Sevenson Environmental Services, Inc.

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FINAL 2011 DREDGE SEASON DATA SUBMITTAL NEW BEDFORD HARBOR REMEDIAL ACTION

New Bedford Harbor Superfund Site
New Bedford, MA

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ACRONYMS AND ABBREVIATIONS

AAR	After Action Report
Cd	cadmium
City	The City of New Bedford
Cr	chromium
CRE	CR Environmental, Inc.
CSO	combined sewer overflow
Cu	copper
cy	cubic yard
DDA	debris disposal area
EPA	U.S. Environmental Protection Agency
Fathom	Fathom Research, LLC.
ft	foot/feet
GAC	granulated activated carbon
GIS	geographic information systems
GPS	Global Positioning System
HDC	New Bedford Harbor Development Commission
HDPE	High Density Polyethylene
ISC3	Industrial Source Complex Model
Jacobs	Jacobs Engineering Group, Inc.
MHHW	mean higher high water
MLLW	mean lower low water
NAE	U.S. Army Corps of Engineers - New England District
NBH	New Bedford Harbor Superfund Site
ng/m^3	nanogram per cubic meter
OL	organic silt
Pb	lead
PCB	polychlorinated biphenyl
PETS	Public Exposure Tracking System
PPE	personal protective equipment
QC	quality control
ROD	Record of Decision

ACRONYMS AND ABBREVIATIONS

SCR	submerged cultural resource
SES	Sevenson Environmental Services, Inc.
T&D	transportation and disposal
TCLP	Toxicity Characteristic Leaching Procedure
TSCA	Toxic Substances Control Act
USCG	U.S. Coast Guard
WHG	Woods Hole Group
WWTP	Wastewater Treatment Plant

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EXECUTIVE SUMMARY

September 30, 2011 marked the successful completion of the eighth season of full-scale remedial dredging at the New Bedford Harbor Superfund Site (NBH). As in previous dredge seasons, the Jacobs Engineering Group, Inc. (Jacobs) and Sevenson Environmental Services, Inc. (SES) team performed the cleanup work under contract to the U.S. Army Corps of Engineers – New England District (NAE) with direction provided by the U.S. Environmental Protection Agency (EPA) in NBH's Upper Harbor.

During the design phase of the NBH project an archaeological survey was conducted to identify any submerged cultural resources (SCRs). This survey, conducted in the late 1990's and early 2000's utilized modern survey equipment at the time. Following the 2009 discovery of a shipwreck in an active dredge area it was decided by EPA that a supplemental survey be performed in 2011 using more advanced remote sensing technology than was previously available. The supplemental survey and associated follow-up investigation revealed no submerged cultural resources in the areas designated as 2011 dredge areas.

Utilizing primarily hydraulic dredging and a focused mechanical dredging program the Jacobs/SES team dredged a total of 26,074 cubic yards of polychlorinated biphenyl (PCB) - impacted sediment from the upper harbor portion of the NBH site, as determined by bathymetry. The dredged sediment (slurry) contains gravel, sand, silt, clay and harbor water; based on production data it is estimated the slurry contains approximately 23,005 tons of damp solids.

Consistent with past hydraulic dredging efforts at NBH, sediment was hydraulically dredged from the upper harbor and pumped to the Sawyer Street Desanding Facility, Area C. Desanding operations removed 4,042 tons of material (primarily gravel and sand) from the dredge slurry. Analytical testing determined 530 tons of the material could be disposed of as non-hazardous, and the remainder was above the Toxic Substances Control Act (TSCA) threshold for PCBs. The TSCA material was disposed

of in a licensed and approved TSCA landfill, the non-TSCA material was disposed of in an approved landfill.

The desanded dredge slurry was pumped from Area C to the Area D Dewatering Facility located on the shore of the lower harbor portion of NBH. From the transferred slurry dewatering operations removed the contaminated sediment from the dredge slurry at Area D. 18,963 tons of contaminated filter cake was produced in 2011 at Area D, and disposed of in an approved TSCA landfill.

The water removed from the dredge slurry at Area D was treated to meet Record of Decision (ROD) discharge goals (Table 8 of the ROD, Action Specific ARARs) and Massachusetts Class SB water standards prior to discharge back into the harbor. Routine periodic testing confirmed that the waste water treatment plant was functioning as intended. 33,710,000 gallons of water were treated and discharged to the harbor during the course of 2011 dredge operations.

Mechanical dredging operations were conducted at NBH just east of the eastern terminus of Sawyer Street. This dredging was performed in support of future recreational use of the Upper Harbor. The Sawyer Street mechanical dredging operation removed an estimated 400 cubic yards of contaminated sediment. The release of oil from the sediment during mechanical dredging operations temporarily halted mechanical dredging progress in the area. Due to the potential for a continued release of oil from the impacted sediment, the project team modified the dredge plan and installed control measures. The control measures, geotextile and crushed stone are intended to restrict the risk of contact with or disturbance to the sediment in the intertidal zone. These control measure were only installed on the western side of the mechanical dredge area.

Jacobs continued to perform ambient air monitoring for PCBs similar to previous seasons. Analytical results and modeling efforts demonstrated that the NBH remedial dredging program is not causing ambient PCB levels to exceed established thresholds.

Jacobs estimates that 8.2 tons of PCBs were removed and disposed of with the contaminated dredged materials during the 2011 season. Remedial dredging by the Jacobs/SES team at NBH has removed an estimated 51.0 tons of PCBs since 2004.

In addition to remedial dredging at NBH Jacobs performed routine facility maintenance at both Areas C and D during 2011. A variety of non-dredging but complimentary tasks were performed by Jacobs during 2011 including the installation of fencing and institutional controls such as signage at NBH.

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1.0 INTRODUCTION

The purpose of this *2011 Data Summary Report* (2011 DSR) is to summarize key activities associated with the remediation of the New Bedford Harbor Superfund Site (NBH) during the 2011 field season. After Action Reports (AAR) were generated for the 2004 (Jacobs 2005) and 2005 (Jacobs 2006) season to fully document the respective dredge seasons. Since 2006 the U.S. Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers - New England District (NAE) have requested that a scaled back data summary report be prepared annually to document field activities. For the 2011 DSR, EPA and NAE have requested that the document contain more detailed text information specific to the 2011 field season. This 2011 DSR documents dredging and associated programmatic activities.

Activities performed by the Jacobs Engineering Group, Inc. (Jacobs)/Sevenson Environmental Services, Inc. (SES) team during the 2011 field season are documented in Section 2.0 as the 2011 Scope of Work Performed. Section 2.0 is further broken down into the following six sub-sections:

- Project Planning (Section 2.1)
- Mobilization (Section 2.2)
- Project Execution (Section 2.3)
- Air Monitoring (Section 2.4)
- Demobilization (Section 2.5)
- Post-Dredge Activities (Section 2.6)

Section 3.0 presents a discussion on mass balance calculations derived from 2011 production data. The mass balance calculations provide a measure of process inputs, process outputs, as well as intermediate processes.

Section 4.0, Lessons Learned, presents observations on methods to improve production, safety or quality. Improvements presented in Section 4.0 were either implemented in 2011 or may be utilized when applicable on the project in the future.

Section 5.0 briefly describes work performed at NBH by the Jacobs/SES team related to the remediation efforts that were non-dredging in scope. Examples of work included in Section 5.0 are maintenance of intuitional controls and improvements to existing facilities.

Section 6.0 provides a tabulated chronology of events at NBH during 2011.

Section 7.0 provides a list of reference documents used in the preparation of this DSR.

1.1 PROJECT BACKGROUND

The 1998 *Record of Decision for the Upper and Lower Harbor Operable Unit New Bedford Harbor Superfund Site New Bedford, Massachusetts* (ROD) (EPA 1998) delineates the NBH site into three geographical areas based on physical features as well as contaminant concentration gradients. Figure A-1 illustrates this delineation showing NBH divided into the upper harbor, lower harbor and outer harbor. The upper harbor is bound to the north by the Wood Street Bridge and to the south by the Route 195 Bridge. The lower harbor begins at the Route 195 bridge to the north and continues south to the New Bedford hurricane barrier. The outer harbor begins at the hurricane barrier and encompasses the area bound on the south by an imaginary line drawn from Rock Point in Fairhaven southwesterly to Buoy C "3" continuing on to Mishaum Point in Dartmouth. Buoy C "3" is a green can buoy used to mark the approach to the New Bedford Harbor Channel. Figure A-2 identifies areas requiring dredging to remove polychlorinated biphenyl (PCB) - impacted sediment per the 1998 ROD.

Since the initiation of full scale dredging activities by the Jacobs/SES team in 2004, remediation efforts have focused on the Upper Harbor. Figure A-3 shows areas dredged by the Jacobs/SES team since 2004 as well as earlier cleanup efforts by others. The apparent patchwork of dredge areas is by design. Dredge areas were designed by considering geographical features, material types, tidal conditions, contaminant mass, dredge technology and future use requirements. An important consideration in designing a dredge area is contaminant mass with the intention to remove the most contaminated sediment first (mass removal). The majority of cleanup efforts by the Jacobs/SES team have utilized hydraulic dredging as the preferred method. A limited amount of mechanical dredging has been conducted at NBH in relatively small dredge areas. Mechanical dredging is selected typically due to material type such as contaminated gravel or cobbles where hydraulic dredging would be inefficient or ineffective.

Since 2004 all material hydraulically dredged at NBH has been disposed of at approved, off-site landfills following gravity or plate and frame filter press dewatering. All the water recovered during the dewatering process has been treated to the appropriate standards and discharged back to the harbor.

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2.0 2011 SCOPE OF WORK PERFORMED

2.1 PROJECT PLANNING

2.1.1 Pre-Dredge Archaeology

In 1999 a marine archaeological survey was conducted in the upper harbor by John Milner Associates, Inc. and Dolan Research, Inc. (Dolan 2000). Most of the upper harbor was surveyed with side scan sonar, sub-bottom profiler and magnetometer. Due to the technology available at the time and limited water depth some areas of the upper harbor were only able to be surveyed with a magnetometer while others were not surveyed at all.

Following the unanticipated 2009 discovery of shipwreck remains during debris removal operations in an active dredge area, it was decided that a supplemental marine archaeological survey would be conducted in areas anticipated to be dredged in 2011. The survey was conducted utilizing side scan sonar, magnetometer and sub-bottom profiler by CR Environmental, Inc. (CRE) and Fathom Research, LLC. (Fathom).

Initially the survey identified four targets as potential submerged cultural resources (SCRs) in two of the four dredge areas. The SCRs were identified on dredge plans, and buffer zones were established around areas where no dredge related work would be conducted without further investigation. A follow-up video hydro-probe investigation by CRE/Fathom determined the targets were not actually SCRs and, subsequently, the buffer zones were cleared and dredging was permitted in those areas. The dredge plans with SCR buffer zones are presented in Attachment A as Figures A-4 and A-5. Detailed information on the 2011 archaeological survey work is available in the document *Final Technical Memorandum, Supplemental Marine Archaeological Survey New Bedford Harbor Superfund Site Dredge Areas N, O, K, and L* (Fathom, 2011a).

2.1.2 Dredge Plan Development

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2.1.3 Minimization of Dredge Related Impacts to Wildlife

The Jacobs document *Final 2011 Fish Migration Impact Plan, New Bedford Harbor Remedial Action* (Jacobs 2011c) is updated annually with the cooperation of the Massachusetts Division of Marine Fisheries and NAE. This document, referred to as the Fish Plan, considers the effects that dredging related activities could have on the migratory fish that use NBH as a pathway to their spawning grounds in the Acushnet River as well as resident fish. The Fish Plan details the planned pipeline routes and dredge area logistics. The plan also describes the preventative measures the Jacobs/SES team would undertake during the season to minimize or eliminate dredging related negative impacts to the fish. The fish plan also provides a communication matrix if negative impacts are observed. There were no instances of documented dredging related negative impacts to resident or migratory fish populations during the 2011 season at NBH.

2.2 MOBILIZATION

A small crew was brought to NBH prior to the full scale mobilization to conduct pre-mobilization tasks. Pre-mobilization tasks included activities outside of the scope of dredge mobilization but were necessary for project execution. The pre-mobilization tasks were completed between May 16, 2011 and, May 31, 2011.

Major tasks performed during the pre-mobilization included:

- replacement of two Flexi-Floats in Area C dock (sections were removed in 2010 and repaired off-site during the winter);
- anchoring of slurry pipeline from Area C to an area north of Coggeshall St. Bridge in preparation for mechanical dredging near Sawyer Street (see Section 2.3.7);.
- relocation of several Area C office and lab trailers.

Full-scale mobilization activities for the 2011 season commenced on June 1, 2011 and continued until June 23, 2011. Major tasks performed during mobilization included:

- re-assembling dredge pipelines;
- set-up of booster pump stations;
- replacement of all press cloths in filter presses;
- service and calibration of on-site truck scales;
- set-up of dredge area sheet piles and cabling;
- inspection and repair if necessary of facilities and equipment;
- deployment of oil boom around dredge areas;
- launching and installation of dredges in three dredge areas;
- set up, calibrate and test health and safety monitoring equipment;
- system test;
- re-energizing and testing major electrical systems and motors by electrician.

Figure A-6 illustrates the pipeline, dredge areas, booster pump stations and ferric sulfate injection system as it was setup for 2011.

Figure A-7 is an as-built of the 2011 Hadley Street booster pump station. Figure A-8 is an as-built of the 2012 Manomet Street booster pump station; this station includes the ferric sulfate injection system.

The final portion of mobilization is the shakedown period. Shakedown involves filling the treatment system with water, pressure testing all pipelines and valves, and operating the system until three press drops of filter cake are produced. Shakedown was completed on June 24, 2011.

2.3 PROJECT EXECUTION

Following a successful shakedown period, full scale dredging was initiated on June 27, 2011. Debris removal crews began systematically removing obstructions to dredging while hydraulic dredging began in areas previously cleared of debris.

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The physical removal of contaminated sediment from the harbor begins when the cutter head for an operating dredge is lowered into the sediment. As the spinning auger breaks up the sediment it is mixed with harbor water to create a slurry. The dredge pump then moves the slurry from the dredge to a shore based booster pump station through a flexible floating pipeline.

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From the booster pump station at Manomet Street the slurry is pumped to the Area C Desanding Facility. At the Desanding Facility hydrocyclones and vibratory inclined screens remove sand, gravel and other relatively coarse materials from the slurry. This removed material is allowed to gravity drain, chemically tested and stockpiled at Area C to await disposal. Once a sufficient quantity of material has been stockpiled at Area C, trucks are loaded and weighed onsite and the material transported to the appropriate contracted landfill.

The remaining dredge slurry, a mixture of water and contaminated silt and clay is pumped from Area C to the Area D Dewatering Facility via pipeline. At Area D the slurry is pumped directly into a set of mix tanks, which are tasked with keeping the solids in the slurry suspended. Feed pumps, attached to the mix tanks, transfer the slurry to a bank of filter presses. A water treatment polymer is added to the slurry during the transfer process to enhance the dewatering efficiency of the filter presses. The filter presses remove the majority of the water in the dredge slurry with smaller amounts being entrained in damp sand, gravel and filter cake. The water removed by the filter presses is pumped into and run through an on-site waste water treatment plant where it is treated and discharged back into the harbor. The filter cake is chemically tested and stockpiled indoors to await disposal. Filter cake generated at Area D is loaded and weighed on-site, then transported off-site for disposal in a licensed and approved TSCA landfill.

2.3.1 Debris Removal Activities

Prior to hydraulic dredging, dredge areas are typically cleared of debris. This process, involves systematically raking, removing debris, and repositioning the debris removal equipment until the entire dredge area has been covered. Debris removal was conducted by a Komatsu® PC-220 excavator fitted with an Add-A-Stick® boom extension and a hydraulic rake and thumb attachment. The excavator was mounted on and worked off of a 40 ft by 40 ft barge equipped with spuds to maintain position. Forty by twenty ft scows were used to contain recovered debris during activities. The scows were brought to the Area C dock for unloading as needed. Following the unloading process, the size of debris was reduced if necessary and then stockpiled for disposal.

Debris removal activities began on June 27, 2011. During the 2011 season the majority of debris removal activities were conducted in Dredge Area K. The bulk of debris removed included a derelict wooden structure from the southwestern corner of Area K and building debris (primarily brick and roofing material) from the western shoreline of Area K. A ship's anchor was recovered in Dredge Area K on August 18, 2011. Upon recovery the anchor was stored per the procedure in the Jacobs document *Plans and Procedures Addressing Unanticipated Discoveries of Cultural Resources and Human*

Remains (Jacobs 2010). The on-call project archaeologist was notified. Formal documentation of the anchor can be found in the Fathom document *Letter Report-New Bedford Harbor Superfund Site-Small Anchor Unanticipated Discovery and Documentation, New Bedford, MA* (Fathom 2011b).

On September 16, 2011, several wood timbers were recovered during Area K debris removal activities. These timbers were recovered approximately 50 ft from where the anchor was recovered. One of the timbers appeared to have a shape and size consistent with wood shipwreck timbers recovered during the 2009 season. The on-call project archaeologist was notified and the timbers were stored per the procedure in the Jacobs document *Plans and Procedures Addressing Unanticipated Discoveries of Cultural Resources and Human Remains* (Jacobs 2010). The timbers are anticipated to be documented and sampled during the 2012 dredge season. Figure A-9 contains photographs of the anchor and timbers following their recovery.

Debris removal efforts were scaled back in Dredge Area N. Due to tidally dependent working conditions, the undeveloped nature of the shoreline and the lower likelihood of encountering man made debris in this area; a targeted debris removal plan was used in Dredge Area N. The pre-dredge archaeological survey described in Section 2.1.1 was able to locate the majority of debris (as targets) thought to have the potential of affecting dredging. These targets were located via Global Positioning System (GPS) and marked with ten foot long plastic survey poles placed vertically in the sediment. When tidal conditions allowed debris removal crews focused their efforts on Dredge Area N by raking the areas marked with the poles. This method resulted in a more efficient debris removal action and reduced the overall amount of sediment mixing in Area N.

There was no debris removal activities conducted in Dredge Areas L or G during the 2011 season because debris removal in these areas was already completed in previous dredge seasons. Debris removal was not necessary in Area Q prior to mechanical dredging activities as any debris would be excavated with the targeted sediment.

2.3.2 Hydraulic Dredging

2011 hydraulic dredging operations were conducted utilizing similar means and methods as previous seasons. During mobilization sheet piles were installed along the perimeter of each area to be dredged. Sheet piles installed at the two edges of a dredge area perpendicular to the direction of dredge travel had a cable strung between the sheets, typically one to two ft above high tide, this cable provides anchoring points for the dredge traverse cable. The dredge traverse cable, attached to two opposing sides of a dredge area is utilized for dredge propulsion. The traverse cable is run through a set of pulleys and a winch on the dredge; this allows the dredge operator to pull the dredge back and forth over the length of the cable. Lateral movement of the dredge is accomplished by re-locating the ends of the traverse cable. The actual dredging is performed by the dredge cutter head, an eight ft long horizontal auger, partially encased in a shroud. The cutter head is on the end of a hydraulically articulated boom, lowering and raising the boom controls the depth of the dredge cut. The auger, in conjunction with a an on-board pump, breaks up the sediment, mixes it with harbor water to form a slurry, and moves the material from the harbor bottom into the floating dredge pipeline and towards the booster pump station. The booster pumps provide additional hydraulic head to allow pumping the dredge slurry to the desanding facility. The slurry from each dredge is run through either one or two booster pump stations depending on the length of pipeline required to dredge a particular area.

Hydraulic dredging operations commenced on June 27, 2011. Three Ellicot Mudcat MC2000 dredges were initially installed in Dredge Areas G, K and L.

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Periodically a progress bathymetric survey was conducted in the active dredge areas to assess in-situ volume dredged, compliance with the dredge plan and completeness of coverage.

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2.3.3 Desanding Operations

2011 Desanding operations were conducted similarly to previous seasons.

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The pipeline reports the slurry onto an inclined, vibratory coarse shaker screen where solids larger than ¼ in are removed. The removed material is referred to as "oversize" and is dropped from the shaker onto an asphalt pad for stockpiling and draining. The remaining slurry is pumped through a hydrocyclone and an inclined, vibratory fine shaker screen. The fine screen removes solids larger than 200 mesh, primarily sand. The sand, like the oversize, is stockpiled to drain on the asphalt pad. The remaining desanded slurry is retained in an agitated mix tank and is transferred to the dewatering facility via a pump once a sufficient slurry volume has accumulated in the tank.

The dredging and desanding process flow diagram is included as Figure A-17. The diagram graphically shows the treatment process from dredging to the separation of sand and oversize material from the dredge slurry.

In preparation for disposal, the materials generated in the desanding process are characterized. All oversize material is assumed to be TSCA based on historical analytical results. Once approximately 100 tons (estimated by stockpile size) of sand has accumulated in a stockpile, it is sampled and analyzed for disposal purposes (PCB Aroclors, metals, oil and grease, and reactive cyanide). Every other time a sand sample is collected for chemical analysis a portion of the sample is submitted for grain size analysis. The grain size test gives an indication of the performance of the desanding operation. At NBH the sand is segregated by PCB TSCA determination. If a sand sample has been characterized as TSCA, the sand is mixed with the oversize material and stockpiled in the TSCA pile in the debris disposal area (DDA). If the sand sample is non-TSCA (< 50 milligrams per kilogram PCBs) it is stockpiled in the non-TSCA pile in the DDA. In the final weeks of the season transportation and disposal (T D) operations were commenced for the material generated at Area C. The T&D activities extended into the demobilization period until all the stockpiles had been disposed. A summary of all the routine chemical tests performed on the sand is presented as Table B-1. A summary of sand grain size results is presented on Table B-2.

2.3.4 Dewatering Operations

2011 Dewatering operations were conducted similarly to previous seasons. Desanded slurry is transferred from the Area C Desanding Facility via dual wall HDPE pipeline to the Area D Dewatering Facility using a Caterpillar C-9 275 horsepower booster pump. At Area D the slurry is stored in a series of agitated mix tanks, which keep the solids in suspension. Feed pumps transfer the slurry from the tanks to one of a bank of six plate and frame filter presses. A water treatment polymer is added to the slurry during the transfer process to enhance dewatering. The filter presses remove the majority of the water from the sediment producing a dewatered sediment referred to as filter cake. The water removed from the filter cake is pumped to a holding tank for treatment in the on-site waste water treatment plant. Once sufficient water has been removed from the filter cake CBI the cake is dropped from the press onto a series of conveyors to the load out area where it is stockpiled for transportation and disposal.

A process flow diagram showing the dewatering process has been included as Figure A-18. The diagram illustrates the flow and separation of sediment from free water in the dewatering process. Production data can be found on the Sevenson Operational Monitoring Data table (Attachment C). A brief summary of filter cake production follows.

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As has been done since 2004, composite samples of the filter cake were collected and analyzed at a frequency of approximately every 550 tons. These samples provide a running waste profile in addition to the toxicity characteristic leaching procedure (TCLP) performed on the filter cake at the beginning of each dredge season. The TCLP sample is collected as a requirement of the disposal facility. The samples, collected every 550 tons, were analyzed for PCB Aroclors, metals, oil and grease, and reactive cyanide, filter cake analytical results and are summarized on Table B-4. Samples were submitted for grain size analysis at a frequency of every approximately every 1100 tons. Filter cake grain size results are reported on Table B-2.

2.3.5 Waste Water Treatment Plant Operations

2011 waste water treatment plant operations were conducted similarly to previous dredge seasons.

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The process flow diagram of the wastewater treatment plant (WWTP) system is included as Figure A-19.

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As has been the practice since 2004, WWTP samples were collected and analyzed throughout the dredge season. The sampling frequency, methods and locations are described in detail in the Jacobs document *Field Sampling Plan New Bedford Harbor Superfund Site* (Jacobs 2009). The basic sampling scheme involves intensive sampling at startup with the effort scaled back as the system proves to be effective and operating as designed. The influent and effluent samples were analyzed for PCB Aroclors, copper (Cu), chromium (Cr), cadmium (Cd), and lead (Pb). The midpoint sample, collected between the lead and lag GAC vessels, is analyzed for PCB Aroclors and Cu. Analytical results are presented on Table B-5. Water quality parameters are monitored, recorded and evaluated throughout the sampling process. Water quality parameters are measured with a calibrated YSI brand water quality meter equipped with a flow-through cell. Midpoint and influent water quality parameters are collected manually just prior to sample collection. Effluent water quality parameters are collected and stored electronically via the YSI auto logging feature automatically over the course of an effluent sampling event. Tabulated effluent water quality parameters are presented as Table B-6, and midpoint and influent water quality parameters are presented as Table B-7. Only the final stabilized influent and midpoint parameters collected just prior to sampling are tabulated. Water quality parameters monitored include temperature, specific conductivity, dissolved oxygen, pH and turbidity.

Discussion of WWTP monitoring results – Influent analytical results and water quality parameters are evaluated to aid in determining GAC loading and to asses the performance of the dewatering process. Midpoint data is used to monitor the performance of the WWTP system prior to the lag GAC vessel. Elevated PCBs or other contaminants would indicate a treatment issue such as breakthrough or carbon channeling and would trigger further investigation by project engineers and WWTP personnel. Effluent data is compared to ROD analytical discharge goals (values listed in footer of Table B-5) and Massachusetts Class SB water quality parameters (testing not performed for Class SB biological parameters).

Influent - Influent analytical results and water quality parameters were similar to what has been observed in previous seasons. The influent sample is collected as a grab sample and therefore reflects conditions at the time of sampling.

Midpoint - Midpoint analytical testing from June 27, 2011 through July 01, 2011 showed that Aroclors were present in the wastewater following the lead GAC vessels. The elevated Aroclor concentrations were observed at startup through the first week of operation. It was suspected that some channeling of the GAC had occurred allowing contaminants to pass through untreated. An aggressive backwash regimen was performed on the vessels with the intent of agitating the GAC to correct any channeling. Following the aggressive backwash the WWTP system was returned to service. Follow-up testing indicated that Aroclor concentrations observed at the midpoint had dropped below detection. No further corrective action was necessary. The midpoint sample is collected as a grab sample and therefore reflects conditions at the time of sampling.

Effluent - Effluent analytical testing demonstrated that the WWTP system was performing as intended. Aroclor results were below detection limits for all sampling rounds. Metals results returned a few detections, but all were below the ROD discharge goals. It should be noted that some turbidity values observed were negative, this does not necessarily indicate an issue with the water quality meter, as a negative turbidity value indicates that the water being measured is clearer than the water used as a zero turbidity standard during calibration. Prior to discharge the effluent is collected in a large volume equalization tank. This practice typically results in little variability with regards to effluent water quality. The observation of short duration spikes in turbidity, dissolved oxygen or other parameters may be indicative of air bubbles in the flow through cell, this should be investigated before any corrective action is taken on parameters alone. Effluent samples are collected via a compositing auto-sampler programmed to collect sub-samples at discrete intervals over the course of a work day.

2.3.6 Transportation and Disposal

Transportation and disposal of waste generated at NBH has been conducted via truck and rail since 2005; however, due to ongoing offsite repairs to the rail system, direct rail disposal was not an option for 2011. All material generated by dredging in 2011 at NBH was transported and disposed of by H S Environmental, Inc. and its teaming partner EQ Northeast, Inc.

TSCA sand and oversize material generated at Area C was loaded from gravity drained stockpiles into trucks at Area C in preparation for transportation to a rail trans-load facility in Worcester, MA. From Worcester the material was shipped under manifest via rail to an approved TSCA landfill in Romulus, Michigan. A total of 105 trucks were loaded with TSCA sand at Area C for transportation to Worcester during 2011. A summary of 2011 TSCA waste shipments from Area C is provided as Table D-1.

Non-TSCA sand generated at Area C was loaded from gravity drained stockpiles into trucks at Area C for transportation to a rail trans-load facility in Worcester, MA. From Worcester the material was shipped under manifest via rail to an approved non-hazardous landfill in Niagara Falls, New York. A total of 15 trucks were loaded with non-hazardous sand at Area C for transportation to Worcester during 2011. A summary of 2011 non-TSCA waste shipments from Area C is provided as Table D-2.

TSCA waste generated at the Area D Dewatering Facility was loaded from filter cake stockpiles into trucks at Area D for transportation to a rail trans-load facility in Worcester, MA. From Worcester the material is shipped under manifest via rail to an approved TSCA landfill in Romulus Michigan. A total of 549 trucks were loaded with filter cake at Area D for transportation to Worcester during 2011. A summary of 2011 TSCA waste shipments from Area D is provided as Table D-3.

2.3.7 Mechanical Dredging Operations

Dredge Area Q was designed around preliminary dock plans submitted by the City of New Bedford's HDC. The dredged area is 50 ft wide, centered on the proposed dock footprint, and extends from the mean higher high water (MHHW) line on the shore out to the mean lower low water (MLLW) line to the east, approximately 200 ft. Per EPA's direction, the goal of the Area Q excavation was to remove all sediment with PCB concentrations over 10 ppm within the dredge area footprint. To meet this goal, EPA, NAE and Jacobs decided, based on sediment core results within the Area Q footprint, that a minimum of two ft of sediment would be removed.

Due to factors such as limited water depth, material type, dredge area size, and location relative to hydraulic dredge operations, mechanical dredging was selected as the preferred dredging method for Dredge Area Q (Figure A-20). A portion of the excavation was conducted on water using a barge-mounted excavator, work boats and scows. The remaining portion of work was performed using a land based, long stick excavator. Water based mechanical dredging operations, conducted from the east side of the dredge area towards the west were conducted utilizing a Komatsu PC225 excavator fitted with an Add-A-Stick® and a conventional one cubic yard (cy) bucket. The excavator was stationed on a flexi-float barge, similar to what is used for debris removal.

The land based excavation was performed utilizing a Terex TXC300 LC-2 long –stick excavator fitted with a conventional one-cy bucket.

Water based mechanical dredging operations in Dredge Area Q commenced on July 19, 2011. A tideboard in conjunction with a metered excavator stick were utilized to control excavation depth. GPS and plastic survey poles were used to delineate the edges of the excavation and changes in target elevation. Upon beginning the excavation it was immediately noted that the material type dredged from Area Q differed from the organic silt (OL) material typically dredged hydraulically. The Area Q material had a higher sand and gravel content than the OL material; this coarse material along with underlying cobbles and boulders made excavation difficult. The Area Q material also was noted to be heavily contaminated with oil. The material produced moderate oil sheen on the surface of the water when disturbed. Additional oil boom was deployed to successfully control the sheen. Water based work began at the eastern end of Area Q, and work progressed inland (west) until water depth limited the ability to maneuver the scows and barge. Work was temporarily suspended at Area Q when a small brass item (approximately 30 pounds) was recovered in the excavator bucket on July 20, 2011. The on-call project archaeologist determined that the item was likely stolen church property and illegally disposed of in the vicinity of where it had been recovered. A brief document, *Letter Report – New Bedford Harbor Superfund Site – Church Object Unanticipated Discovery and Documentation, New Bedford, MA* (Fathom 2012) has been prepared by the Fathom to document the item. EPA and NAE are currently working to determine the final disposition of the item.

Land based excavation with the long stick excavator began on July 26, 2011 and halted on July 27, 2011 following the release of a small quantity of free product oil from the sediment. Jacobs and SES worked to contain and collect the oil via oil boom and hydrophobic oil absorbing pads. The majority of the oil was quickly controlled and collected. The U.S. Coast Guard (USCG) was promptly notified of the release during the cleanup effort. Shortly after notification, USCG representatives arrived at NBH to inspect the release site, satisfied the appropriate control measures were being taken to control and collect the oil the USCG departed following inspection. The remaining volume was contained and absorbed by oil boom.

The oil release was due to disturbance of the sediment; however, the source of the oil is undetermined. In the 1980's, during the construction of Area C, the contaminated sediment was overlaid with a heavy geotextile fabric. It is hypothesized that the oil likely gathered underneath the confining geotextile as free product over time. The land based excavation disturbed the geotextile and allowed the oil to be released. Chemical analysis of the oil was unable to match the oil to a specific type but suggests the oil is likely a motor oil or a mixture of motor oils. PCB analysis revealed that while PCBs were present, the concentration was relatively low. This suggests the oil itself did not contain PCBs at the time of disposal. A decision was made by EPA, NAE and Jacobs to modify the original dredge plan in an effort to control the possibility of continued oil releases. The modified plan involved the removal of loose unconsolidated sediment within the dredge area above the geotextile fabric only. The modified plan left the abandoned combined sewer overflow (CSO) intact. All excavation at Area Q following the release of oil was performed at low tide which allowed the oil to be collected and absorbed more effectively. Following the removal of the loose sediment, a new layer of geotextile was laid over the western end of the excavation (as accessible to workers at low tide in knee-high wading boots), and crushed stone was placed on the fabric and graded. The thickness of the stone varies from one to three ft to accommodate the uneven contours of the river bottom and geotextile. The purpose of the additional fabric and stone is to act as a control measure to prevent contact with or disturbance to the sediment.

Approximately 400 cy of sediment was removed from Area Q. The volume was estimated using bucket counts. Dredged volume was not derived from the pre- and post-bathymetric surveys because the surveys were limited at the western portion of the dredge area due to shallow water; therefore, the survey area did not fully cover the dredge area. A pre-dredge bathymetric survey was conducted on July 11, 2011. Following the 2011 completion of excavation work in Area Q, a post-dredge bathymetric survey was conducted on August 6, 2011; see section 2.6.1 for additional information. Sediment samples were collected between August 4, 2011 and August 30, 2011 by CRE and Jacobs, see Section 2.6.2 for additional information.

2.4 AIR MONITORING

Ambient air monitoring was conducted during 2011 similarly to how it has been conducted from 2004 to 2010. Ambient air samples were collected for PCBs by EPA Method TO-10A. The samples were then analyzed by EPA Method 1668 for PCB Homologues via high resolution gas chromatography/mass spectroscopy.

The air quality monitoring program in 2011 was conducted to monitor remedial activities which included hydraulic dredging in Areas G, K, L, and N and mechanical dredging in Area Q. Based on the dredging locations and activities, various locations were selected for air monitoring. Figure E-1 shows the monitoring locations used for the 2011 season. Station locations used for the 2011 dredging season included: 24 (Aerovox), 55 (Aerovox West), 30 (Fiber Leather), 42 (NSTAR North), 43 (Veranda), 46 (Coffin Avenue), 49 (Area C), 50 (Area D), 53 (Dredge), 56 (Acushnet Park), 62 (Century House), and 63 (Area Q). The new location (63) was added for the 2011 season to monitor mechanical dredging activities in Area Q, southeast of the DDA. The 24-hour time-weighted average PCB concentrations were collected from all locations with the exception of the dredging station (53), which was sampled during the dredging hours to a maximum of eight hours for the day. The air sampling at the monitoring stations began during the day's dredging activities, and terminated the next day (24 hours later).

One round of pre-dredge sampling was completed before the 2011 season mobilization activities on May 25, 2011 at Stations 24, 55, 62, and 63. Three monthly rounds of samples were collected in 2011 during hydraulic dredging activities on the following dates: July 13, August 23, and September 14. One additional sample was collected at Station 63 during the active dredging of Area Q. A post-dredge round of samples was collected on October 11, 2011 after the completion of the dredging season and demobilization and winterization activities.

Air monitoring data collected as part of the 2011 dredging season show that the most elevated concentrations of total PCBs were detected during the periods of active dredging (Table E-1). The highest concentrations were found at the air monitoring stations on the dredge (53) and Aerovox (24) with maximum concentrations of 1,800 and 1,100 nanograms per cubic meter of air (ng/m^3) respectively. Only Aerovox West (55) showed higher concentrations during the non-dredging period. This station had a maximum concentration of 420 ng/m^3 on October 11, 2011, after active dredging was completed. This sample collection date coincides with the demolition of the Aerovox Building and the elevated PCB concentrations are possibly related to that event. In all other cases, the concentrations of PCBs in air are lower during non-dredging periods than during dredging events. In general, maximum concentrations of PCBs in air have declined from levels monitored since the first active dredging season of 2004 (maximum of 9,557 ng/m^3).

Air monitoring from the previous season was documented in the Jacobs December 2012 document *Final 2010 Ambient Air Monitoring Report, New Bedford Harbor Superfund Site* (Jacobs 2012). The air monitoring report includes an assessment of worker and public exposure to PCBs at a number of air sampling stations. The exposure is measured by the EPA developed Public Exposure Tracking System (PETS) curves.

Modeling of PCB concentrations in air has also been performed as a means of quantifying the impacts of ambient PCBs on air quality. The modeling effort, at the direction of EPA, is a continuation of modeling efforts by Jacobs (since 2004) and previously by other contractors. NBH modeling utilizes sampling and meteorology data as inputs to the EPA developed Industrial Source Complex Model (ISC3) to predict the dispersion of PCBs in air from such scenarios as dredging activities, proposed CAD cell development, and continued exposure of tidal mud flats. The most recent summarization of NBH air modeling is documented in the Jacobs May 2011 document *Draft Air Dispersion Modeling of 2009 and 2010 Dredging Operations, New Bedford Harbor Superfund Site, MA* (Jacobs 2011a).

2.5 DEMOBILIZATION

Demobilization activities commenced on September 20, 2011 and were completed on September 30, 2011. Demobilization was conducted similar to past seasons with the exception of removing some of the sheet piles to allow recreational use of the Acushnet River.

A brief list of the major activities conducted as a part of demobilization is presented below:

- flushing all dredge lines;
- disassembly and storage of all booster pump related equipment and materials;
- restoration to original conditions at both booster pump sites;
- removal and storage of all cables from dredge areas;
- removal and storage of select sheet piles from the harbor;
- disassembly and storage of all dredge pipelines up to the Area C fence line;
- removal of all boats, scows and dredges from the water;
- flushing of the WWTP system;
- wash down of Desanding plant;
- wash down of Dewatering plant;
- draining of all piping systems that are not in a heated area or freeze protected.

2.6 POST-DREDGE ACTIVITIES

2.6.1 Post-Dredge Bathymetric Survey

Following the cessation of dredge activities in a dredge area for a field season a post-dredge bathymetric survey is typically conducted. The purpose of a post-dredge bathymetric survey is to asses the compliance of the actual field work to the dredge plan, and to calculate the volume of in-situ material removed.

CRE performed the post-dredge bathymetric surveys in a manner similar to post-dredge surveys performed in the past for Jacobs at NBH. One difference to note was that the final progress survey and post-dredge survey in Dredge Area K were conducted using a dual frequency precision echo sounder rather than the single frequency precision echo sounder typically used at NBH. The use of the dual frequency device did not change the way either dredge plan compliance or volume of material dredged was determined, as only the high frequency data was used for these determinations. The single frequency device utilizes the same frequency as the high frequency portion of the dual frequency echo sounder. The low frequency portion of the dual frequency echo sounder is utilized for its ability to see through loosely consolidated dredge residuals. The information the dual frequency echo sounder provides is currently being evaluated for use on the NBH project; its evaluation is beyond the scope of this report.

The Dredge Area Q post-dredge bathymetric survey (Figure A-21) was conducted on August 6, 2011. Area Q bathymetry was not evaluated regarding dredge tolerances due to alterations made to the original plan. See section 2.3.7 for additional information.

The post-dredge bathymetric survey was conducted in Dredge Areas G, N, and K on October 6, 2011 and October 7, 2011. The dredge plan compliance and final in-situ volume dredged were calculated and reported in a project Quality Control Report, *Final Dredge Accuracy 2011 New Bedford Harbor Superfund Site* (Attachment A-1).

2.6.2 Post-Dredge Sediment Sampling

Post-dredge sediment samples are collected and analyzed following dredging to asses the amount of residual contamination remaining in situ (typically the surficial 0.5 ft). Sediment samples are also evaluated and described geologically for soil types, color and consistence.

Dredge Area Q post dredge sediment samples were collected between August 4, 2011 and August 30, 2011 by CRE and Jacobs. Sediment samples were collected via vibracore, hand auger or surface grab depending on the material type and location.

Sample collection depths ranged from 0.5 ft to 5 ft below the sediment surface. The Area Q post-dredge samples were collected at depths deeper than typically done in an effort to characterize the area for possible future recreational use by the city. Sample collection was performed at one foot intervals at each location until refusal was encountered. Sediment samples were described geologically and analyzed for PCB Aroclors and semivolatile compounds. PCB Aroclor results are presented on Figure A-21; semivolatile results are available from the Battelle NBH Project Database.

Post-dredge sediment cores were collected from Dredge Areas G, K and N by Woods Hole Group (WHG) for NAE on November 15, November 17 and November 22, 2011. The majority of the 2011 post-dredge cores were collected at locations where pre-dredge samples had been collected previously. Following the collection of the cores, WHG split, described and sampled the cores for PCB congener analysis. The analytical results and OL thicknesses are illustrated on Figures A-22, A-23 and, A-24.

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3.0 MASS BALANCE

The 2011 mass balance calculations represent a high level assessment of the primary treatment process conducted at NBH, dredging contaminated sediment and separating the solids from the liquids for further treatment or disposal. The major components of this process are as follows:

- dredge and pump sediment slurry from the dredge areas via slurry pipeline to Area C;
- inject ferric sulfate into slurry pipeline to treat hydrogen sulfide gas;
- introduce city water to the process from booster pump seal water, wash down water and polymer make-up water;
- separate wet solid oversize material from slurry using desander coarse screen shaker ($\geq$ 1/4 inch);
- separate wet solid sand from the slurry using desander hydrocyclones that report wet solids (primarily sand) from slurry onto the desander 200-mesh screens;
- separate wet sand ($\geq$ 0.0029 inch) from residual silt and clays on the 200-mesh inclined vibratory screens, the sand passes over the screens and drops to the floor for stockpiling, finer materials pass through the screen with the water and the resultant slurry is pumped to the Dewatering Facility;
- add polymer flocculent to increase dewatering efficiency;
- separate wet solid sediment from slurry using Dewatering Facility filter presses; and
- separate residual solids from waste water using the Area D WWTP, recycling solids back to the filter press feed tanks, and discharging treated water to New Bedford Harbor.

The information used to present and calculate the mass balance data is derived from a number of sources. The monitoring data such as totalized flow meter readings, percent solids measurements, solids quantity estimates and chemical additive quantities is based on the Sevenson Operational Monitoring Data table (Attachment C). The table is updated and distributed daily throughout the dredge season. Water balance information is based on flow meter readings and usage estimates from historical measurements. Water added to the treatment system is tabulated by use and points of addition (Table F-1). Solids balance information is based on Area C weigh scale data and filter cake production

(Attachment C). It should be noted that the sand weights in Attachment C differ from those presented in Attachment D, and that the Attachment C weights are that of the sand as it is removed from the Desanding Facility for stockpiling. The Attachment D weights are the weights at the time of disposal.

3.1 SOLID BALANCE

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3.2 WATER BALANCE

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3.3 PREDICTED PRODUCTION QUANITITIES VERSUS ACTUAL PRODUCTION QUANTITIES

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3.4 PCBs REMOVED

Table F-4 provides an estimate of the mass of PCB Aroclors removed from the harbor by dredging in 2011. The following paragraph describes how the amount of PCBs removed is calculated. First the average PCB Aroclor concentrations and average percent solids values used for the calculation were determined from the analytical data presented in Table B-1 (sand) and Table B-3 (filter cake). Using the average percent solids value for a particular material and the scale weighed wet weight (Attachment D) of that material the dry weight is calculated. The next step is to take the dry material weight and average Aroclor concentration and convert all values to similar units (kilograms). The dry weight of material and average Aroclor concentration are then multiplied to yield kilograms of PCB Aroclors, this value is then converted to tons. The PCB mass removed calculations have been performed for previous dredge seasons. Table F-5 provides a cumulative summary of PCB Aroclors removed via dredging by the Jacobs team since 2004.

While it is believed that the methods used to determine the amount of PCBs removed is accurate, there are several factors that may bias the measurement:

- the oversize material generated on the coarse screen is not analyzed for PCBs; for estimating purposes its weight is added to the sand and the average sand PCB concentration is applied;
- concentration variations inherent in sampling or compositing ;
- PCBs removed by the WWTP are not measured;
- variations in material affecting percent solids;
- differences in the material weight due to draining or evaporation between the time of sample collection and weighing of trucks.

Attachment G provides a brief summary of NBH production metrics, Table G-1 summarizes 2011 production while Table G-2 provides a production summary since the beginning of NBH dredging activities by the Jacobs/SES team in 2004.

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4.0 LESSONS LEARNED

This section evaluates the field execution of the project and different ways that improvements can be made to enhance safety, efficiency or reliability. The inclusion of an idea as a lesson learned does not guarantee that it will be carried forth but means that it warrants closer examination. Only after evaluating the cost, implementability and practicality can it be determined if a lessons learned will become a routine practice at the site. A tabulated list of lessons learned developed over the 2011 season is included as Attachment H.

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5.0 NON-DREDGING SCOPE OF WORK

5.1 AREA C IMPROVEMENTS

5.1.1 Fencing

At the end of the 2010 season work crews demolished or moved the office trailers located at the south side of Area C in preparation for turning a portion of the site over to the City of New Bedford (the City) to support future development. Following the removal of the trailers, utilities were disconnected or terminated and the area graded. In cooperation with the City, EPA, NAE and Jacobs designed a fencing and gate system that would allow use of the vacant lot by the City but still allow truck access to the site. The gate system allows the City access to the river through the lot but prevents unauthorized access to the site. Figure A-24 illustrates the fencing and gates added to the site during 2011 mobilization activities to support the City.

5.1.2 Office Relocation

The majority of the Area C office relocation activities described in Section 5.1.1 were completed in 2010. Some work, however, remained to be done in 2011. Two of the office trailers were relocated, secured and electrified for use as NAE storage or office space for SES. The Area C laboratory trailer was installed and electrified beside the Desanding Facility. Two new office trailers were installed beside the Area C main office building to house Jacobs field staff. A new electromechanical main gate and security office were installed at the main entrance to Area C.

5.1.3 EPA Informational Trailer

For the duration of the 2011 field season, EPA requested that an office trailer be rented and installed in the southern parking lot of Area C (street level access). The office trailer was used to conduct informational meetings and field questions from the public regarding the NBH dredging program or the former Aerovox Facility demolition. Jacobs demobilized the trailer at the conclusion of field activities.

5.1.4 Maintenance of Institutional Controls

As a part of the Superfund remedy, institutional controls such as fencing, informational kiosks and signage are installed at access points to the harbor around the NBH site. Jacobs, at the direction of EPA/NAE, routinely replaces damaged or missing signage, repairs fencing and gates, and updates information on the kiosks. The institutional controls are maintained under the NBH Operations and Maintenance contract. Jacobs is currently producing a harbor wide figure showing the locations of public access points, signage and kiosks.

6.0 SUMMARY OF 2011 ACTIVITIES

Attachment I provides a detailed list of major events, submittals and activities conducted by Jacobs at NBH during the 2011 calendar year.

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7.0 REFERENCES

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ATTACHMENT A

Figures

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ATTACHMENT A-1

Quality Control Report
Final Dredge Accuracy 2011

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ATTACHMENT B

Analytical Data Summary

Table B-1
2011 Summary of Area C Sand Analytical Data

Sample ID	Control Number	Total Aroclors (mg/kg)	Oil and Grease (ppm)	Antimony (mg/kg)	Arsenic (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Thallium (mg/kg)	Zinc (mg/kg)	Total Cyanide (mg/kg)	% Solids
V1-062911	NB-P000901	86	440	0.06UJ	1.5	0.12J	0.35J	14.1J	32.8J	41.0	0.007J	5.0	0.16U	0.30J	0.08U	53.6J	0.24U	87
V1-070711	NB-P001001	30.8	660	0.06U	1.4	0.09J	0.06J	7.2	16.1	44.4	0.04	4.0	0.33J	0.15J	0.08U	44.9	0.24U	86
V1-071111	NB-P002101	19	450	1.6J	1.6	0.12J	0.11J	7.5	19.3	226J	0.04J	3.4J	0.21U	0.25J	0.08U	33.8	0.24U	88
V1-071411	NB-P002301	40.2	1200	0.04J	1.5	0.15J	0.09J	9.8	20.1	32.3	0.03J	4.3	0.10J	0.05J	0.05U	47.7	0.27U	84
V1-071911	NB-P002401	90	1100	0.05U	1.4	0.18J	0.16J	9.4	31.6	47.6	0.04	5.4	0.16J	0.02U	0.06U	43.8	0.24U	85
V1-072111	NB-P002402	19	430	0.29J	1.5	0.10J	0.07J	17.1J	21.1J	41.3	0.03J	5.7	0.29J	0.42J	0.08U	42.0	0.24U	84
V1-072611	NB-P003901	46.9	950	0.11J	1.6	0.13J	0.20J	19.7	177	118	0.07	5.2	0.13UJ	0.16J	0.07U	125	0.27U	84
V1-080111	NP-P004001	185	1300	0.06U	1.8	0.13J	0.30J	24.0	32.1	102	0.08	5.9	0.15J	0.18J	0.07UJ	94.8	0.24U	87
V1-080811	NP-P004601	112	640	0.04UJ	1.9J	0.10J	1.1	12.8	25.7	189	0.08	4.7	0.11J	0.04J	0.05UJ	139	0.24UJ	84
V1-081611	NB-P007201	46	1400	0.05UJ	1.9	0.12J	0.17J	13.0	29.1	45.5	0.07	4.8	0.21J	0.25J	0.07U	78.8	0.24U	83
V1-081911-1	NB-P007501	23.4	420	0.07UJ	1.4	0.07J	0.10J	11.0	26.4J	41.0	0.07U	5.0	0.16U	0.20J	0.08UJ	52.4J	0.24U	92
V1-081911-2	NB-P007601	40	420	0.05UJ	1.6	0.07J	0.14J	9.4	22.0J	35.3	0.13	4.5	0.20J	1.9	0.06UJ	55.8J	0.24U	92
V1-082411	NB-P007701	189	1300	0.08UJ	1.7	0.18J	0.25J	17.7	43.4	92.0	0.37	6.7	0.20U	0.27J	0.10UJ	98.9	0.27U	78
V1-083111	NB-P007901	127	1500	0.15J	2.2	0.19J	0.26J	17.0	49.6	77.3	0.30	6.2	0.40J	0.18J	0.09U	93.8	0.27U	80
V1-091211	NB-P008001	143	1400	0.13J	1.6	0.20J	0.83	15.3	68.4	65.3	0.12	6.1	0.40U	0.14J	0.07U	133	0.24U	80

Notes:
Composite sand samples collected approximately every 100 tons.
Oil and grease originally reported on a percent by weight basis; converted to parts per million (ppm).
"J" qualifier indicates estimated data.
"U" qualifier indicates analyte not detected above method detection limit (MDL).
"UJ" qualifier indicates analyte not detected above estimated MDL.
mg/kg = milligrams per kilogram
ppm = parts per million
% = percent

Table B-2
2011 Area C and D Sieve Samples Geotechnical Summary

Area C			
Desander Spoils			
Sample ID	% Gravel	% Sand	% Silt and Clay
V1-070711	0.2	84.8	15.0
V1-071111	1.8	85.0	13.2
V1-071911	0.2	81.9	17.9
V1-072611	0.6	82.1	17.3
V1-080111	0.3	79.6	20.1
V1-081611	0.3	72.8	26.9
V1-083111	0.0	72.3	27.7
V1-091211	0.5	68.0	31.5

Area D			
Filter Cake			
Sample ID	% Gravel	% Sand	% Silt and Clay
V2-063011	0.0	5.9	94.1
V2-070811	0.0	4.1	95.9
V2-071411	0.0	3.5	96.5
V2-071811	0.0	5.7	94.3
V2-072111-02	0.1	4.9	95.0
V2-072711	0.1	5.1	94.8
V2-080211	0.0	3.5	96.5
V2-080411	0.0	9.3	90.7
V2-080911	0.0	13.1	86.9
V2-081211	0.4	29.4	70.2
V2-081711	0.0	9.1	90.9
V2-082311	0.2	16.9	82.9
V2-082911	0.0	5.9	94.1
V2-090211	0.1	3.3	96.6
V2-091211	0.0	4.8	95.2
V2-091511	0.0	4.1	95.9
V2-092011	0.0	3.7	96.3

Notes:
Samples evaluated via ASTM method D422.
Desander spoils refers to material generated on the #200 mesh shaker screen.
% = percent

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Table B-4
2011 Summary of Analytical Data for Area D Filter Cake

Sample ID	Control Number	Drops		Total Aroclors (mg/kg)	Oil and Grease (ppm)	Antimony (mg/kg)	Arsenic (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Thallium (mg/kg)	Zinc (mg/kg)	Total Cyanide (mg/kg)	% Solids
V2-062911	NB-P001201	1	55	850	3100	0.09U	8.9	0.66	3.1	113	238	168	0.47	24.8	1.2	0.88J	0.1U	486	0.33U	64
V2-063011	NB-P001101	56	110	398	1700	0.09U	8.6	0.68	1.4	59.5	122	119	0.48J	19	1.2J	0.64J	0.11U	392	0.36U	61
V2-070711	NB-P001801	111	165	396	2200	0.09U	9.3	0.67	2.2	81.4	239	176	0.77J	22	1.1J	0.93J	0.11U	596	0.33U	62
V2-070811	NB-P001901	166	220	253	1600	0.07U	8.2	0.65	1.2	49.9	107	100	0.45J	17.4	1	0.14J	0.08U	332	0.36U	63
V2-071211	NB-P002001	221	275	193	2100	0.08U	9	0.82	2.2	84.1	191	154	0.46	21.6	1J	0.46J	0.1U	549	0.38U	62
V2-071411	NB-P002501	276	330	520	1900	0.08U	9.5	0.87	2.2	90.3	246	189	0.67	22.3	0.85J	0.77J	0.1U	688	0.36U	60
V2-071511	NB-P002601	331	385	434	2100	0.08U	9	0.86	2.7	103	265	185	0.57	23.8	0.79J	0.5J	0.1U	677	0.38U	60
V2-071811	NB-P002701	386	440	482	2600	13.4	10.4	0.89	3.4	127	346	248	0.78	27.0	1.2	0.6J	0.1U	998	0.36U	60
V2-072111-01	NB-P002801	441	495	306	2600	0.13U	8.9	0.69	2.1	93.1	216	201	0.68J	22.9	0.82J	1.2J	0.16U	564	0.33U	62
V2-072111-02	NB-P002901	496	550	178	2100	0.08U	9.7	0.71	2.2	85	252	213	0.8J	22.3	0.94J	0.94J	0.1U	705	0.36U	61
V2-072611	NB-P004301	551	605	161	3400	0.14J	8.8	0.74	2.2	79.3	208	185	0.74	21.1	1J	0.73J	0.12U	607	0.33U	63
V2-072711	NB-P004101	606	660	178	3300	0.08U	9.4	0.65	4.0	117	319	303	0.95	24.9	0.5J	0.76J	0.1U	1010	0.33U	62
V2-080111	NB-P004201	661	715	660	4500	0.46U	10.8	0.72	6.5	164	449	358	1.2	31.7	0.86J	1.1J	0.11U	1240	0.36U	61
V2-080211	NB-P004901	716	770	570	3300	0.13U	9.7	0.74J	4.0	156	324	218	1.0	31.7	1J	1.4J	0.15U	602	0.36UJ	60
V2-080311	NB-P005001	771	825	417	4600	0.08U	10.6	0.73	3.4	133	409	268	1.3	28.0	1.6	1.5J	0.1U	935	0.36UJ	61
V2-080411	NB-P005101	826	880	327	5700	0.08U	10.4	0.69	3.3	119	421	273	1.2	26.4	1.5	1.3J	0.1U	976	0.33UJ	63
V2-080811	NB-P005201	881	935	482	4300	0.17UJ	10.3	0.66	4.7	149	435	258	1.1	30.0	1.4	0.96J	0.1UJ	811	0.36UJ	62
V2-080911	NB-P006601	936	990	350	4000	0.11U	10.0	0.68J	2.7	116	402	249	0.97	25.4	1.4J	1.8J	0.13U	906	0.33UJ	63
V2-081111	NB-P006701	991	1045	458	2800	0.09UJ	9.9	0.64J	3.1	132	366	242	0.92	27.9	1.2J	1.3J	0.11U	803	0.33U	63
V2-081211	NB-P006901	1046	1100	429	3200	0.11U	10.9	0.64J	2.6	111	428	276	0.91	26.2	0.89J	1.5J	0.13U	1030	0.33U	63
V2-081511	NB-P007001	1101	1155	550	3800	0.11U	11.4	0.65J	2.7	109	482	318	1.2	26.9	1.1J	1.6J	0.14U	1250	0.33U	62
V2-081711	NB-P007101	1156	1210	750	4900	0.11UJ	1.8	0.01U	0.01U	90.3	52	28.2	1.5J	37.3	0.26U	0.22J	0.13U	57.1	0.33U	63
V2-081911	NB-P007301	1211	1265	511	3600	0.13U	10.4	0.55	3.3	147	372	238	0.83	36.8	1.4J	1.2J	0.16UJ	830	0.36U	62
V2-082311	NB-P007401	1266	1320	1190	4900	R	10.6	0.73	6.2J	181	470	283	1.0	35.2	0.98J	1.4J	0.09UJ	991J	0.36U	62
V2-082511	NB-P008801	1321	1375	580	4700	0.18J	10.9	0.75J	4.7	156	497	320	1.3	31.8	1.2J	0.97J	0.33J	1150	0.33U	63
V2-082911	NB-P008901	1376	1430	560	4900	0.14U	11.0	0.71	4.7	164	536	355	1.4	33.6	1.4J	1.6J	0.48J	1330	0.36U	63
V2-083111	NB-P007801	1431	1485	610	5500	0.14U	10.8	0.75J	4.4	157	522	330	1.7	33.0	1.2J	1.4J	0.43J	1240	0.36U	63
V2-090211	NB-P009001	1486	1540	457	4300	0.39J	10.3	0.85	4.3	142	449	293	1.3	31.3	1.7U	1.1J	0.13J	1120	0.36U	60
V2-090811	NB-P009101	1541	1595	630	2800	0.26J	10.3	0.82	4.0	124	401	277	1.2	28.2	1.3U	1J	0.16J	995	0.33U	61
V2-091211	NB-P009201	1596	1650	520	3000	0.5J	10.1	0.76	3.2	104	385	262	1.0	24.4	1.4U	1.2J	0.13U	947	0.36U	62
V2-091411	NB-P009301	1651	1705	2130	4000	0.14J	10.1	0.59J	2.5	80.1	380	249	0.98	21.9	1.7U	1.3J	0.13U	993	0.33U	64
V2-091511	NB-P009401	1706	1760	1790	5000	0.09U	10.3	0.61J	2.4	78.1	409	256	1.0	22.0	1.3U	1.1J	0.11U	1060	0.31U	64
V2-091611	NB-P009701	1761	1815	155	3400	0.09U	9.5	0.61J	1.9	65.5	309	202	0.79	19.9	1.1U	0.98J	0.11U	825	0.33U	63
V2-092011	NB-P009501	1816	1870	1800	4900	0.1U	10.1	0.62J	3.1	116	393	236	0.86	25.4	1.5U	1.5J	0.12U	826	0.33U	63
V2-092211	NB-P009601	1871	1925	2880	5400	0.09U	10.0	0.64	4.6	167	423	248	0.89	30.2	1.3U	1.9	0.11U	830	0.33U	63

Notes:
Composite filter cake samples collected approximately every 550 tons.
Oil and grease originally reported on a percent by weight basis; converted to parts per million (ppm).
"J" qualifier indicates estimated data.
"U" qualifier indicates analyte not detected above method detection limit (MDL).
"R" qualifier indicates data rejected during validation.
"UJ" suffix indicates analyte not detected above estimated MDL.
mg/kg = milligrams per kilogram
ppm = parts per million
% = percent

Table B-5
2011 Summary of Waste Water Treatment Plant Analytical Results

Lab: Test America

Sample Date	COC #	Influent					Midpoint		Effluent				
		Aroclor (µg/L)	Cu (µg/L)	Cd (µg/L)	Cr (µg/L)	Pb (µg/L)	Aroclor (µg/L)	Cu (µg/L)	Aroclor (µg/L)	Cu (µg/L)	Cd (µg/L)	Cr (µg/L)	Pb (µg/L)
6/27/2011	NB-P0007	35	18.2J	0.87J	2.3J	6.2J	0.12	4.5J	0.048U	3.3J	1.1J	4.5J	5.4U
6/28/2011	NB-P0008								0.049U	2.6J	0.64J	2.3J	5.4U
6/29/2011	NB-P0013	9.8	5J	0.45U	0.55U	5.4U	0.079	2.1J	0.048U	1.6U	0.45U	0.64J	5.4U
6/30/2011	NB-P0014								0.048U	2.5J	1.3J	2.5U	6.3J
7/1/2011	NB-P0015	7.5	3J	0.84J	1U	6.3J	0.063	1.6U	0.048U	1.6U	1.3J	1.7U	5.4U
7/7/2011	NB-P0017	18					0.049U	5.5J	0.049U	1.8J	1.3U	0.92J	5.4U
7/14/2011	NB-P0030	14					0.048U	1.6U	0.05U	1.6U	0.65	1.3	5.4U
7/21/2011	NB-P0032						0.052U	1.6U	0.049U	1.6U	1.8J	1.1J	5.4U
7/28/2011	NB-P0044						0.049U	2.1J	0.049U	1.6U	1.4J	1.2J	5.4U
8/11/2011	NB-P0068	27	46	1.6J	6.6J	26.8	0.049U	1.8J	0.048U	1.6U	1.3J	2.7J	5.4U
9/1/2011	NB-P0104	61	64.8	2J	17.5	50.3	0.049U	1.9J	0.052U	1.8J	1.7J	5.9J	6.1J
Field Duplicate													
7/7/2011	NB-P0017						0.049U	5.8J					

ROD discharge goals:
PCB Aroclor = 0.065 µg/L
Cu = 5.6 µg/L
Cd = 9.3 µg/L
Cr = 50 µg/L
Pb = 8.5 µg/L
Discharge limits applied to the monthly average.

Notes:
"J" qualifier indicates estimated data.
"U" qualifier indicates analyte not detected above method detection limit (MDL).
µg/L = micrograms per liter

Table B-6
2011 WWTP Effluent Water Quality Data

Date	Time	Temperature (°C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH	Turbidity[1,2] (NTU)
6/27/2011	7:58:42	21.79	67893	6.06	6.47	-0.7
6/27/2011	8:09:58	21.85	68402	5.99	6.51	-0.9
6/27/2011	8:21:26	21.86	68602	5.95	6.51	-0.4
6/27/2011	8:36:34	21.86	68703	5.95	6.54	-0.2
6/27/2011	8:48:12	21.73	68929	4.37	6.51	-1.1
6/27/2011	8:56:35	21.73	68945	4.90	6.52	-1.2
6/27/2011	9:07:07	21.85	68930	5.90	6.52	-1.2
6/27/2011	9:10:56	21.85	68936	5.92	6.55	-1.2
6/27/2011	9:25:56	21.84	68951	5.97	6.55	-1.2
6/27/2011	9:40:56	21.72	68976	3.39	6.48	-1.2
6/27/2011	9:55:56	21.81	68988	5.68	6.53	-1.2
6/27/2011	10:10:56	21.86	68997	5.92	6.53	-1.3
6/27/2011	10:25:56	21.90	68971	5.96	6.54	-1.2
6/27/2011	10:40:56	21.88	68840	4.83	6.51	-1.3
6/27/2011	10:55:56	22.05	68769	5.86	6.53	-1.3
6/27/2011	11:10:56	22.13	68589	5.91	6.53	-1.4
6/27/2011	11:25:56	22.26	68231	5.96	6.53	-1.4
6/27/2011	11:40:56	22.25	67862	4.86	6.50	-1.4
6/27/2011	11:55:56	22.44	67775	5.79	6.50	-1.4
6/27/2011	12:10:56	22.54	67755	5.75	6.50	-1.4
6/27/2011	12:25:56	22.65	67917	5.79	6.50	-1.3
6/27/2011	12:40:56	22.75	68244	5.68	6.49	-1.4
6/27/2011	12:55:56	22.86	68694	5.64	6.49	-1.3
6/27/2011	13:10:56	22.97	69225	5.64	6.49	-1.4
6/27/2011	14:06:37	23.23	70655	5.73	6.56	-1.3
6/27/2011	14:21:37	23.50	71143	5.34	6.50	-1.3
6/27/2011	14:36:37	23.63	71371	5.27	6.50	-1.4
6/27/2011	14:51:37	23.76	71578	5.28	6.50	-1.3
6/27/2011	15:06:37	23.87	71723	5.22	6.51	-1.4
6/27/2011	15:21:37	23.97	71789	5.20	6.51	-1.4
6/27/2011	15:36:37	24.00	71789	5.14	6.52	-1.4
6/27/2011	15:51:37	23.95	71770	4.35	6.52	-1.4
6/27/2011	16:06:37	23.95	71766	4.26	6.52	-1.4
6/27/2011	16:21:37	24.15	71693	5.13	6.53	-1.4
6/27/2011	16:36:37	24.23	71557	5.12	6.53	-1.4
6/27/2011	16:51:37	24.31	71350	5.10	6.53	-1.4
6/27/2011	17:06:37	24.39	71011	5.08	6.52	-1.5
6/27/2011	17:21:37	24.47	70524	5.06	6.53	-1.5
6/27/2011	17:36:37	24.54	69862	5.05	6.53	-1.5
6/27/2011	17:51:37	24.62	69047	5.01	6.54	-1.5
6/27/2011	18:06:37	24.70	68281	5.01	6.54	-1.6
Daily Average		**22.92**	**69586**	**5.37**	**6.52**	**-1.3**

Table B-6
2011 WWTP Effluent Water Quality Data

Date	Time	Temperature (°C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH	Turbidity[1,2] (NTU)
6/28/2011	7:44:58	24.40	66861	5.89	6.47	-1.5
6/28/2011	7:59:58	24.88	65282	5.57	6.59	-1.6
6/28/2011	8:14:58	25.01	63559	5.58	6.59	-1.7
6/28/2011	8:29:58	25.14	62018	5.58	6.58	-1.7
6/28/2011	8:44:58	25.25	60795	5.63	6.58	-1.7
6/28/2011	8:59:58	25.34	59925	5.60	6.57	-1.7
6/28/2011	9:14:58	25.39	59435	5.59	6.57	-1.7
6/28/2011	9:29:58	25.39	59248	5.39	6.56	-1.7
6/28/2011	9:44:58	25.39	59340	5.37	6.55	-1.7
6/28/2011	9:59:58	25.37	59711	5.31	6.55	-1.7
6/28/2011	10:14:58	25.32	60340	5.24	6.54	-1.7
6/28/2011	10:29:58	25.26	61253	5.15	6.54	-1.7
6/28/2011	10:44:58	25.20	62287	5.07	6.54	-1.7
6/28/2011	10:59:58	25.14	63430	4.97	6.54	-1.7
6/28/2011	11:14:58	25.09	64472	4.87	6.55	-1.7
6/28/2011	11:29:58	25.05	65358	4.80	6.55	-1.7
6/28/2011	11:44:58	24.99	66216	4.78	6.56	-1.7
6/28/2011	11:59:58	24.96	66970	4.81	6.57	-1.7
6/28/2011	12:14:58	24.93	67597	4.88	6.59	-1.7
6/28/2011	12:29:58	24.87	68185	4.99	6.62	-1.6
6/28/2011	12:44:58	24.87	68747	4.99	6.63	-1.7
6/28/2011	12:59:58	24.83	69190	5.09	6.66	-1.7
6/28/2011	13:14:58	24.69	69550	4.10	6.66	-1.7
6/28/2011	13:29:58	24.78	69667	4.99	6.68	-1.7
6/28/2011	13:44:58	24.74	69944	5.17	6.70	-1.7
6/28/2011	13:59:58	24.66	70135	3.73	6.68	-1.7
6/28/2011	14:14:58	24.69	70194	5.19	6.71	-1.7
6/28/2011	14:29:58	24.69	70071	5.29	6.73	-1.6
6/28/2011	14:44:58	24.68	69992	5.26	6.74	-1.6
6/28/2011	14:59:58	24.58	69634	4.25	6.72	-1.6
6/28/2011	15:14:58	24.70	69435	5.31	6.75	-1.5
6/28/2011	15:29:58	24.71	68983	5.45	6.76	-1.5
6/28/2011	15:44:58	24.61	68437	3.97	6.73	-1.5
6/28/2011	15:59:58	24.72	68254	5.49	6.77	-1.4
6/28/2011	16:14:58	24.73	67831	5.53	6.78	-1.5
6/28/2011	16:29:58	24.65	67512	4.18	6.75	-1.4
6/28/2011	16:44:58	24.77	67375	5.57	6.78	-1.4
6/28/2011	16:59:58	24.80	67108	5.66	6.79	-1.5
6/28/2011	17:14:58	24.81	66976	5.58	6.78	-1.5
6/28/2011	17:29:58	24.89	66792	5.55	6.78	-1.5
6/28/2011	17:44:58	24.94	66802	5.57	6.78	-1.5
6/28/2011	17:59:58	25.01	66961	5.63	6.77	-1.5
Daily Average		**24.93**	**65997**	**5.16**	**6.65**	**-1.6**

Table B-6
2011 WWTP Effluent Water Quality Data

Date	Time	Temperature (°C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH	Turbidity[1,2] (NTU)
6/29/2011	7:39:53	24.83	64774	6.07	6.71	-1.0
6/29/2011	7:54:53	24.98	64995	5.76	6.78	-0.9
6/29/2011	8:09:53	25.01	65118	5.45	6.77	-0.8
6/29/2011	8:24:53	25.02	65118	5.63	6.76	-0.8
6/29/2011	8:39:53	25.02	65036	5.75	6.77	-0.9
6/29/2011	8:54:53	24.98	64946	5.68	6.76	-0.9
6/29/2011	9:09:53	25.00	64764	5.62	6.74	-1.0
6/29/2011	9:24:53	25.00	64688	5.55	6.71	-1.1
6/29/2011	9:39:53	24.99	64666	5.51	6.70	-1.1
6/29/2011	9:54:53	24.98	64696	5.47	6.69	-1.2
6/29/2011	10:09:53	24.96	64788	5.43	6.68	-1.2
6/29/2011	10:24:53	24.94	64954	5.39	6.67	-1.2
6/29/2011	10:39:53	24.93	65185	5.40	6.67	-1.3
6/29/2011	10:54:53	24.94	65360	5.34	6.67	-1.3
6/29/2011	11:09:53	24.97	65514	5.31	6.67	-1.3
6/29/2011	11:24:53	25.00	65573	5.29	6.67	-1.4
6/29/2011	11:39:53	25.04	65587	5.32	6.68	-1.4
6/29/2011	11:54:53	25.03	65610	5.28	6.68	-1.4
6/29/2011	12:09:53	24.95	65676	3.68	6.67	-1.4
6/29/2011	12:24:53	24.95	65719	4.24	6.67	-1.4
6/29/2011	12:39:53	24.94	65704	4.57	6.68	-1.4
6/29/2011	12:54:53	25.01	65763	4.92	6.67	-1.4
6/29/2011	13:53:15	24.89	65994	5.64	6.77	-1.4
6/29/2011	14:08:15	25.15	66229	5.34	6.70	-1.4
6/29/2011	14:23:15	25.23	66244	5.32	6.70	-1.5
6/29/2011	14:38:15	25.28	65935	5.30	6.70	-1.5
6/29/2011	14:53:15	25.33	65235	5.31	6.70	-1.5
6/29/2011	15:08:15	25.35	64620	5.31	6.70	-1.4
6/29/2011	15:23:15	25.38	64322	5.31	6.70	-1.5
6/29/2011	15:38:15	25.42	64357	5.31	6.70	-1.5
6/29/2011	15:53:15	25.42	64700	1.33	6.66	-1.5
6/29/2011	16:08:15	25.54	64793	5.13	6.69	-1.5
6/29/2011	16:23:15	25.61	65034	5.09	6.69	-1.5
6/29/2011	16:38:15	25.67	65258	5.07	6.70	-1.5
6/29/2011	16:53:15	25.73	65508	5.06	6.70	-1.5
6/29/2011	17:08:15	25.79	65782	5.07	6.71	-1.6
6/29/2011	17:23:15	25.84	66023	5.06	6.72	-1.4
6/29/2011	17:38:15	25.89	66204	5.09	6.73	-1.4
6/29/2011	17:53:15	25.91	66318	5.17	6.75	-1.3
Daily Average		**25.20**	**65302**	**5.17**	**6.70**	**-1.3**

Table B-6
2011 WWTP Effluent Water Quality Data

Date	Time	Temperature (°C)	Specific Conductivity (μS/cm)	Dissolved Oxygen (mg/L)	pH	Turbidity[1,2] (NTU)
6/30/2011	7:38:01	25.46	65752	5.90	6.67	-1.3
6/30/2011	7:53:01	25.66	65231	5.64	6.73	-1.4
6/30/2011	8:08:01	25.62	64339	5.62	6.72	-1.4
6/30/2011	8:23:01	25.48	63278	5.66	6.72	-1.4
6/30/2011	8:38:01	25.38	62496	5.72	6.73	-1.3
6/30/2011	8:53:01	25.37	62039	5.72	6.73	-1.3
6/30/2011	9:08:01	25.44	61308	5.63	6.72	-1.3
6/30/2011	9:23:01	25.49	60947	5.63	6.71	-1.3
6/30/2011	9:38:01	25.55	60669	5.60	6.69	-1.3
6/30/2011	9:53:01	25.56	60540	5.57	6.69	-1.4
6/30/2011	10:08:01	25.54	60654	5.54	6.68	-1.4
6/30/2011	10:23:01	25.48	61053	5.54	6.68	-1.4
6/30/2011	10:38:01	25.43	61764	5.53	6.68	-1.4
6/30/2011	10:53:01	25.38	62739	5.52	6.68	-1.4
6/30/2011	11:08:01	25.36	63860	5.48	6.68	-1.4
6/30/2011	11:23:01	25.36	64941	5.46	6.69	-1.4
6/30/2011	11:38:01	25.38	65936	5.42	6.69	-1.4
6/30/2011	12:17:12	25.00	67616	5.88	6.83	-1.5
6/30/2011	12:32:12	25.51	68464	5.35	6.70	-1.6
6/30/2011	12:47:12	25.54	68757	5.32	6.71	-1.6
6/30/2011	13:02:12	25.56	68939	5.31	6.72	-1.6
6/30/2011	13:17:12	25.57	69054	5.30	6.73	-1.6
6/30/2011	13:32:12	25.58	69099	5.27	6.74	-1.6
6/30/2011	13:47:12	25.60	69115	5.18	6.74	-1.6
6/30/2011	14:02:12	25.61	69077	5.19	6.74	-1.5
6/30/2011	14:17:12	25.63	69002	5.21	6.75	-1.5
6/30/2011	14:32:12	25.66	68899	5.23	6.76	-1.5
6/30/2011	14:47:12	25.70	68803	5.30	6.77	-1.5
6/30/2011	15:02:12	25.76	68734	5.36	6.78	-1.6
6/30/2011	15:17:12	25.69	68681	2.49	6.74	-1.5
6/30/2011	15:32:12	25.85	68633	5.26	6.77	-1.5
6/30/2011	15:47:12	25.89	68544	5.25	6.77	-1.5
6/30/2011	16:02:12	25.95	68231	5.43	6.80	-1.5
6/30/2011	16:17:12	26.01	67828	5.45	6.81	-1.4
6/30/2011	16:32:12	26.02	67482	5.03	6.79	-1.4
6/30/2011	16:47:12	26.07	67294	5.35	6.81	-1.4
6/30/2011	17:02:12	26.06	67317	5.30	6.80	-1.4
6/30/2011	17:17:12	26.11	66781	5.37	6.82	-1.4
6/30/2011	17:32:12	26.14	66412	5.42	6.82	-1.3
6/30/2011	17:47:12	26.17	66172	5.44	6.82	-1.3
Daily Average		**25.64**	**65912**	**5.37**	**6.74**	**-1.4**

Table B-6
2011 WWTP Effluent Water Quality Data

Date	Time	Temperature (°C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH	Turbidity[1,2] (NTU)
7/1/2011	7:30:00	24.66	68105	4.69	6.64	-1.5
7/1/2011	7:45:00	25.92	68875	5.58	6.86	-1.4
7/1/2011	8:00:00	25.94	68781	5.60	6.85	-1.4
7/1/2011	8:15:00	25.94	68655	5.59	6.84	-1.5
7/1/2011	8:30:00	25.96	68618	5.54	6.81	-1.5
7/1/2011	8:45:00	25.97	68706	5.54	6.79	-1.6
7/1/2011	9:00:00	25.96	68940	5.53	6.78	-1.6
7/1/2011	9:15:00	25.86	69286	4.68	6.76	-1.7
7/1/2011	9:30:00	25.84	69744	5.34	6.75	-1.7
7/1/2011	9:45:00	25.75	70383	5.33	6.75	-1.7
7/1/2011	10:00:00	25.67	71035	5.28	6.75	-1.7
7/1/2011	10:15:00	25.60	71692	5.25	6.74	-1.8
7/1/2011	10:52:30	25.23	72949	5.60	6.77	-2.0
7/1/2011	11:07:30	25.56	73478	5.04	6.71	-1.8
7/1/2011	11:22:30	25.57	73739	5.02	6.71	-1.8
Daily Average		**25.70**	**70199**	**5.31**	**6.77**	**-1.6**

Table B-6
2011 WWTP Effluent Water Quality Data

Date	Time	Temperature (°C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH	Turbidity[1,2] (NTU)
7/7/2011	7:36:22	27.26	69780	5.62	6.58	-0.5
7/7/2011	7:51:22	27.36	69855	5.45	6.76	-2.1
7/7/2011	8:06:22	27.43	69536	5.39	6.75	-2.1
7/7/2011	8:21:22	27.43	69336	5.40	6.75	-2.1
7/7/2011	8:36:22	27.46	69129	5.41	6.76	-2.1
7/7/2011	8:51:22	27.47	68905	5.47	6.77	-2.1
7/7/2011	9:06:22	27.43	68642	4.58	6.76	-2.1
7/7/2011	9:21:22	27.47	68377	5.34	6.76	-2.1
7/7/2011	9:36:22	27.45	68109	5.35	6.76	-2.1
7/7/2011	9:51:22	27.43	67930	5.36	6.77	-2.1
7/7/2011	10:06:22	27.42	67854	5.40	6.77	-2.1
7/7/2011	10:21:22	27.40	67923	5.31	6.77	-2.1
7/7/2011	10:36:22	27.43	67937	5.26	6.77	-2.1
7/7/2011	10:51:22	27.46	67992	5.27	6.77	-2.1
7/7/2011	11:06:22	27.49	68100	5.32	6.79	-2.1
7/7/2011	11:21:22	27.49	68067	5.28	6.79	-2.1
7/7/2011	11:36:22	27.53	68213	5.28	6.80	-2.1
7/7/2011	11:51:22	27.56	68321	5.38	6.82	-2.1
7/7/2011	12:06:22	27.55	68390	5.41	6.83	-2.1
7/7/2011	12:21:22	27.59	68500	5.31	6.84	-2.1
7/7/2011	12:36:22	27.62	68587	5.41	6.86	-2.1
7/7/2011	12:51:22	27.63	68666	5.45	6.88	-2.1
7/7/2011	13:06:22	27.67	68867	5.32	6.87	-2.0
7/7/2011	13:21:22	27.70	69078	5.35	6.88	-2.0
7/7/2011	13:36:22	27.73	69321	5.40	6.89	-2.0
7/7/2011	13:51:22	27.74	69489	5.35	6.89	-2.0
7/7/2011	14:06:22	27.80	69714	5.26	6.89	-2.0
7/7/2011	14:21:22	27.84	69852	5.28	6.89	-2.0
7/7/2011	14:36:22	27.88	70006	5.33	6.90	-2.0
7/7/2011	14:51:22	27.88	70112	5.20	6.89	-2.0
7/7/2011	15:06:22	27.94	70304	5.21	6.89	-2.0
7/7/2011	15:21:22	27.97	70445	5.27	6.90	-2.0
7/7/2011	15:36:22	28.02	70588	5.28	6.90	-2.0
7/7/2011	16:12:56	28.03	70743	5.40	6.96	-2.1
7/7/2011	16:27:56	28.12	70755	5.22	6.89	-1.9
7/7/2011	16:42:56	28.14	70828	5.24	6.89	-1.9
7/7/2011	16:57:56	28.14	71010	5.26	6.89	-1.9
7/7/2011	17:12:56	28.11	71282	5.25	6.89	-1.9
7/7/2011	17:27:56	28.10	71588	5.08	6.88	-1.9
Daily Average		**27.67**	**69285**	**5.31**	**6.83**	**-2.0**

Table B-6
2011 WWTP Effluent Water Quality Data

Date	Time	Temperature (°C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH	Turbidity[1,2] (NTU)
7/14/2011	7:21:37	27.31	67104	5.68	6.97	-1.5
7/14/2011	7:36:37	27.49	67027	5.62	7.01	-1.5
7/14/2011	7:51:37	27.51	66858	5.60	6.99	-1.7
7/14/2011	8:06:37	27.53	66766	5.54	6.97	-1.7
7/14/2011	8:21:37	27.56	66781	5.54	6.96	-1.7
7/14/2011	8:36:37	27.55	66888	5.48	6.96	-1.8
7/14/2011	8:51:37	27.39	67138	0.71[2]	6.87	-1.9
7/14/2011	9:06:37	27.41	67160	4.10	6.93	-1.8
7/14/2011	9:21:37	27.55	67310	5.41	6.96	-1.8
7/14/2011	9:36:37	27.54	67489	5.50	6.96	-1.8
7/14/2011	9:51:37	27.51	67599	5.49	6.96	-1.8
7/14/2011	10:06:37	27.48	67625	5.34	6.95	-1.8
7/14/2011	10:21:37	27.48	67563	5.39	6.95	-1.8
7/14/2011	10:36:37	27.44	67388	5.44	6.96	-1.8
7/14/2011	10:51:37	27.38	67243	5.46	6.97	-1.8
7/14/2011	11:06:37	27.17	67024	4.00	6.93	-1.8
7/14/2011	11:21:37	27.27	66983	5.43	6.97	-1.7
7/14/2011	11:36:37	27.20	66872	5.50	6.98	-1.9
7/14/2011	11:51:37	27.13	66814	5.44	6.98	-1.8
7/14/2011	12:06:37	27.05	66756	5.18	6.98	-1.8
7/14/2011	12:21:37	27.05	66814	5.48	6.98	-1.8
7/14/2011	12:36:37	27.00	66947	5.59	7.00	-1.7
7/14/2011	12:51:37	26.80	67290	1.62[2]	6.89	-1.7
7/14/2011	13:06:37	26.92	67287	5.46	6.99	-1.8
7/14/2011	13:21:37	26.91	67483	5.54	7.00	-1.7
7/14/2011	14:15:23	26.74	68023	5.61	7.03	-1.7
7/14/2011	14:30:23	26.78	68074	5.50	7.01	-1.7
7/14/2011	14:45:23	26.67	68129	4.01	6.97	-1.6
7/14/2011	15:00:23	26.81	68120	5.58	7.01	-1.7
7/14/2011	15:15:23	26.78	68072	5.59	7.02	-1.7
7/14/2011	15:30:23	26.62	67817	3.16	6.96	-1.5
7/14/2011	15:45:23	26.63	67750	4.16	6.98	-1.5
7/14/2011	16:00:23	26.75	67708	5.62	7.04	-1.5
7/14/2011	16:15:23	26.68	67608	5.36	7.02	-1.5
7/14/2011	16:30:23	26.62	67023	3.56	6.98	-1.4
7/14/2011	16:45:23	26.78	66894	5.59	7.04	-1.5
7/14/2011	17:00:23	26.80	66421	5.68	7.04	-1.4
7/14/2011	17:15:23	26.77	66111	5.57	7.04	-1.4
7/14/2011	17:30:23	26.86	65332	5.56	7.02	-1.5
7/14/2011	17:45:23	26.92	64834	5.60	7.02	-1.5
Daily Average		**27.10**	**67153**	**5.25**	**6.98**	**-1.7**

Table B-6
2011 WWTP Effluent Water Quality Data

Date	Time	Temperature (°C)	Specific Conductivity (μS/cm)	Dissolved Oxygen (mg/L)	pH	Turbidity[1,2] (NTU)
7/21/2011	7:22:41	27.76	67379	5.84	6.50	-1.2
7/21/2011	7:37:41	28.12	68528	4.02	6.97	-1.8
7/21/2011	7:52:41	28.27	68560	5.45	7.02	-1.8
7/21/2011	8:07:41	28.27	68533	5.50	7.03	-1.9
7/21/2011	8:22:41	28.18	68305	3.94	6.96	-1.9
7/21/2011	8:37:41	28.33	68059	5.38	6.98	-1.9
7/21/2011	8:52:41	28.34	67578	5.39	6.97	-1.9
7/21/2011	9:07:41	28.37	66943	5.47	6.96	-1.9
7/21/2011	9:22:41	28.29	65897	3.05	6.89	-1.9
7/21/2011	9:37:41	28.39	65726	5.34	6.94	-1.9
7/21/2011	9:52:41	28.37	65154	5.38	6.95	-1.9
7/21/2011	10:07:41	28.34	64737	5.42	6.96	-1.9
7/21/2011	10:22:41	28.20	64089	4.11	6.93	-1.9
7/21/2011	10:37:41	28.32	63865	5.39	6.96	-1.9
7/21/2011	10:52:41	28.32	63422	5.49	6.98	-1.9
7/21/2011	11:07:41	28.21	62961	2.86	6.93	-1.9
7/21/2011	11:22:41	28.34	62802	5.42	6.97	-1.9
7/21/2011	11:37:41	28.37	62494	5.49	6.98	-1.9
7/21/2011	11:52:41	28.34	62233	4.35	6.93	-1.9
7/21/2011	12:07:41	28.40	62140	5.41	6.98	-1.9
7/21/2011	12:22:41	28.43	62000	5.48	6.98	-1.9
7/21/2011	12:37:41	28.43	61900	5.49	6.99	-1.9
7/21/2011	12:52:41	28.40	61732	5.03	6.97	-1.9
7/21/2011	13:07:41	28.48	61571	5.43	6.97	-1.9
7/21/2011	13:22:41	28.49	61342	5.49	6.98	-2.0
7/21/2011	13:37:41	28.48	61156	4.82	6.94	-1.9
7/21/2011	13:52:41	28.52	60998	5.40	6.97	-1.9
7/21/2011	14:07:41	28.54	60960	5.44	6.97	-1.9
7/21/2011	14:22:41	28.56	61042	5.48	6.98	-1.9
7/21/2011	14:45:00	28.61	61229	5.41	6.99	-1.9
7/21/2011	15:00:00	28.67	61347	5.39	6.97	-1.9
7/21/2011	15:15:00	28.73	61501	5.45	6.98	-1.9
7/21/2011	15:30:00	28.71	61696	1.59	6.89	-1.9
7/21/2011	15:45:00	28.82	61831	5.32	6.97	-1.9
7/21/2011	16:00:00	28.87	62008	5.35	6.97	-1.9
7/21/2011	16:15:00	28.90	62178	5.39	6.98	-1.9
7/21/2011	16:30:00	28.83	62305	3.97	6.94	-1.8
7/21/2011	16:45:00	28.97	62375	5.27	6.97	-1.9
7/21/2011	17:00:00	28.99	62474	5.32	6.97	-1.9
7/21/2011	17:15:00	29.00	62605	5.33	6.98	-1.9
7/21/2011	17:30:00	28.99	62783	5.13	6.97	-1.9
7/21/2011	17:45:00	29.01	62984	5.26	6.97	-1.9
Daily Average		**28.50**	**63558**	**5.02**	**6.95**	**-1.9**

Table B-6
2011 WWTP Effluent Water Quality Data

Date	Time	Temperature (°C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH	Turbidity[1,2] (NTU)
7/28/2011	7:18:40	28.55	71878	5.52	6.73	-1.7
7/28/2011	7:33:40	28.76	72154	5.41	6.91	-1.7
7/28/2011	7:48:40	28.76	72126	5.39	6.90	-1.6
7/28/2011	8:03:40	28.71	72103	5.37	6.90	-1.7
7/28/2011	8:18:40	28.66	72133	5.40	6.89	-1.6
7/28/2011	8:33:40	28.61	72222	5.37	6.89	-1.6
7/28/2011	8:48:40	28.55	72252	5.01	6.87	-1.6
7/28/2011	9:03:40	28.54	72463	5.19	6.89	-1.6
7/28/2011	9:18:40	28.52	72604	5.17	6.89	-1.7
7/28/2011	9:33:40	28.48	72766	5.20	6.89	-1.7
7/28/2011	9:48:40	28.43	72961	5.22	6.89	-1.7
7/28/2011	10:03:40	28.36	73178	5.23	6.89	-1.7
7/28/2011	10:18:40	28.29	73384	4.78	6.87	-1.7
7/28/2011	10:33:40	28.28	73587	5.10	6.87	-1.7
7/28/2011	10:48:40	28.24	73814	5.12	6.87	-1.7
7/28/2011	11:03:40	28.19	74067	5.14	6.86	-1.7
7/28/2011	11:18:40	28.13	74394	5.12	6.86	-1.7
7/28/2011	11:33:40	28.06	74698	5.09	6.85	-1.7
7/28/2011	11:48:40	28.01	74967	5.10	6.85	-1.7
7/28/2011	12:03:40	27.96	75233	5.11	6.86	-1.7
7/28/2011	12:18:40	27.92	75201	5.06	6.86	-1.8
7/28/2011	12:33:40	27.88	74615	5.05	6.88	-1.7
7/28/2011	12:48:40	27.83	74173	5.17	6.89	-1.6
7/28/2011	13:03:40	27.81	74061	5.19	6.91	-1.7
7/28/2011	13:18:40	27.86	74320	5.20	6.91	-1.7
7/28/2011	13:33:40	27.89	74472	5.17	6.91	-1.7
7/28/2011	14:06:42	28.06	75070	5.09	6.93	-1.6
7/28/2011	14:21:42	28.14	75199	5.06	6.89	-1.7
7/28/2011	14:36:42	28.20	75344	5.05	6.89	-1.7
7/28/2011	14:51:42	28.26	75452	5.04	6.89	-1.7
7/28/2011	15:06:42	28.33	75527	5.07	6.88	-1.6
7/28/2011	15:21:42	28.39	75554	5.05	6.88	-1.7
7/28/2011	15:36:42	28.44	75570	5.04	6.88	-1.7
7/28/2011	15:51:42	28.47	75557	4.96	6.87	-1.8
7/28/2011	16:06:42	28.52	75600	4.84	6.87	-1.7
7/28/2011	16:21:42	28.55	75600	4.86	6.87	-1.7
7/28/2011	16:36:42	28.59	75660	4.84	6.87	-1.7
7/28/2011	16:51:42	28.63	75652	4.85	6.87	-1.7
7/28/2011	17:06:42	28.66	75628	4.88	6.87	-1.7
7/28/2011	17:21:42	28.70	75608	4.92	6.88	-1.7
Daily Average		**28.33**	**74171**	**5.11**	**6.88**	**-1.7**

Table B-6
2011 WWTP Effluent Water Quality Data

Date	Time	Temperature (°C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH	Turbidity[1,2] (NTU)
8/11/2011	7:30:02	28.17	69485	5.64	6.70	-5.1
8/11/2011	7:45:02	28.37	69524	5.42	7.11	-4.7
8/11/2011	8:00:02	28.46	68873	5.42	7.10	-5.6
8/11/2011	8:15:02	28.44	68178	5.52	7.10	-5.4
8/11/2011	8:30:02	28.42	67617	5.45	7.09	-5.5
8/11/2011	8:45:02	28.36	67611	5.35	7.09	-5.5
8/11/2011	9:00:02	28.45	66662	5.37	7.08	-5.5
8/11/2011	9:15:02	28.44	66334	5.48	7.09	-5.5
8/11/2011	9:30:02	28.47	65417	5.42	7.09	-5.4
8/11/2011	9:45:02	28.53	64694	5.45	7.08	-5.5
8/11/2011	10:00:02	28.59	64020	5.46	7.07	-5.5
8/11/2011	10:45:49	28.55	63092	5.45	7.10	-5.7
8/11/2011	11:00:49	28.60	63069	5.44	7.06	-5.7
8/11/2011	11:15:49	28.56	63139	5.45	7.05	-5.6
8/11/2011	11:30:49	28.50	63219	5.47	7.06	-5.6
8/11/2011	11:45:49	28.45	63221	5.17	7.04	-5.6
8/11/2011	12:00:49	28.50	63417	5.38	7.05	-5.6
8/11/2011	12:15:49	28.48	63605	5.44	7.06	-5.7
8/11/2011	12:30:49	28.46	63719	5.30	7.05	-5.6
8/11/2011	12:45:49	28.45	64062	5.35	7.05	-5.7
8/11/2011	13:00:49	28.45	64233	5.41	7.06	-5.6
8/11/2011	13:15:49	28.43	64299	5.41	7.07	-5.6
8/11/2011	13:30:49	28.39	64303	5.01	7.04	-5.6
8/11/2011	13:45:49	28.46	64417	5.38	7.08	-5.7
8/11/2011	14:00:49	28.45	64462	5.46	7.09	-5.6
8/11/2011	14:15:49	28.42	64694	5.40	7.09	-5.6
8/11/2011	14:30:49	28.38	64959	5.50	7.10	-5.7
8/11/2011	14:45:49	28.35	65106	5.49	7.11	-5.6
8/11/2011	15:00:49	28.34	65266	5.39	7.10	-5.7
8/11/2011	15:15:49	28.39	65367	5.47	7.11	-5.7
8/11/2011	15:30:49	28.41	65487	5.50	7.12	-5.6
8/11/2011	15:45:49	28.45	65657	5.36	7.11	-5.7
8/11/2011	16:00:49	28.50	65853	5.40	7.12	-5.7
8/11/2011	16:15:49	28.52	66091	5.42	7.12	-5.6
8/11/2011	16:30:49	28.49	66132	5.30	7.11	-5.6
8/11/2011	16:45:49	28.55	66595	5.32	7.12	-5.6
8/11/2011	17:00:49	28.58	66903	5.39	7.13	-5.6
Daily Average		**28.45**	**65372**	**5.41**	**7.08**	**-5.6**

Table B-6
2011 WWTP Effluent Water Quality Data

Date	Time	Temperature (°C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH	Turbidity[1,2] (NTU)
9/1/2011	7:42:30	26.59	69656	5.69	6.85	-1.6
9/1/2011	7:57:30	26.76	69651	5.50	7.12	-1.7
9/1/2011	8:12:30	26.81	69554	5.56	7.13	-1.7
9/1/2011	8:27:30	26.83	69447	5.33	7.10	-1.7
9/1/2011	8:42:30	26.87	69390	5.47	7.12	-1.7
9/1/2011	8:57:30	26.90	69310	5.34	7.10	-1.7
9/1/2011	9:12:30	26.92	69284	5.40	7.11	-1.7
9/1/2011	9:27:30	26.94	69222	4.65	7.07	-1.8
9/1/2011	9:42:30	26.99	69189	5.51	7.12	-1.8
9/1/2011	9:57:30	27.02	69151	5.39	7.10	-1.7
9/1/2011	10:12:30	27.05	69122	5.49	7.11	-1.7
9/1/2011	10:27:30	27.11	69085	5.42	7.10	-1.7
9/1/2011	11:04:58	27.12	69077	5.52	7.15	-1.3
9/1/2011	11:19:58	27.15	69118	2.26	6.95	-1.9
9/1/2011	11:34:58	27.21	69168	5.45	7.10	-1.8
9/1/2011	11:49:58	27.05	69360	0.98	6.95	-1.7
9/1/2011	12:04:58	27.14	69377	5.51	7.10	-1.8
9/1/2011	12:19:58	27.05	69482	3.77	7.02	-1.7
9/1/2011	12:34:58	27.04	69587	5.49	7.10	-1.8
9/1/2011	12:49:58	27.01	69666	5.29	7.07	-1.8
9/1/2011	13:04:58	26.96	69722	5.49	7.11	-1.8
9/1/2011	13:19:58	26.95	69728	5.34	7.08	-1.7
9/1/2011	13:34:58	26.95	69724	5.46	7.10	-1.8
9/1/2011	13:49:58	26.93	69736	5.38	7.10	-1.8
9/1/2011	14:04:58	26.94	69798	5.43	7.11	-1.7
9/1/2011	14:19:58	26.93	69929	5.36	7.10	-1.8
9/1/2011	14:34:58	26.93	70047	5.40	7.11	-1.6
9/1/2011	14:49:58	26.94	70263	5.39	7.11	-1.7
9/1/2011	15:04:58	26.94	70375	5.33	7.11	-1.7
9/1/2011	15:19:58	26.97	70653	5.34	7.11	-1.6
9/1/2011	15:34:58	26.98	70789	5.32	7.11	-1.6
9/1/2011	15:49:58	27.05	71077	5.32	7.11	-1.6
9/1/2011	16:04:58	27.06	71178	5.27	7.11	-1.7
9/1/2011	16:19:58	27.12	71383	5.30	7.10	-1.7
9/1/2011	16:34:58	27.11	71436	4.16	7.05	-1.7
9/1/2011	16:49:58	27.17	71652	5.34	7.11	-1.7
9/1/2011	17:04:58	27.10	71853	1.86	6.98	-1.7
9/1/2011	17:19:58	27.16	71844	5.34	7.12	-1.7
Daily Average		**26.99**	**69950**	**5.02**	**7.08**	**-1.7**

ROD Project Effluent Water Quality Criteria

Temperature	<29.4 ºC
Dissolved Oxygen	≥5.0 mg/L (unless background < 5 mg/L)
pH	6.5 to 8.5
Turbidity	free from color and suspended solids

Table B-6
2011 WWTP Effluent Water Quality Data

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Table B-7
2011 WWTP Midpoint and Influent Water Quality Data

Influent Water Quality Monitoring						
Date	**Time**	**Temperature (°C)**	**Specific Conductivity (µS/cm)**	**DO (mg/L)**	**pH**	**Turbity (NTU)**
6/27/2011	13:35	23.84	70483	6.00	7.17	8.7
6/29/2011	13:16	25.10	62097	6.02	7.26	-0.8
7/1/2011	10:27	25.27	71837	5.64	7.07	-1.3
7/7/2011	15:49	27.63	72200	5.65	7.20	0.3
7/14/2011	13:44	26.43	65804	5.73	7.20	2.6
8/11/2011	10:10	28.02	62994	5.34	6.90	11.6
9/1/2011	10:35	26.41	70151	5.89	7.07	13.8

Midpoint Water Quality Monitoring						
Date	**Time**	**Temperature (°C)**	**Specific Conductivity (µS/cm)**	**DO (mg/L)**	**pH**	**Turbity (NTU)**
6/27/2011	13:58	23.73	69930	2.05	6.56	-1.5
6/29/2011	13:37	25.16	66825	0.32	6.71	-1.6
7/1/2011	10:41	25.40	74253	2.01	6.88	-1.8
7/7/2011	16:04	28.08	70775	1.52	7.16	-2.0
7/14/2011	13:59	26.69	68231	0.29	6.93	-1.7
7/21/2011	14:34	28.66	61465	0.29	6.91	-2.1
7/28/2011	13:55	28.17	75398	0.30	6.85	-1.5
8/11/2011	10:34	28.41	63124	0.30	7.09	-5.7
9/1/2011	10:50	27.03	69194	0.30	6.98	-1.6

Notes:
All measurements were collected with a YSI 650/6920, calibrated daily.
A flow-through cell connected to WWTP system plumbing was used to collect sample readings.
A negative turbidity reading indicates measured sample exhibited lower turbidity than the 0 NTU calibration standard.

DO = dissolved oxygen
mg/L = milligrams/liter
NTU = nephelometric turbidity units
WWTP = waste water treatment plant
µS/cm = microsiemens per centimeter
°C = degrees Celsius

ATTACHMENT C

Sevenson Operational Monitoring Data

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ATTACHMENT D

Transportation and Disposal Reports

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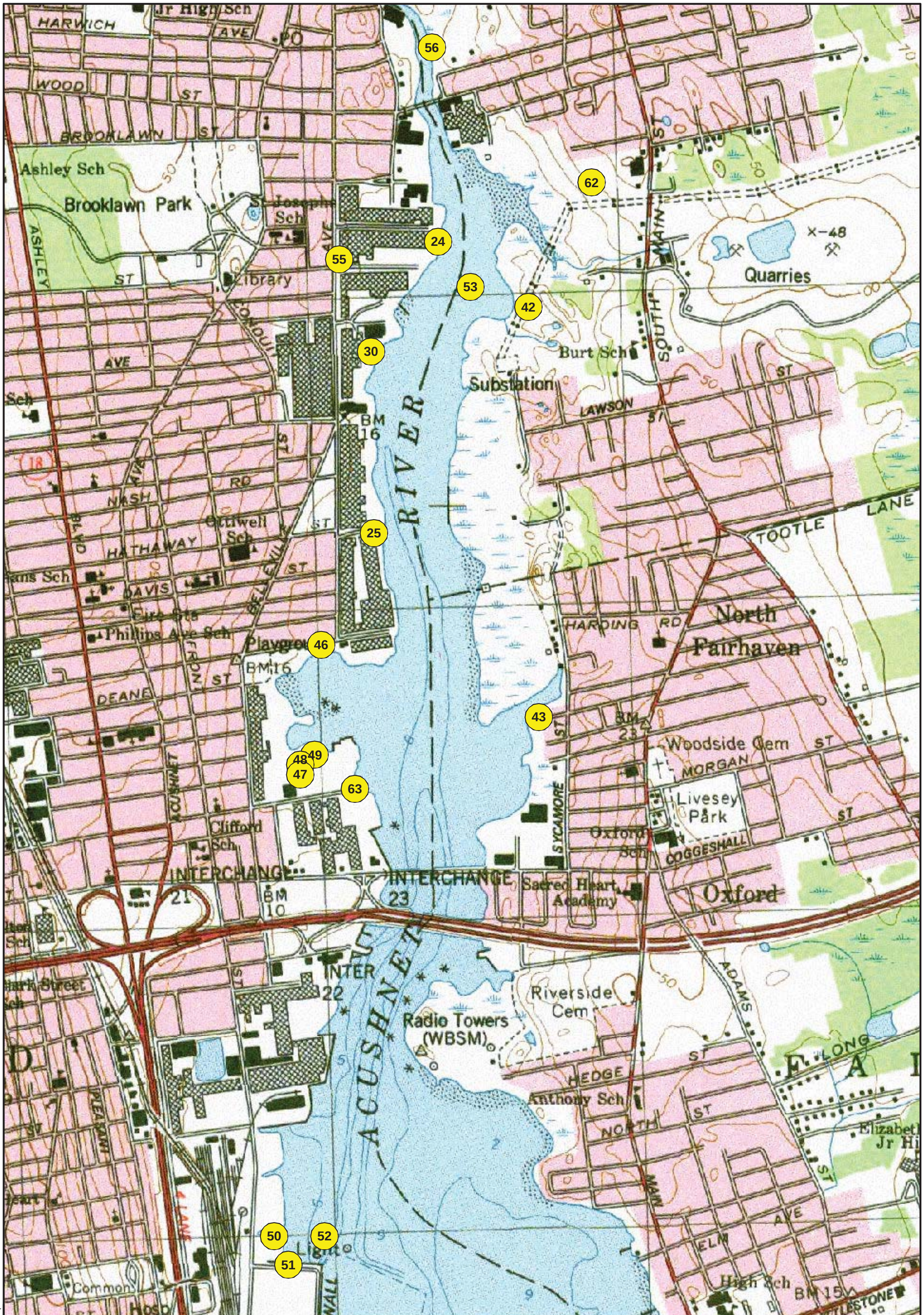
ATTACHMENT E

Ambient Air Monitoring Information



Ambient Air Sampling Location

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Table E-1
2011 Ambient Air Monitoring Program
Total Detectable PCB Homologues in Air

	Station 24	Station 55	Station 25	Station 30	Station 42	Station 43	Station 46	Station 49	Station 50	Station 53	Station 56	Station 62	Station 63		
Sampling Period[(1)]	**Aerovox [(2)]**	**Aerovox West**	**Cliftex**	**Fiber Leather**	**NSTAR North**	**Veranda**	**Coffin Ave**	**Area C Downwind**	**Area D Downwind**	**Dredge**	**Acushnet Park**	**Century House**	**Area Q**	**Duplicate**	**Blank**
	PCB Concentration (ng/m^3)														
25-May-2011	56	93	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.68	25	97	ND
Round 1															
13-Jul-2011	1100	79	NS	130	40	43	43	78	110	1000	25	6.7	NS	1100	0.2457 MJ
Round 2															
26-Jul-2011	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	51	NS	0.002453 J
Round 3															
23-Aug-2011	280	48	NS	60	80	94	NS	220	16	1800	13	52	NS	200	0.00468 MJ
Round 4															
14-Sep-2011	480	28	NS	120	29	61	93	220	0.62	460	57	NS	NS	NS	ND
Round 5															
11-Oct-2011	36	420	NS	42	10	18	11	25	17	NS	18	0.29	NS	NS	0.0352 MJ
Round 6															

NS = not sampled
ND = not detected
M = manually integrated
J = estimated data
ng/m^3 = nanograms per cubic meter of air

Notes:
(1) Sampled and analyzed using EPA TO-10A methodology.
(2) All results reported for 24 hour time-weighted average in nanograms per cubic meter of air (ng/m^3) with the exception of Station 53 (Dredge) which is an 8 hour sample.

ATTACHMENT F

Jacobs Solids and Water Balance, and PCB Mass Removal Calculations

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ATTACHMENT G

2011 Dredge Production Summary

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ATTACHMENT H

2011 Lessons Learned

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ATTACHMENT I

Summary of 2011 Activities

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