any area more than once, as well as to keep air and water quality impacts to acceptable levels." (Note: This seems to be a valid response. Once a "bank-to-bank" removal approach as opposed to the "hot spot" removal approach or "navigational channel" approach is selected, precision is less of a constraint.)
- On pages A-157 through A-161 of the Responsiveness Summary, EPA responds to questions on approach for resuspension control and minimizing environmental effects of dredging.

(4) Water Treatment:

For the hot spot dredging, a 350 gpm water treatment plant was constructed and operated. This treatment plant will be used for the OU-1 remedy. Additionally, three new similarly-sized plants are also planned to be constructed and operated (ROD, page 30), in order to provide the required 1,400 gpm capacity.

RISK ASSESSMENT

Project Name ***NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)*** ***ProjectID:*** 01-08

Last Updated: 10/21/98

RA Type: Human Health and Ecological

RA Status: Complete

RA Objectives:

Company Ebasco

Performing RA:

RA Reference Report:

RA Summary and A brief summary follows:

Conclusions:

- EPA's ambient water quality criteria (AWQC) of 0.03 ppb PCBs, based on chronic impacts to marine organisms, is a target cleanup level;
- Target cleanup levels (TCLs) for sediment, protective of biota, were developed after application of six different generally-accepted methodologies. Resultant PCB concentrations in sediment considered protective ranged from 0.01 to 1 ppm.
- EPA judged that 1 ppm in sediments and a resultant 0.03 ppb water column level were technically infeasible to attain, based on volume of sediment and cost, and lack of available space for CDFs and treatment systems. Therefore, specific remedial action objectives for surface water and biota were not developed. EPA noted that reducing PCB concentrations in sediment will result in concurrent reduction in surface water and biota;
- The TCL for shoreline sediment, to be protective of human health based on contact and incidental ingestion, was initially calculated at 10 ppm PCBs, and ultimately raised to 50 ppm in 1992, then back to 10 ppm in 1996 (both levels fall within EPA's target risk range of 10⁻⁴ to 10⁻⁶); and
- The model predicts the AWQC of 0.03 ppb PCBs will be met in 10 years, with a 50 ppm sediment cleanup level.

Further:

(1) Human Health Risk:

The exposure pathways found to be of most concern were: 1) ingestion of contaminated seafood; 2) direct contact with contaminated shoreline sediments; and 3) (for children ages 1-5) incidental ingestion of contaminated shoreline sediment.

The risks from consumption of local seafood are in the 10⁻³ range for total lifetime cancer risk and exhibited a 1.0 to 25 HI for non-cancer risk. Using local patterns of seafood consumption, EPA calculated a human health-based seafood criteria of 0.02 ppm PCBs (as opposed to the FDA tolerance level of 2 ppm). The risk calculated from dermal contact and incidental ingestion of sediment is 3.5 x 10⁻⁴ in the Upper Estuary and Lower Harbor area.

(2) Eco Risk:

On pages 14 and 15 of the ROD: "The 1990 baseline ecological risk assessment performed by Ebasco evaluated risk to aquatic biota using a joint probability analysis in which two probability distributions - - one representing PCB, cadmium, copper, and lead levels in various areas of the harbor and the second

RISK ASSESSMENT

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representing the ecotoxicity of these contaminants to marine biota - - were combined to provide a comprehensive, probabilistic evaluation of risk. This joint probability analysis was supplemented by comparison of PCB levels in the harbor water column to AWQC, evaluation of site-specific toxicity tests, and examination of the benthic community structure in the harbor. The 1990 ecological risk assessment found that these various approaches, both together and independently, supported the conclusion that aquatic organisms are at significant risk due to exposure to PCBs in New Bedford Harbor."

"The 1990 ecological risk assessment also found that PCB concentrations in sediment and sediment pore water in many areas of the harbor were highly toxic to at least some members of all major taxonomic groups. In the upper harbor, the probability of pore water PCBs being toxic to marine fish, the most sensitive taxonomic group investigated, was found to approach certainty."

"The 1990 feasibility study reviewed four other general approaches to evaluating ecological risk - equilibrium partitioning, apparent effects thresholds, screening level concentrations, and sediment quality triads. For this Site, the feasibility study found that these four approaches pointed to a 0.1 to 1.0 ppm range of sediment PCB levels that could be considered protective of marine resources. Comparison with existing sediment PCB levels showed large areas of the harbor above the upper bound of this estimate, with almost all of the upper harbor at least ten times higher than the 1 ppm threshold. Although the feasibility study recognized substantial uncertainty inherent in the fact that the ecologically protective PCB level was expressed as an order of magnitude range (0.1 to 1.0 ppm), the magnitude and extent to which the upper threshold of this range was exceeded was found to support the 1990 baseline risk assessment's conclusions."

POTENTIALLY RESPONSIBLE PARTIES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

PRP Name: PRP INFORMATION NOT RELEASED

PRPID:

Street Address:

City:

State:

KEY CONTACTS

Project Name **NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)**

ProjectID: 01-08

Last Name: KEY CONTACT INFORMATION NOT RELEASED

Contact ID:

First Name:

Title:

Company:

Address:

City:

State:

Postal Code:

Work Phone # :

Other Phone #:

Fax # :

Email Address:

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: A

ReferenceID: 188

Title: *Comments of AVX Corporation on The Proposed Cleanup Plan for the Upper and Lower New Bedford Harbor Released to the Public for Comment on October 30, 1996*

Location: AEM

Category: Site Update

Prepared by/Author: (1) Nutter, McClennen & Fish, LLP, (2) SEA Spaulding Environmental Associates, Inc, (3) W. Frank Bohlen, (4) Dames & Moore, Inc., (5) TERRA, Inc., (6) Danny D. Reible and Louis J. Thibodeaux, (7) Applied Environmental Management, Inc.

Preparer/Author Address: (1) One International Place
Boston, MA 02110
(2) 1674 B Ministerial Road
Wakefield, RI 02879
(3) Department of Marine Sciences
The University of Connecticut
Groton, CT 06340
(4) 5 Industrial Way
Salem, NH 03079
(5) 1203 Governors Square Boulevard
Tallahassee, FL 32301
(6) Hazardous Substance Research Center
Louisiana State University
Baton Rouge, LA 70803
(7) 16 Chester County Commons
Malvern, PA 19355

Prepared For: US EPA Region I

Date Published: February 3, 1997

Key Words and Phrases:

Reference Type: A

ReferenceID: 296

Title: *National Remedy Review Board Recommendations on the New Bedford Harbor Superfund Site*

Location: AEM

Category: Remedial Action Plan/Work Plan

Prepared by/Author: Bruce Means, Chair, National Remedy Board

Preparer/Author Address: US EPA HQ
Washington, DC 20460

Prepared For: US EPA Region I
Office of Site Remediation and Restoration

Date Published: September 11, 1996

Key Words and Phrases:

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: A

ReferenceID: 312

Title: *Public Health Assessment for New Bedford Site*

Location: AEM

Category: Site Update

Prepared by/Author: U.S. Department of Health & Human Services (Massachusetts Department of Public Health, with ATSDR)

**Preparer/Author
Address:**

Prepared For: US EPA Region I and State of Mass.

Date Published: April 21, 1995

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 313

Title: *New Bedford Harbor Superfund Project, Acushnet River Estuary Engineering Feasibility Study of Dredging and Dredged Material Disposal Alternatives: Report 11 of 11 (Evaluation Conceptual Dredging and Disposal Alternatives)*

Location: AEM

Category: Site Update

Prepared by/Author: Daniel E. Averett, Michael R. Palermo, Mark J. Otis and Pamela B. Rubinoff

**Preparer/Author
Address:** U.S. Army Corps of Engineers

Prepared For: US EPA Region I

Date Published: July 1989

**Key Words and
Phrases:**

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: A

ReferenceID: 314

Title: *Section 5.0 - Biodegradation of PCBs from EPA Responsiveness for Hot Spot Operable Unit*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA HQ

**Preparer/Author
Address:**

Prepared For:

Date Published: 1990

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 315

Title: *New Bedford Harbor Superfund Project, Acushnet River Estuary Engineering Feasibility Study of Dredging and Dredged Material Disposal Alternatives: Report 7 of 11 (Settling and Chemical Clarification Tests)*

Location: AEM

Category: Site Update

Prepared by/Author: Roy Wade

**Preparer/Author
Address:** U.S. Army Corps of Engineers

Prepared For: US EPA Region I

Date Published: November 1988

**Key Words and
Phrases:**

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: A

ReferenceID: 316

Title: *Framework for Real-Time Decision-Making, New Bedford Harbor Pilot Dredging Study*

Location: AEM

Category: Site Update

Prepared by/Author: William G. Nelson

Preparer/Author Address: US EPA ERL-Narragansett
Environmental Research Lab.
Narragansett, RI

Prepared For: EPA/600/8-89/084 (NTIS PB90-150822)

Date Published: November 1989

Key Words and Phrases:

Reference Type: A

ReferenceID: 317

Title: *New Bedford Harbor Superfund Project, Acushnet River Estuary Engineering Feasibility Study of Dredging and Dredged Material Disposal Alternatives: Executive Summary -- Report 12*

Location: AEM

Category: Site Update

Prepared by/Author: Daniel E. Averett and Mark J. Otis

Preparer/Author Address: U.S. Army Corps of Engineers

Prepared For: US EPA Region I

Date Published: January 1990

Key Words and Phrases:

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: A

ReferenceID: 318

Title: *Theoretical Evaluation of the Effectiveness of Capping PCB Contaminated New Bedford Harbor Bed Sediment (PB91-225656).*

Location: AEM

Category: Site Update

Prepared by/Author: (1) Louis J. Thibodeaux and Danny D. Reible and (2) Weldon S. Bosworth and Leonard C. Sarapas

Preparer/Author Address: (1) Louisiana State University
(2) Balsam Environmental Consultants

Prepared For: AVX Corporation (through Nutter, McClennen & Fish, Boston, MA)

Date Published: November 14, 1990

Key Words and Phrases:

Reference Type: A

ReferenceID: 319

Title: *PCB Pollution in the New Bedford, Massachusetts Area - A Status Report*

Location: AEM

Category: Site Update

Prepared by/Author: Grant Weaver

Preparer/Author Address: Massachusetts Coastal Zone Management

Prepared For: State of Massachusetts

Date Published: June 1982

Key Words and Phrases:

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: A

ReferenceID: 320

Title: *Feasibility Study of Remedial Alternatives for the Estuary and Lower Harbor/Bay (Draft Final)*

Location: AEM

Category: Site Update

Prepared by/Author: Hans-Peter Krahn

Preparer/Author Address: E.C. Jordan Co.

Prepared For: EPA/Work Assignment No. 04-1L43/Contract No. 68-01-7250/Ebasco Services.

Date Published: August 1990

Key Words and Phrases:

Reference Type: A

ReferenceID: 321

Title: *EPA Proposes Cleanup Plan to Address Contamination in the Estuary and Lower Harbor/Bay at the New Bedford Harbor Site*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

Preparer/Author Address:

Prepared For:

Date Published: January 1992

Key Words and Phrases:

Reference Type: A

ReferenceID: 322

Title: *EPA Proposes Expanded Cleanup to Address Contamination in Parts of Upper Buzzards Bay, New Bedford Harbor Superfund Site. (Amended Proposed Plan)*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

Preparer/Author Address:

Prepared For:

Date Published: May 1992

Key Words and Phrases:

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: A

ReferenceID: 323

Title: *New Bedford Harbor Superfund Project, Acushnet River Estuary Engineering Feasibility Study of Dredging and Dredged Material Disposal Alternatives: Report 8 (Compatibility of Liner Systems with Dredged Materials)*

Location: AEM

Category: Site Update

Prepared by/Author: Richard A. Shafer

Preparer/Author Address: U.S. Army Corps of Engineers

Prepared For: US EPA Region I

Date Published: October 1988

Key Words and Phrases:

Reference Type: A

ReferenceID: 324

Title: *Examination of Dechlorination Processes and Pathways in New Bedford Harbor Sediments EPA/600/J-94/001 (NTIS PB94-140795)*

Location: AEM

Category: Site Update

Prepared by/Author: James L. Lake, Richard J. Pruell and Frank A. Osterman

Preparer/Author Address: US EPA ERL-Narragansett
Environmental Research Lab
Narragansett, RI

Prepared For: US EPA Region I

Date Published: 1992

Key Words and Phrases:

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: A

ReferenceID: 325

Title: *Evaluation of New Bedford Harbor Superfund Pilot Study*

Location: AEM

Category: Site Update

Prepared by/Author: John B. Herbich, Ph.D

**Preparer/Author
Address:** Consulting and Research Services, Inc.

Prepared For: GE: Report No. JBH-92-25

Date Published: July 15, 1992

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 327

Title: *Building a Confined Disposal Facility (CDF)*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: Community Forum Poster Session

Date Published: November 29, 1995

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 328

Title: *New Bedford Harbor Long-Term Monitoring Assessment Report:
Baseline Sampling*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA NHEERL-Narragansett

**Preparer/Author
Address:** National Health and Environmental Effects Research Laboratory
Atlantic Ecology Division
Narragansett, RI

Prepared For: US EPA 600/R-96/097

Date Published: October 1996

**Key Words and
Phrases:**

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: A

ReferenceID: 330

Title: *EPA Proposes Cleanup Plan for Upper and Lower New Bedford Harbor*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

Preparer/Author Address: New England Region
JFK Federal Building,
Boston, MA

Prepared For: General Public

Date Published: October 30, 1996

Key Words and Phrases:

Reference Type: A

ReferenceID: 359

Title: *Letter - Announcement - Issue of the Second Phase Cleanup Plan for the New Bedford Harbor Superfund Site*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

Preparer/Author Address: John F. Kennedy Federal Building
Boston, MA 02203-0001

Prepared For: General Public

Date Published: October 5, 1998

Key Words and Phrases:

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: A

ReferenceID: 363

Title: *Record of Decision: New Bedford Harbor Superfund Site, New Bedford, Massachusetts - Upper and Lower Harbor Operable Unit*

Location: AEM

Category: ROD/Proposed Plan/Action Memo/Decision Document

Prepared by/Author: US EPA Region I

Preparer/Author Address: Boston, MA

Prepared For: General Public

Date Published: September 1998

Key Words and Phrases:

Reference Type: A

ReferenceID: 445

Title: *New Bedford Harbor Superfund Site Update*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

Preparer/Author Address:

Prepared For: General Public

Date Published: August 23, 1999

Key Words and Phrases:

Reference Type: A

ReferenceID: 659

Title: *New Bedford Harbor Long Term Monitoring Survey III: Summary Report - Final*

Location: AEM

Category: Site Update

Prepared by/Author: ENSR International

Preparer/Author Address:

Prepared For: U.S. Army Corps of Engineers, New England District

Date Published: March 2001

Key Words and Phrases:

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: A

ReferenceID: 762

Title: *Final Pre-Design Field Test Dredge Technology Evaluation Report*

Location: AEM

Category: Dredging: Equipment

Prepared by/Author: J. Lally

Preparer/Author Foster Wheeler Environmental Corporation

Address: 133 Federal Street
Boston, MA 02110

Prepared For: US Army Corps of Engineers, New England District, Concord, MA

Date Published: August 2001

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 1048

Title: *Explanation of Significant Differences for the Upper and Lower
Harbor Operable Unit*

Location: AEM

Category: ROD/Proposed Plan/Action Memo/Decision Document

Prepared by/Author: US EPA Region I

Preparer/Author

Address:

Prepared For: General Public

Date Published: August 2002

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 1049

Title: *Explanation of Significant Differences for the Upper and Lower
Harbor Operable Unit*

Location: AEM

Category: ROD/Proposed Plan/Action Memo/Decision Document

Prepared by/Author: US EPA Region I

Preparer/Author

Address:

Prepared For: General Public

Date Published: September 2001

**Key Words and
Phrases:**

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: B

ReferenceID: 212

Title: *Environmental Protection Agency Addendum Proposed Plan*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For:

Date Published: May 1992

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 214

Title: *Letter re: Proposed Phase II Cleanup Plan for Upper and Lower
New Bedford Harbor (November 1996)*

Location: AEM

Category: Response Comments

Prepared by/Author: Sidley & Austin

**Preparer/Author
Address:** Washington, DC

Prepared For: US EPA Region I

Date Published: February 3, 1997

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 291

Title: *Summary of Meeting Held June 13, 1995 on the New Bedford
Harbor Superfund Site*

Location: AEM

Category: Site Update

Prepared by/Author: Community Forum

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: 1995

**Key Words and
Phrases:**

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: B

ReferenceID: 292

Title: *The New Bedford Community Forum Invites New Members to Join*

Location: AEM

Category: Site Update

Prepared by/Author: The Commonwealth of Massachusetts

Preparer/Author Address: Office of Dispute Resolution
100 Cambridge Street, Room 1406
Boston, MA 12202

Prepared For: Press Release

Date Published: April 13, 1995

Key Words and Phrases:

Reference Type: B

ReferenceID: 293

Title: *Summary of Meeting Held July 12, 1994 on the New Bedford Harbor Superfund Site*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author Address:

Prepared For: General Public

Date Published: July 26, 1994

Key Words and Phrases:

Reference Type: B

ReferenceID: 294

Title: *EPA Proposes Cleanup for Second Portion of New Bedford Harbor Superfund Site*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

Preparer/Author Address:

Prepared For: EPA Environmental News

Date Published: January 17, 1992

Key Words and Phrases:

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type:

B

ReferenceID: 295

Title:

New Bedford Harbor Site Risks (one page)

Location:

AEM

Category:

Site Update

Prepared by/Author:

legal counsel

Preparer/Author

Address:

Prepared For:

Distribution

Date Published:

1992

**Key Words and
Phrases:**

Reference Type:

B

ReferenceID: 297

Title:

*Technical Limitations / Environmental Issues Associated with
Sediment Removal (New Bedford Harbor; Sheboygan River)*

Location:

AEM

Category:

Dredging: Contaminated

Prepared by/Author:

Blasland, Bouck & Lee, Inc

Preparer/Author

Address:

6723 Towpath Road
P.O. Box 66
Syracuse, NY 13214

Prepared For:

Date Published:

June 28, 1995

**Key Words and
Phrases:**

Reference Type:

B

ReferenceID: 339

Title:

*EPA Issues Cleanup Decision for Upper and Lower New Bedford
Harbor*

Location:

AEM

Category:

Site Update

Prepared by/Author:

US EPA Region I

Preparer/Author

Address:

Boston, MA

Prepared For:

General Public

Date Published:

October 1, 1998

**Key Words and
Phrases:**

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: B

ReferenceID: 544

Title: *Relocating Submerged NSTAR Power Cables Clears Way for Dredging Contaminated Sediments in New Bedford Harbor*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

Preparer/Author Address:

Prepared For: General Public

Date Published: March 20, 2001

Key Words and Phrases:

Reference Type: B

ReferenceID: 560

Title: *Changes Proposed to Harbor Cleanup Plan*

Location: AEM

Category: Contaminated Sediments: Disposal Methods

Prepared by/Author: US EPA Region I

Preparer/Author Address:

Prepared For: Harbor Cleanup News

Date Published: February 2002

Key Words and Phrases:

Reference Type: B

ReferenceID: 562

Title: *EPA Fine Tunes the Harbor Cleanup Plan*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

Preparer/Author Address:

Prepared For: General Public

Date Published: October 12, 2001

Key Words and Phrases:

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: B

ReferenceID: 670

Title: *Dewatering Facts*

Location: AEM

Category: Contaminated Sediments: Disposal Methods

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: Distribution

Date Published: February 2002

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 742

Title: *Update Report for Massachusetts*

Location: AEM

Category: Site Update

Prepared by/Author: USACE - New England District

**Preparer/Author
Address:** 696 Virginia Road
Concord, MA 01742-2751

Prepared For: General Public

Date Published: July 31, 2002

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 919

Title: *Current Site Status*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: 2003

**Key Words and
Phrases:**

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: B

ReferenceID: 920

Title: *Harbor Cleanup News - - Early Cleanup Work Begins*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: October 2002

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 921

Title: *Harbor Cleanup News - - Early Cleanup Work Continues*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: February 2003

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 948

Title: *e-mail re: New Bedford Harbor Update: Telephone Conversation
with Jim Brown*

Location: AEM

Category: Site Update

Prepared by/Author: AEM, Inc.

**Preparer/Author
Address:**

Prepared For: Internal file

Date Published: May 12, 2000

**Key Words and
Phrases:**

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: B
Title: *Early Cleanup Work Begins*
Location: AEM
Category: Site Update
Prepared by/Author: US EPA Region I
Preparer/Author Address:
Prepared For: General Public
Date Published: October 2002
Key Words and Phrases:

ReferenceID: 1022

Reference Type: B
Title: *e-mail re: New Bedford Harbor*
Location: AEM
Category: Site Update
Prepared by/Author: AEM, Inc.
Preparer/Author Address:
Prepared For: General Electric
Date Published: April 25, 2003
Key Words and Phrases: pre-dredging projects

ReferenceID: 1037

Reference Type: B
Title: *Fact Sheet: New Bedford Site*
Location: AEM
Category: Site Update
Prepared by/Author: USEPA Region I
Preparer/Author Address:
Prepared For: General Public
Date Published: November 26, 2003
Key Words and Phrases:

ReferenceID: 1038

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: B

ReferenceID: 1039

Title: *e-mail re: New Bedford Harbor*

Location: AEM

Category: Site Update

Prepared by/Author: USEPA Region I

**Preparer/Author
Address:**

Prepared For: Severson Environmental Services

Date Published: January 20, 2004

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 1040

Title: *e-mail re: Aushnet River Sediment Removal*

Location: AEM

Category: Site Update

Prepared by/Author: Dave Dickerson

**Preparer/Author
Address:** US EPA Region I

Prepared For: AEM, Inc.

Date Published: January 13, 2004

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 1049

Title: *EPA to Begin Dredging Portion of New Bedford Harbor - Work
Will Allow Construction of Cleanup Facility*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: August 21, 2003

**Key Words and
Phrases:**

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: B

ReferenceID: 1050

Title: *Ground Broken for New Bedford Harbor PCB Cleanup Facility*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: August 26, 2003

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 1053

Title: *U.S.E.P.A. Waste Site Cleanup & Reuse in New England - New Bedford Site*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: May 25, 2004

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 1090

Title: *EPA Begins Construction of Pipeline Assembly and Desanding Building for New Bedford Harbor Cleanup*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: June 30, 2004

**Key Words and
Phrases:**

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: C

ReferenceID: 210

Title: *New Bedford sediment dredge plan near*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Superfund Week

Date Published: October 25, 1996

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 211

Title: *New Bedford gets \$116M sediment proposal*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Superfund Week

Date Published: December 13, 1996

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 245

Title: *EPA mulls New Bedford ROD*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Superfund Week

Date Published: May 22, 1998

**Key Words and
Phrases:**

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: C

ReferenceID: 303

Title: *GAO: NRD claims might be limited*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Superfund Week

Date Published: May 31, 1996

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 304

Title: *New Bedford PCB case settled*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Superfund Week

Date Published: September 11, 1992

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 305

Title: *Parties settle without knowing damages*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Superfund Week

Date Published: July 31, 1992

**Key Words and
Phrases:**

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: C

ReferenceID: 307

Title: *Application of a Mixed-Method Analytical Scheme for Analysis of PCB in Water and Sediment Samples from a Polluted Estuary*

Location: AEM

Category: Site Update

Prepared by/Author: (1) Richard McGrath, (2) William Steinhauer, and (3) Siegfried Stockinger

Preparer/Author Address: (1 and 2) Battelle (MA) and
(3) Ebasco Services, Inc. (MA)

Prepared For: Waterways and Wetlands Reclamation

Date Published: 1980s late

Key Words and Phrases:

Reference Type: C

ReferenceID: 308

Title: *Harbor PCB fix accelerates*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author Address:

Prepared For: Engineering News-Record (ENR)

Date Published: September 14, 1992

Key Words and Phrases:

Reference Type: C

ReferenceID: 325

Title: *Harbor Cleanup Awarded in Mass.*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author Address:

Prepared For: Engineering News-Record (ENR)

Date Published: October 12, 1998

Key Words and Phrases:

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: C

ReferenceID: 329

Title: *New Bedford Harbor Gets \$120 Million Dredging ROD, Among Largest in U.S.*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: Superfund Week

Date Published: October 16, 1998

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 450

Title: *PCB-laden sediment cleanup plans set for Mass. sites*

Location: AEM

Category: Site Update

Prepared by/Author:

**Preparer/Author
Address:**

Prepared For: Environmental Science & Technology, 1998, Vol. 32, No. 23, pp 536 A

Date Published: December 1, 1998

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 546

Title: *Following Removal, \$120M Cleanup Subcontracted Soon at New Bedford*

Location: AEM

Category: Site Update

Prepared by/Author:

**Preparer/Author
Address:**

Prepared For: Superfund Week

Date Published: October 29, 1999

**Key Words and
Phrases:**

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: C

ReferenceID: 650

Title: *Contractors Wade into PCB Removal From Beach at New Bedford Harbor*

Location: AEM

Category: Site Update

Prepared by/Author:

**Preparer/Author
Address:**

Prepared For: Hazardous Waste/Superfund Week

Date Published: February 19, 2001

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 656

Title: *Corps Breaks New Ground with TERC for MMR, New Bedford Superfund Sites*

Location: AEM

Category: Site Update

Prepared by/Author:

**Preparer/Author
Address:**

Prepared For: Hazardous Waste/Superfund Week

Date Published: February 26, 2001

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 720

Title: *Four Major Contracts to Cover Work at NPL, FUSRAP Sites*

Location: AEM

Category: Site Update

Prepared by/Author:

**Preparer/Author
Address:**

Prepared For: Hazardous Waste/Superfund Week

Date Published: June 25, 2001

**Key Words and
Phrases:**

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: C

ReferenceID: 761

Title: *Mass.: New Cleanup Plan Expected*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Hazardous Waste/Superfund Week

Date Published: October 29, 2001

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 764

Title: *New Bedford to Open Escrow to Finance Superfund Cleanup*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Hazardous Waste/Superfund Week

Date Published: August 27, 2001

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 827

Title: *Mass.: Remedy Changes Proposed*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Hazardous Waste/Superfund Week

Date Published: March 4, 2002

**Key Words and
Phrases:**

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: C

ReferenceID: 835

Title: ***\$14.8M Hot Spot Disposal Approved, More Dredging Soon at New Bedford***

Location: AEM

Category: Site Update

Prepared by/Author:

**Preparer/Author
Address:**

Prepared For: Superfund Week

Date Published: May 21, 1999

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 869

Title: ***Mass.: Ships Moved to reach PCBs***

Location: AEM

Category: Site Update

Prepared by/Author:

**Preparer/Author
Address:**

Prepared For: Hazardous Waste/Superfund Week

Date Published: April 22, 2002

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 958

Title: ***Mass.: Dredging to Start Sooner***

Location: AEM

Category: Site Update

Prepared by/Author:

**Preparer/Author
Address:**

Prepared For: Hazardous Waste/Superfund Week

Date Published: September 2, 2002

**Key Words and
Phrases:**

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: C

ReferenceID: 975

Title: *Mass: Archeological Survey Under Way*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Hazardous Waste/Superfund Week

Date Published: November 11, 2002

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 976

Title: *Cultural Research, Construction Prior to Dredging Require Extra Money*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Hazardous Waste/Superfund Week

Date Published: November 18, 2002

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 1074

Title: *Contract: The U.S. Army Corps of Engineers New England District*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Hazardous Waste/Superfund Week

Date Published: August 25, 2003

**Key Words and
Phrases:**

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: C

ReferenceID: 1075

Title: *Opportunities: Jacobs Engineering Group, Inc.*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Hazardous Waste/Superfund Week

Date Published: June 9, 2003

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 1134

Title: *EPA Invokes Seldom-Used Superfund Power in Precedent-Setting Cleanup Plan*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Inside EPA

Date Published: August 18, 2004

**Key Words and
Phrases:**

Reference Type: D

ReferenceID: 42

Title: *New Bedford still seeks way to deal with PCBs*

Location: AEM

Category: Contaminated Sediments: Overview of Issues

Prepared by/Author:

Preparer/Author

Address:

Prepared For: The Boston (MA) Globe

Date Published: November 3, 1997

**Key Words and
Phrases:**

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: D

ReferenceID: 43

Title: *Round two: Citizens group concerned about Second Phase of PCB clean up*

Location: AEM

Category: Site Update

Prepared by/Author: Lori Rebello

**Preparer/Author
Address:**

Prepared For: The Fairhaven (MA) Advocate

Date Published: July 27, 1995

**Key Words and
Phrases:**

Reference Type: D

ReferenceID: 238

Title: *EPA considers new PCB plan*

Location: AEM

Category: Site Update

Prepared by/Author: Monica Allen

**Preparer/Author
Address:**

Prepared For: The New Bedford (MA) Standard-Times

Date Published: July 20, 2001

**Key Words and
Phrases:**

Reference Type: D

ReferenceID: 408

Title: *Barge capsizes, dumps silt*

Location: AEM

Category: Dredging: Maintenance/Navigational

Prepared by/Author: Jack Spillane

**Preparer/Author
Address:**

Prepared For: The New Bedford (MA) Standard-Times

Date Published: June 12, 2002

**Key Words and
Phrases:**

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: G

ReferenceID: 46

Title: *Remedy Effectiveness: Comparison of Remediation Technologies
(for complete presentation see Reference G-41)*

Location: AEM

Category: Dredging: Equipment

Prepared by/Author: (1) William Elmer, (2) John Lally

**Preparer/Author
Address:** (1), (2) Foster Wheeler Environmental

Prepared For: EPA Forum on Managing Contaminated Sediments at Hazardous Waste Sites

Date Published: May 30 - June 1, 2001

**Key Words and
Phrases:**

Reference Type: G

ReferenceID: 50

Title: *Assessing Remedial Dredging Effects and Effectiveness:
Examples from New Bedford Harbor
(for complete presentation see Reference G-41)*

Location: AEM

Category: Cleanup Levels and Risks

Prepared by/Author: (1) William G. Nelson, (2) Barbara J. Bergen

**Preparer/Author
Address:** Office of Research & Development
National Health and Ecological Effects Research Laboratory
Atlantic Ecology Division
Narragansett, RI 02882

Prepared For: EPA Forum on Managing Contaminated Sediments at Hazardous Waste Sites

Date Published: May 30 - June 1, 2001

**Key Words and
Phrases:**

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: H

ReferenceID: 8

Title: *Figure 1: New England Harbor and Acushnet River Estuary*

Location: AEM

Category: Miscellaneous

Prepared by/Author:

Preparer/Author

Address:

Prepared For:

Date Published:

**Key Words and
Phrases:**

Reference Type: L

ReferenceID: 33

Title: *Memo re: Proposed OU-1 for New Bedford Harbor (Public Meeting in New Bedford on Nov 6, 1996)*

Location: AEM

Category: Site Update

Prepared by/Author: AEM, Inc.

**Preparer/Author
Address:** Malvern, PA 19355

Prepared For: Distribution

Date Published: November 7, 1996

**Key Words and
Phrases:**

Reference Type: L

ReferenceID: 37

Title: *Fax Transmittal re: Status of New Bedford Harbor Site*

Location: AEM

Category: Site Update

Prepared by/Author: AEM, Inc.

**Preparer/Author
Address:** Malvern, PA 19355

Prepared For: Distribution

Date Published: June 30, 1995

**Key Words and
Phrases:**

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: L

ReferenceID: 38

Title: *Letter re: Status of New Bedford Harbor Hot Spot Dredging and Proposed Treatability / Dredging Efforts*

Location: AEM

Category: Site Update

Prepared by/Author: AEM, Inc.

Preparer/Author Address: Malvern, PA 19355

Prepared For: Distribution

Date Published: April 7, 1995

Key Words and Phrases:

Reference Type: L

ReferenceID: 39

Title: *Memo re: Amended Proposed Plan for New Bedford Harbor, and Memo from General Electric (May 29, 1992), Same Subject*

Location: AEM

Category: Site Update

Prepared by/Author: AEM, Inc.

Preparer/Author Address: Malvern, PA 19355

Prepared For: Distribution

Date Published: June 8, 1992

Key Words and Phrases:

Reference Type: L

ReferenceID: 49

Title: *Memo re: Subject : Amended Proposed Plan for New Bedford Harbor, and Memo from General Electric (May 29, 1992), Same Subject*

Location: AEM

Category: Site Update

Prepared by/Author: AEM, Inc.

Preparer/Author Address: Malvern, PA 19355

Prepared For: Distribution

Date Published: June 8, 1992

Key Words and Phrases:

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: L

ReferenceID: 50

Title: *Letter re: New Bedford Harbor OU-2 ROD, Dated 9/25/98, and Responsiveness Summary*

Location: AEM

Category: Site Update

Prepared by/Author: AEM, Inc.

Preparer/Author Address: Malvern, PA 19355

Prepared For: Distribution

Date Published: October 21, 1998

Key Words and Phrases:

Reference Type: L

ReferenceID: 134

Title: *Maximum Baseline Cancer Risks for Contaminated Sediment Sites*

Location: AEM

Category: Risk Assessment

Prepared by/Author: AEM, Inc.

Preparer/Author Address:

Prepared For: Distribution

Date Published: October 22, 2001

Key Words and Phrases:

Reference Type: L

ReferenceID: 151

Title: *Initial Review -- Final Pre-Design Field Test Dredge Technology Evaluation Report for the New Bedford Harbor Superfund Site*

Location: AEM

Category: Contaminated Sediments: Remedial Options/Guidance

Prepared by/Author: AEM / BBL / QEA

Preparer/Author Address:

Prepared For: Internal Distribution

Date Published: November 1, 2001

Key Words and Phrases:

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: L

ReferenceID: 171

Title: *EPA's Evolving Position on Remedial Dredging*

Location: AEM

Category: ROD/Proposed Plan/Action Memo/Decision Document

Prepared by/Author: AEM, Inc.

**Preparer/Author
Address:** Malvern, PA 19355

Prepared For: Internal Distribution

Date Published: Undated

**Key Words and
Phrases:**

Reference Type: L

ReferenceID: 195

Title: *Draft Final: A Review of the Final Pre-Design Field Test Dredge Technology Evaluation Report For the New Bedford Harbor Superfund Site*

Location: AEM

Category: Dredging: Equipment

Prepared by/Author: BBL / AEM / QEA

**Preparer/Author
Address:**

Prepared For: Distribution

Date Published: March 11, 2002

**Key Words and
Phrases:**

Reference Type: M

ReferenceID: 94

Title: *Dechlorinations of Polychlorinated Biphenyls in Sediments of New Bedford Harbor EPA/600/D-91/249 (NTIS PB92-121151)*

Location: AEM

Category: Site Update

Prepared by/Author: James L. Lake, Richard J. Pruell and Frank A. Osterman

**Preparer/Author
Address:** US EPA ERL-Narragansett
Environmental Research Lab
Narragansett, RI

Prepared For: US EPA Region I

Date Published: 1991

**Key Words and
Phrases:**

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: M

ReferenceID: 95

Title: *Superfund Toxic Substances: Exposure and Disease*

Location: AEM

Category: Site Update

Prepared by/Author: Richard R. Monson, M.D.

Preparer/Author Address: Harvard School of Public Health

Prepared For: From INTERNET

Date Published:

Key Words and Phrases:

Reference Type: M

ReferenceID: 221

Title: *Draft New Bedford Harbor Cleanup Dredge Technology Review - New Bedford Harbor Superfund Site, New Bedford, MA*

Location: AEM

Category: Dredging: Equipment

Prepared by/Author: Foster Wheeler Environmental Corporation

Preparer/Author Address: 470 Atlantic Avenue
Boston, MA 02210

Prepared For: US Army Corps of Engineers, New England District, Concord, MA

Date Published: April 1999

Key Words and Phrases:

Reference Type: M

ReferenceID: 222

Title: *Draft Evaluation of Dredge Technologies Phase Two - Detailed Evaluation for Remedial Design for Operable Unit #1, New Bedford Harbor Superfund Site, New Bedford, MA*

Location: AEM

Category: Dredging: Equipment

Prepared by/Author: Foster Wheeler Environmental Corporation

Preparer/Author Address: 470 Atlantic Avenue
Boston, MA 02210

Prepared For: US Army Corps of Engineers, New England District, Concord, MA

Date Published: September 1999

Key Words and Phrases:

REFERENCES

Project Name NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

ProjectID: 01-08

Reference Type: N

ReferenceID: 24

Title: *Telephone Conversation with Jim Brown*

Location: AEM

Category: Site Update

Prepared by/Author: AEM, Inc.

**Preparer/Author
Address:**

Prepared For: Internal file

Date Published: August 22, 2000

**Key Words and
Phrases:**

Reference Type: N

ReferenceID: 51

Title: *e-mail re: NBH Dredging*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA RPM

**Preparer/Author
Address:**

Prepared For: AEM, Inc.

Date Published: June 18, 2004

**Key Words and
Phrases:**

Reference Type: N

ReferenceID: 52

Title: *memo re: Phone conversation with US EPA RPM*

Location: AEM

Category: Site Update

Prepared by/Author: AEM, Inc.

**Preparer/Author
Address:**

Prepared For:

Date Published: June 7, 2004

**Key Words and
Phrases:**

MODELING

Project Name:	<u>NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)</u>	ProjectID: 01-08
Last Updated:	08/11/98	
Modeling Performed:	Numerical modeling to predict sediment movement; modeling to determine PCB release rate and flux rate from sediment; hydrodynamic/transport modeling (TEMPEST/FLESCOT) and food chain modeling (WASTOX).	
Modeling Objectives:		
Modeling Description:	Refer to "Modeling Results"	
Company Performing Modeling:		
Modeling Status:	Complete	
Modeling Summary:	<p>Transport and Fate Modeling:</p> <ul style="list-style-type: none">Numerical modeling was performed by USCOE in 1988 to predict sediment movement within and out of upper estuary during dredging and confined aquatic disposal (CAD);Two different entities performed modeling for the PRPs in 1987 - 1990 to determine PCB release mechanism and flux rate from sediments to water column; andEPA modeling (1989) involved hydrodynamic/transport model, Tempest/Flescot, and a food chain model, WASTOX. <p>Transport Modeling Results:</p> <ul style="list-style-type: none">Upper estuary and lower harbor are sediment depositional areas;Transfer of PCBs from the sediment to the water column through direct desorption and the volatilization of PCBs from the water column are the most important processes;Tidal pumping and dispersion is the dominant transport mechanism producing a net flux of PCBs from the estuary into the lower harbor, then into the bay, with estimates varying between 1 to 6 pounds of PCBs per day; model projections indicate remediation will reduce the flux to the bay but suggest such reduction will only have minimal impact on bay sediments/water column/biota;The PCB flux from the estuary sediments to the water column is estimated at 6 - 36 lbs per day, with 40-50%, and possibly greater, of this amount then lost from the system via volatilization;Suspended sediment becomes contaminated with PCBs from contact with the water column prior to settling;Ten-year modeling, with no remedial action, showed a PCB mass reduction of 13 - 23% and factor of 2 water column concentration decrease, which was judged unacceptable by EPA. Water column concentrations of 0.85 ppb in the estuary and 0.1 ppb in the lower harbor at year ten were predicted; andTen-year projections of the WASTOX model for the no-action scenario (but assuming the hot spot has been removed) predict flounder and lobster concentrations would decrease to close to the FDA 2 ppm edible tissue level, but well above the project-specific, health-based residual tissue levels of 0.02 ppm edible tissue (10-5 incremental cancer risk).	

FISH ADVISORIES

Project Name **NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)** ***ProjectID:*** 01-08

Advisory: New Bedford Harbor - Area 1 ***AdvisoryID:*** 456

Extent: Area 1

Pollutant: PCBs (total)

Species: all fish

Population: NCGP

Population Definition: No Consumption-General Population: Advise against consumption by the general population.

Advisory Type: Estuary ***Advisory Number:*** 191

Status (Active or Rescinded): Active ***Date Rescinded:***

Contact Name: Elaine Krueger ***Contact Number:*** 617-624-5757

Advisory: New Bedford Harbor - Area 1 ***AdvisoryID:*** 930

Extent: Area 1

Pollutant: PCBs (total)

Species: all fish

Population: NCSP

Population Definition: No Consumption-Subpopulation(s): Advises against consumption for populations that are potentially at greater risk, e.g., pregnant or nursing women, and small children.

Advisory Type: Estuary ***Advisory Number:*** 191

Status (Active or Rescinded): Active ***Date Rescinded:***

Contact Name: Elaine Krueger ***Contact Number:*** 617-624-5757

Advisory: New Bedford Harbor - Area 1 ***AdvisoryID:*** 304

Extent: Area 1

Pollutant: PCBs (total)

Species: shellfish-lobster

Population: NCGP

Population Definition: No Consumption-General Population: Advise against consumption by the general population.

Advisory Type: Estuary ***Advisory Number:*** 191

Status (Active or Rescinded): Active ***Date Rescinded:***

Contact Name: Elaine Krueger ***Contact Number:*** 617-624-5757

FISH ADVISORIES

Project Name **NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)** ***ProjectID:*** 01-08

Advisory: New Bedford Harbor - Area 1

AdvisoryID: 929

Extent: Area 1

Pollutant: PCBs (total)

Species: shellfish-lobster

Population: NCSP

Population Definition: No Consumption-Subpopulation(s): Advises against consumption for populations that are potentially at greater risk, e.g., pregnant or nursing women, and small children.

Advisory Type: Estuary

Advisory Number: 191

Status (Active or Rescinded): Active

Date Rescinded:

Contact Name: Elaine Krueger

Contact Number: 617-624-5757
