# Response Action Plan and Construction Contingency Plan

## *Rice's Point Docks C & D*
## *Helberg Drive, Duluth, Minnesota*

Prepared for
LHB Corporation and the Duluth Seaway Port Authority

MPCA VIC No. VP30770 and PBP No. PB4479

July 2014

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# Response Action Plan and Construction Contingency Plan

## Rice's Point Docks C & D
## Helberg Drive, Duluth, Minnesota

## July 2014

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# 1.0 Introduction

This Response Action Plan (RAP) and Construction Contingency Plan (CCP) present the methods, actions and controls proposed to be implemented to protect human health and the environment for the Rice's Point Docks C & D property located between 800 and 900 Helberg Drive in the NW ¼ of Section 3, Township 49 North, Range 14 West, in Duluth, St. Louis County, Minnesota, referred to hereafter as the Property. The Property location is shown on Figure 1. The approximate Property boundaries are shown on Figure 2 and include only the land portion of the Property and the northern half of Slip D.

Barr Engineering Company (Barr) was retained by LHB Corporation (LHB) on behalf of the Duluth Seaway Port Authority (DSPA) to prepare this RAP/CCP for the Property that is owned by the DSPA and used as a shipping dock. The Property is planned to be redeveloped for use as an industrial shipping dock. The Property is enrolled in the Minnesota Pollution Control Agency (MPCA) Voluntary Investigation and Cleanup (VIC) Program in November 2013. The VIC number assigned to the Property is VP30770 and the Petroleum Brownfields Program number is PB4479. This RAP was prepared in support of planning for development of the Property.

The northern corner of the Property currently is used as a docking and tie-up area for Great Lakes Towing. The rest of the dock currently is vacant and is zoned as heavy industrial. Buildings include a small shed and office building to support the Great Lakes Towing operation on the Property. The current and past use of the area surrounding the Property is industrial. Historically the Property has been used as a sawmill, grain elevator and laydown yard for multiple industrial activities. Historical buildings, including grain elevators, have been demolished. The history of development and land uses on and in the vicinity of the Property are summarized in previous investigation reports listed in Section 2.3.

## 1.1 Response Action Plan and Construction Contingency Plan Scope and Objectives

The scope of the RAP/CCP is to implement response action measures for management of contaminated soil, sediments and construction water during development of the Property that are protective of human health and the environment and consistent with the proposed heavy industrial uses of the Property. Groundwater response actions are not anticipated.

The proposed RAP includes planned steps for managing contaminated material necessary to achieve the objectives for the Property. The soil response actions will include excavation, sediment dredging, on-site management, off-site disposal of contaminated materials as necessary, and backfilling and covering of remaining soil.

The primary contaminants of concern (COCs) established for this property is the combined polynuclear aromatic hydrocarbons (PAH) benzo-a-pyrene (BaP) equivalent. The MPCA Tier 2 (Industrial) Soil Reference Values (SRVs) for BaP equivalent is 3.0 milligrams per kilogram (mg/kg). However, during a our project meeting with the MPCA on February 25, 2014, a verbal cleanup goal of 6 mg/kg was approved specifically for this site for (B(a)P) equivalent concentrations in soil/sediment based on the proposed

heavy industrial use and proposed plan for covering the entire site using class 5 gravel that will be separated from underlying contaminated soil by a geotextile fabric layer, as described in the following sections (MPCA, 2014). The proposed RAP includes planned steps for managing contaminated soil/sediment necessary to achieve the cleanup and redevelopment objectives for the Property. The soil/sediment management response actions will include a combination of excavation, covering with soil meeting site cleanup goals, and pavement. Construction water management will consist of removing excess water from soils and sediments excavated from below the water table, as necessary. Water that is removed from the soils and sediments is expected to be managed by onsite re-infiltration.

The CCP presents proposed contingency methods to be used and actions to be taken in the event of discovering additional hazardous substances or petroleum products not currently documented at the Property, but which may reasonably be expected to occur at a former industrial site of this nature and past history. The CCP also outlines the procedures that will be required for the contractor during construction activities to protect human health and the environment.

The methods, proposed response actions and construction contingency measures presented in this plan are based on the currently proposed site plans (as of June , 2014) as shown on Figure 3, and on the sampling data collected through December 20, 2013.

## 1.2 Requested MPCA Assurances

The DSPA requests technical review and approval of the response actions outlined in this RAP/CCP. No additional MPCA assurances are being sought at this time.

## 1.3 Contact Information

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|---|---|
| **Site Location**: | Docks C & D<br>Rice's Point<br>Between 800 and 900 Helberg Drive<br>NW ¼ of Sec. 3, T49N, R14W, St. Louis County<br>City of Duluth, Minnesota |
| **Project Contact:** | Jim Sharrow, Facilities Manager<br>Duluth Seaway Port Authority<br>1200 Port Terminal Drive<br>Duluth, MN 55802<br>Phone: (218) 727-8525<br>Email: jsharrow@duluthport.com |
| **Barr Engineering Company (Consultant, Environmental):** | Lynette Carney, Project Manager<br>Barr Engineering Company<br>332 West Superior Street, Suite 600<br>Duluth, MN 55802<br>Phone: (218) 529-8234<br>Email: lcarney@barr.com |
| **LHB Corporation (Consultant, Lead Design Engineer):** | Joe Litman, Structural Engineer<br>LHB Corporation<br>21 West Superior Street, Suite 500<br>Duluth, MN 55802<br>Phone: (218) 279-2455<br>Email: joe.litman@lhbcorp.com |

# 2.0 Property Background

This section summarizes previous investigations of the Property. The results of the recent investigations were evaluated in conjunction with previous investigation results to provide an updated and more comprehensive understanding of the existing environmental conditions at the Property.

## 2.1 Historic Uses

The following historical information is summarized from previous reports (Barr, 2013; Barr, 2014). The Property is located on Rice's Point, which is an industrial development area of the Duluth Harbor that supports the shipping industry. The Property is approximately 26 acres of industrial port land taking the form of a peninsula. The peninsula is bordered by water-filled boat slips on the north and south sides and by the Duluth harbor and ship channel on the east side. The current Property layout is shown on Figure 2.

Historically, the Property has been used by a sawmill, a grain elevator, and as a laydown yard for multiple industrial activities. The land occupied by the docks on the Property was created in the early 1900s with dredge material from the harbor. The Property has had over one hundred years of industrial development including a lumber mill operation followed by filling to create the current pier where three separate grain elevator complexes were built. The elevators had the following associated features: two train sheds, one truck unloading station, two headhouses, a coal-fired powerhouse for generating electricity, an outdoor coal storage area, railroad sidings with multiple tracks, and a truck access road. Historical features are shown on Figure 4. Historical buildings were serviced by the water supply well and private septic. Former building foundation slabs remain on the Property, particularly at the locations of the two former grain elevators (Figure 4).

Buildings remaining on the Property include a small shed and a mobile office building located in the northeastern corner of the property along Dock C which is currently leased by Great Lakes Fleet. The Property is accessible from Helberg Drive and has two separate driveway entrances. The Property is not currently serviced by municipal water or sewer but does have a water supply well. The water supply well will be evaluated for future use or permanent sealing; the evaluation of the water supply well is not part of this RAP. Occasionally, the Property has been used for additional industrial and/or commercial purposes such as storage of commercial products brought in by ship, a material laydown area or temporary soil storage for other materials and/or equipment as needed by DSPA tenants.

Dock walls on the Slip D and Channel Dock sides of the Property are in poor condition and much of the area behind the wall along Slip D has been washed into the slip through wave and ice action.

## 2.2 Future Uses

The Property is proposed for commercial development. Future development at the Property associated with this plan will consist of the stabilization, repair, and reconstruction of sections of dock wall, and dredging a portion of Slip D. Development plans also include site grading, addition of a facilities building and security fencing, extension of utility services, addition of lighting and power supply points, addition of

ship tie-downs, and addition of a railroad spur. Figure 3 shows the conceptual layout of the planned development of the Property.

The current conceptual construction plans for the Property will require a limited amount of soil to be removed from the Property; however the majority of the soil will be retained on site. Several areas with relatively higher concentrations of COCs will be excavated prior to grading activities. Excavation trenches will be completed along the Dock D and Channel Dock walls following sheet pile installation to allow for tie-back anchors to be installed.

Site grading also will be required for paved driveway entrances, a railroad spur, a railroad crossing at Helberg Drive, concrete pavement along Dock D, and for general site drainage. A grading plan for the Property is discussed further in Section 3.7.2 of this RAP. It is expected that following final grading, the Property will be covered with a geotextile barrier and 12 inches of class 5 gravel.

Minimal trenching also will be required to install a shallow potable water supply line and electric utility lines. Caissons for light poles and bollards for ship tie-downs also will require small spot excavations during installation. These features and their anticipated locations are depicted on Figure 3.

Development plans include that the northern half of Slip D be dredged to allow for ships to access Dock D. The majority of the dredged sediments will be hauled off site to Erie Pier to be used as unregulated fill. A smaller area of sediments dredged from Slip D has been documented to have a BaP equivalent concentration greater than the MPCA Tier 2 industrial SRV standard. This sediment will be segregated, drained and made available for use on site or sent to a landfill – its disposition will be based on soil analytical test results or in accordance with Section 3.7.6 of this RAP.

## 2.3 Previous Property Assessments

Previous environmental assessments and soil investigation work has been performed at the Property. Previous environmental reports consist of the following:

- Environmental summary letter (Cargill, 1989)
- Soil Sampling report (TPT, 1989)
- Acquisition memorandum (Seaway Port Authority of Duluth, 1989)
- Phase I Environmental Site Assessment (ESA) report (AET, 1994a)
- Dismantling and Development Project report (LHB, 1994)
- Geotechnical Exploration/Review for Proposed Demolition and Redevelopment report (AET, 1994b)
- Phase II ESA report (AET, 1994c)
- Sediment Investigation of Duluth Harbor Area report (Somat, 2012)

- Sediment Sampling, Proposed Dredging Project, D Dock, letter report (EPC 2012).
- Additional Sediment Sampling, Proposed Dredging Project, D Dock, letter report (EPC 2013).
- Baseline Environmental report (ICECOR, 2013a)
- Visual inspection report (ICECOR, 2013b)
- Phase I Soil Sampling report (ICECOR, 2013c)
- Sampling report (ICECOR, 2013d)
- Phase I ESA report (Barr 2013)
- Phase II Investigation report (Barr 2014).

## 2.4 Summary of Previous Investigations / Sampling Results

Previous surface and soil boring sampling investigations conducted at the Property from 1989 through 2013 indicated:

- metals concentrations within common range (chromium greater than background but not warranting additional investigation) with the exception of a previously leased area in the southeast corner of the Property with arsenic and lead concentrations greater than Tier 2 SRVs (ICECOR, 2013c). Metals contamination at this former lease area will be addressed as a separate project (prior to development activities) and will not be incorporated as part of this RAP;
- volatile organic compounds (VOCs) less than Tier 1 SRVs and polychlorinated biphenyls (PCBs) less than detection limits;
- pesticides not detected above detection limits with the exception of "Dieldrin";
- petroleum compounds above MPCA guidelines; and
- concentrations of B(a)P greater than the Tier 2 SRV.

Previous sediment sampling investigations conducted in Slip D in 2012 and 2013 indicated:

- one area of sampled sediment with a B(a)P equivalent concentration greater than the Tier 2 SRV.

The drinking water well was sampled in 1994 with no VOCs or pesticides greater than detection limits.

A Phase I ESA performed for the Property in 2013 (Barr, 2013) identified the following recognized environmental conditions (RECs): historical filling, historical chemical storage, historical PCB capacitors and transformers, historical and current above- and underground storage tanks, debris piles, historical train and truck unloading areas, a former private septic and stormwater system, documented contaminated soil at tenant lease parcels (Docks C and D) and at former yard waste storage facility lease

area, a former sawmill operation, historical powerhouse, storage of old railroad ties, and a water supply well and covered concrete pit.

Test pits were excavated during investigations conducted in 2013 at the locations shown on Figure 5. Soil results from the 2013 test pit samples are summarized in Sections 2.4.2 through 2.4.7 (ICECOR, 2013a,c,d and Barr, 2014).

Sediment samples were collected from Slip D during investigations conducted in 2012 and 2013 at the locations shown on Figure 5. Results of the sediment samples are summarized in Section 2.5 (EPC, 2012 and 2013).

### 2.4.1 Field Observations

Soil at the Property is composed of 9 to 25 feet of loose fill sand overlying native, undisturbed, medium to dense beach sands with some peat and organic layers (AET, 1994a). Typical test pit excavation materials included fill, poorly-graded sands, and well-graded sands (Barr, 2013). Fill was most often present from the surface to at least 2 feet below ground surface (bgs). Fill materials included poorly-graded sands, bricks, wooden planks, steel re-bar, asphalt pavement, coal, and "clinker-like" material. Fill often was poorly-graded sands with pebbles to cobble-sized earth materials. Well-graded sands typically were present at depths equal to or greater than 2 feet bgs and were usually fine- to medium-grained and light brown to brown in color. Some test pits encountered the water table at 4 to 4.5 feet bgs. There were no areas of discolored soil or sheens identified in the 2013 test pits conducted by Barr (Barr, 2014). Field headspace readings did not exceed 10 parts per million (ppm). An apparent chemical odor was noted at test pit TP-21 (Figure 5) at a depth of 1.5 to 2 feet bgs.

During a 1994 investigation, groundwater was observed at depths of 2 to 8 feet bgs (AET, 1994c). Groundwater flow at the Property is likely to vary due to changes in the St. Louis River or the Lake Superior lake level – seasonally as well as in response to normal lake seiche fluctuations; however, the predominant groundwater flow direction is expected to be to the east (Barr, 2013).

### 2.4.2 Soil – Herbicides and Pesticides

As part of the Barr 2013 investigation, a total of 15 soil samples (2 stockpile, 11 test pit composites, 2 test pit discrete) were collected from depths of 0 to 2 feet bgs for analysis for herbicides and pesticides (Barr, 2014). The only analyte detected greater than the method detection limits (MDLs) was Dieldrin – detected in the two stockpile samples and in one test pit sample (TP-14/15, Figure 5) – at concentrations less than the Tier 2 SRV. The MPCA has not established a Tier 1 Soil Leaching Value (Tier 1 SLV) for Dieldrin.

### 2.4.3 Soil - RCRA Metals

ICECOR conducted surface soil sampling in 2013 at a formerly leased area in the southeast corner of the Property (Dock D) that included analysis for metals (ICECOR, 2013c and 2013d). Of the eight shallow soil samples analyzed for metals, samples at two locations had arsenic concentrations greater than the Tier 2 SRV; the sample from one location had a lead concentration greater than the Tier 2 SRV. Metals

contamination at this formerly leased parcel of the Property will be addressed prior to development as a separate project and is not included as part of this RAP.

As part of Barr's Phase II investigation, a total of 14 soil samples (2 stockpiles, 12 test pits) were collected for metals analysis from depths of 0 to 2 feet bgs (Barr, 2014). Relatively low concentrations of arsenic, barium, cadmium, chromium, and lead were detected in the 14 samples. Concentrations of barium, cadmium, and lead at all locations were less than the Tier 1 Soil Leaching Values (Tier 1 SLVs). Concentrations of arsenic and/or chromium greater than the Tier 1 SLV but less than the Tier 2 SRV were detected at ST-01 and TP-05/06 (Figure 5). A Toxicity Characteristic Leaching Procedure (TCLP) chromium analysis was performed on the sample from TP-21/22 – the result was less than the MDL. It should be noted that the listed Tier 1 SLV and/or Tier 2 SRV criteria for chromium are listed for hexavalent chromium and not total chromium. Based on the previous site uses and setting, it is expected that the chromium detection is the non-hexavalent form.

### 2.4.4 Soil - Volatile Organic Compounds (VOCs) and DRO

ICECOR conducted shallow soil sampling at the northeast corner of the Property (Dock C) in 2013 that included analysis for VOCs and DRO (ICECOR, 2013a). The sampling locations, SS-1 through SS-8, are shown on Figure 5. Samples were collected at depths of 0′ to 0.5′ bgs. Of the 8 shallow soil samples collected, none of the samples had VOC concentrations greater than the Tier 1 SRVs. DRO was detected at concentrations equal to or greater than 100 mg/kg at 7 of the 8 samples (all but SS-3), ranging from 100 to 300 mg/kg (Figure 6).

ICECOR conducted shallow soil sampling at the southeast corner of the Property (Dock D) in 2013 that included analysis for VOCs and DRO (ICECOR, 2013d). Eight of the 9 samples were analyzed for VOCs; none of the detected VOC compounds exceeded Tier 1 SRVs. DRO was detected in all 9 of the samples and exceeded 100 mg/kg in 3 of the samples. DRO contamination at this formerly leased parcel of the Property will be addressed in a separate project and is not included as part of this RAP.

As part of Barr's Phase II investigation, a total of 26 soil samples were collected for analysis of VOCs and diesel range organics (DRO) from depths of 0 to 2 feet bgs (Barr, 2014). One sample (TP-21, Figure 5) had concentrations of petroleum-related VOCs greater than the Tier 1 SLVs (ethylbenzene, toluene, and total xylenes). No VOC concentrations exceeded the Tier 1 (Residential) SRVs (Tier 1 SRVs). DRO was detected at concentrations greater than 100 mg/kg at 10 test pit locations, ranging from 100 mg/kg to 1,000 mg/kg at TP-18 (Figure 6).

### 2.4.5 Soil - Semi-Volatile Organic Compounds (SVOCs)

A total of 5 soil samples were collected from depths of 0 to 2 feet bgs for analysis of SVOCs (Barr 2014). Non-PAH SVOCs were detected at concentrations less than the Tier 1 SRV at TP-11 and TP-20. No other non-PAH SVOCs were detected greater than the MDLs.

### 2.4.6 Soil – Polyaromatic Hydrocarbons (PAHs)

ICECOR conducted shallow soil sampling at the northeast corner of the Property (Dock C) in 2013 that included analysis for PAHs (ICECOR, 2013a). The ICECOR sampling locations, SS-1 through SS-8, are shown on Figure 5. The 8 soil samples were analyzed for PAHs -- samples at five locations had B(a)P equivalent concentrations greater than the Tier 2 SRV (SS-1, SS-2, SS-4, SS-7 and SS-8). Samples from SS-1 and SS-4 had B(a)P concentrations greater than the site specific Tier 2 SRV referenced in Section 1.1 of 6.0 mg/kg (Figure 7).

ICECOR conducted shallow soil sampling at the southeast corner of the Property (Dock D) in 2013 that included analysis for PAHs (ICECOR, 2013d). One of the 9 soil samples collected was analyzed for PAHs with a B(a)P equivalent concentration greater than the Tier 2 SRV but less than 6 mg/kg (MPCA, 2014). PAH contamination at this formerly leased parcel of the Property will be addressed prior to site development as a separate project and is not included as part of this RAP.

As part of Barr's Phase II investigation, a total of 26 soil samples were analyzed for PAHs from depths of 0 to 2 feet (Barr 2014). Individual PAH compounds were detected greater than MDLs in all 26 samples except for TP-04 and TP-15. Individual PAH compound detections were less than Tier 1 SLVs except for naphthalene at TP-11 and TP-18 Duplicate, both less than the Tier 2 SRV. B(a)P equivalent calculated concentrations were reported for all 26 samples. B(a)P equivalent concentrations were greater than the Tier 2 Short Term SRV at TP-11 and TP-18. B(a)P equivalent concentrations were greater than the Tier 2 SRV at TP-05, TP-07, TP-13, and TP-14 (Figure 7). The B(a)P equivalent concentration from the sample at TP-09 was greater than the Tier 1 SLV but less than the Tier 2 SRV. B(a)P equivalent concentrations were greater than 6.0 mg/kg at TP-05, TP-07, TP-11, TP-13, and TP-18.

### 2.4.7 Soil - Polychlorinated Biphenyls (PCBs)

A total of 6 samples were collected from depths of 0 to 2 feet for analysis for PCBs. PCBs were not detected greater than MDLs (Barr, 2014).

## 2.5 Slip D Sediments – PAHs

The sediments of Slip D along the wall of Dock D and Channel Dock were sampled during two events – November 2012 and September/October 2013 (EPC, 2012 and 2013). Four sediment cores were collected during each event for a total of 8 cores. For the two sampling events, a total of 15 sediment samples were submitted for laboratory analysis for Minnesota landfill metals, phosphorous, nitrate-nitrite, ammonia nitrite, Total Kjeldahl nitrogen, total organic carbon, PCBs, and PAHs. Of the 15 samples, the only analyte with a concentration greater than the Tier 2 SRV was B(a)P equivalent collected at SB-12-03 (28.5'-30') in 2012 (Figures 5 and 7) with a concentration of 4.5 mg/kg. Although this concentration is below the MPCA approved site specific standard for BaP in soil of 6.0 mg/kg, it exceeds the Erie Pier permit standard of 3.0 mg/kg. Therefore, this sediment will be segregated and reused on site or hauled to a landfill.

# 3.0 Response Action Plan

This section of the RAP describes the tasks that will be implemented and the documentation that will be provided following completion of RAP activities.

## 3.1 General Approach and Operation

Exposure risk will be reduced by a combination of soil excavation, sediment dredging, onsite placement, offsite disposal as required, soil covering, construction water management, and anchoring of Dock D and the Channel Dock. Conceptual construction plans are presented on Figure 3. Based on the results of previous subsurface investigations for the Property, the identified COCs do not pose a vapor intrusion risk potential (see Section 3.2). In addition, current construction plans for the Property do not include potential receptors for vapor intrusion.

Areas with B(a)P equivalent concentrations exceeding 6.0 mg/kg (MPCA, 2041) will be excavated prior to grading at the Property, as described in Section 3.7.1 below. For Property redevelopment, soil excavation areas will include, at a minimum, two entrance areas to be paved from Helberg Drive, tie-back anchor points along Dock D and the Channel Dock (Figure 3), and a subcut (approximately 2 feet deep) along the face of Dock D extending landward as much as 70 feet to allow for base material placement for concrete paving. Site grading will be required for paved driveway entrances, addition of a railroad spur, a railroad crossing at Helberg Drive, concrete pavement along Dock D, installation of a small, pre-fabricated slab-on-grade guard shack, and for general site drainage. Small spot excavations will be required for installation of caissons for light poles, installation of bollards for ship tie-downs to be installed along Slip D and the Channel Dock, and posts for new security fencing. Minimal trenching will be required to install a shallow water line and electric utility lines (Figure 3) and two catch basins on the northern half of the Property. Limited excavation will be required to ensure sufficient vegetation planting depth for the vegetated runoff buffer strip near the northwest corner of the Property. It is expected that following final grading, the Property will be covered with geotextile fabric and 12 inches of class-5 gravel providing a separation barrier to residual contamination. The repair of slip walls along Slip D, the harbor channel, and the eastern-most end of Slip C, will prevent contaminated fill from sloughing into Slip D and the channel.

Installation of the water line and the two catch basins will require removing soil beneath the water table (approximately 4 to 5 feet below current grade) necessitating management of construction water (consisting mostly of groundwater) onsite. Groundwater collected during construction dewatering will be collected and disposed of on-site through infiltration.

The DSPA will contract directly with a general contractor (Contractor) for the implementation of the response actions at the Property. The Contractor is required to be trained under the Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations (HAZWOPER) regulations (29 CFR 1910.12c). An Environmental Representative will observe the Contractor during contaminated soil excavation activities. The Environmental Representative will document soil excavation limits, field screen excavated material, collect soil samples for environmental screening and analysis, and coordinate the implementation of potential contingency actions listed in the Construction Contingency Plan (CCP)

(Section 4). The Environmental Representative will also assist the Contractor with landfill profiling of any contaminated materials to be disposed off-site, including collecting additional analytical samples for landfill profiling purposes.

## 3.2 Contaminants of Concern, Cleanup Goals and Covering of Remaining Contaminated Soil

The COCs at the Property are metals, B(a)P equivalent (PAHs), and DRO. It is proposed that the site cleanup goals be the MPCA Tier 2 SRVs, with the exception of B(a)P equivalent which would have a cleanup concentration of 6.0 mg/kg (MPCA, 2014), with appropriate separation thicknesses overlying contaminants remaining in-place on-site and a geotextile delineation layer.

Impacted soils with COC concentrations exceeding the cleanup goals will be managed by removal, relocation, and/or covering. It is expected that following final grading, the Property will be covering with geotextile fabric and 12 inches of class-5 gravel. The following soil separation zones will be implemented.

**Soil Separation Zones** – Separation from contaminated soil will be achieved with import material meeting or on-site soils meeting Tier 2 SRVs and/or and B(a)P equivalent less than 6.0 mg/kg as follows:

1) Green Space – from 0 to 6 inches below final grade surface. This area includes the stormwater vegetated buffer filtration to be used for treating general runoff. This area will be re-graded and planted with grasses to build a low point collection structure.
2) Laydown Yard – from 0 to 12 inches below the final grade surface imported class-5 gravel will be placed on top of geotextile fabric. The geotextile fabric will provide a barrier and a delineation layer to separate the imported backfill from the residual contamination.
3) Paved Areas – from top of paved surface to 2 feet below top of paved surface. The 2-ft separation distance thickness will include the pavement thickness.
4) Pre-Fabricated Guard Shack Slab Footprint – 6 inches below building slab with a geotextile fabric layer beneath or 12 inches below building slab without a geotextile fabric layer. Estimated size of guard shack is 6 feet by 6 feet.
5) Utility Corridors – It is assumed that soil exceeding site specific standard for (B(a)P equivalent of greater than 6.0 mg/kg) will be removed during the remedial excavation outlined above, therefore, no special separation zones are proposed for utility corridors.

Excavated soil that does not exceed the Tier 2 SRVs or site-specific B(a)P equivalent cleanup criterion will remain on-site and be used to backfill areas needing fill. Clean soil from off-site (e.g. class 5, select granular barrow and/or top soil) will be sampled, or evaluated prior to delivery by the Engineer to document the soil quality prior to importing it to the Property. Overview of Response Action Tasks

The primary response actions for the Property are soil excavation, sediment dredging, onsite management and offsite disposal of soil and/or sediment, and placement of a soil cover over in-place impacted soil. Implementation of the RAP will involve completion of the following tasks:

- Implement runoff and run-on control.

- Implement dust control procedures.
- Install security fence, clear, remove, and dispose of surface debris from the Property.
- Excavate areas of soil with COC concentrations exceeding Tier 2 SRVs, except for a B(a)P equivalent concentration cleanup criteria of 6.0 mg/kg (MPCA, 2014).
- Conduct additional sampling on the Property as needed including additional sampling of sediments in Slip D.
- Segregate excavated soils for management on-site or off-site.
- Manage contaminated soil below the Tier 2 SRVs (and B(a)P equivalent concentrations greater than 6.0 mg/kg (MPCA, 2014)) on-site with appropriate cover or separation layer.
- Dispose contaminated soil and materials off-site at an approved, permitted landfill.
- Dispose of construction dewatering-generated groundwater on-site by infiltration.
- Backfill soil on-site, as necessary, to the depths required in the redevelopment plan.
- Repair, replace or install sheetpile as necessary along the wetted perimeter of Dock D and the Channel Dock, and a small portion of Dock C of the Property to laterally retain site fill soils and prevent their erosion into the harbor and/or Slip D.

## 3.3 Additional Sampling – Sediment in Slip D

Based on the results of previous sediment investigations in Slip D, additional sampling and investigation will be necessary to define the extent of BaP equivalent contamination around SB-03-12. A separate sediment investigation work plan will be submitted for MPCA review and approval. The dredging portion of the construction will not occur until the results of this additional investigation are available. Upon completing the initial remedial excavation, additional excavation sidewall soil sampling will be completed in the areas targeted for response action excavation. Excavations will continue until sidewall samples indicate results that are less than the Tier 2 SRVs (and B(a)P equivalent concentrations less than 6.0 mg/kg (MPCA, 2014)). Soil and sediment sampling are discussed in Section 3.7.1 and Section 3.7.6 below.

## 3.4 Dust Control Procedures during Earthwork

Standard dust control practices will be implemented as necessary during excavation, stockpiling, hauling, and backfilling activities. Dust control may consist of watering earthwork areas to maintain a soil moisture content favorable to dust suppression. Open excavation and stockpile surface areas will be minimized to control dust. Appropriate health and safety air monitoring will also be conducted at the Property. The air monitoring will be performed according to the Contractor's Site Safety Plan to be developed by the Contractor. At a minimum, the air monitoring plan will include monitoring for particulates in the work zone during the response action excavation activities.

## 3.5 Erosion Control and Stormwater Management

Erosion control measures shall consist of silt fences, straw bales and/or other control measures implemented to prevent erosion and transport of contaminated materials off-site and to protect surface water quality. Care will be taken to divert any stormwater run-off from open excavation areas. Berms, ditches, or other control measures may be constructed to direct run-off away from the excavation area and contaminated materials. Stormwater management planning and design will be coordinated by the Engineer with the MPCA and the City of Duluth. A stormwater management plan will be submitted to the City of Duluth.

The sheet pile face to be installed along D Dock and Channel Dock will serve to rehabilitate and reinforce the failing dock face both during construction and into the future, thereby, providing and assisting in erosion control during construction excavations. The in-place sheet piling along with erosion control BMPs will be used to ensure erosion is controlled and contained and will prevent migration of contaminated material into Slip D and/or the harbor during construction.

## 3.6 Contaminated Soil Excavation, Removal, Transport, and Disposal

### 3.6.1 Limited Remedial Soil Excavations

Several areas with COC concentrations in the soil that exceed Tier 2 SRVs were identified during previous subsurface investigations (Figure 7). Prior to construction grading activities at the Property, approximately eight areas will be excavated to remove soil with B(a)P equivalent concentrations exceeding the site-specific criterion of 6.0 mg/kg (MPCA, 2014): in the vicinity of TP-5, TP-7, TP-11, TP-13, TP-18, and SS-1 and SS-4 in the northeast corner of the Property. In addition, an area at TP-21 will be excavated in order to address petroleum hydrocarbon detections above Tier 1 SLVs. Figure 8 shows the proposed locations of limited remedial soil excavations. The primary goal of the excavations is to remediate soils with B(a)P equivalent concentrations greater than 6.0 mg/kg, but soils with elevated DRO concentrations will also be removed as a result of the B(a)P excavations. Concentrations of DRO greater than 100 mg/kg may be attributable to the presence of B(a)P equivalent compounds.

Based on previous investigation results, it is estimated that each of the eight remedial excavations will be a minimum of 15′ by 15′ by 4′ (depth) in size. At each excavation, one soil sample will be collected from each of the four sidewalls and will be submitted for analysis to obtain a B(a)P equivalent concentration; additionally, the soil samples from the area of TP-21 will be analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX). The excavations will remain open until analytical results are received from the laboratory. The estimated turn-around time for the laboratory analysis is one week or less. Temporary soil stockpiles will be managed in accordance with state regulatory requirements as discussed in Section 3.7.4. At a given excavation, if the four sidewall samples have B(a)P equivalent concentrations less than 6 mg/kg (and at TP-21, BTEX concentrations less than the Tier 1 SLVs), the excavation will be backfilled with graded material from the Property or with off-site, imported fill.. If a sidewall sample has a B(a)P concentration greater than 6 mg/kg or BTEX concentrations greater than Tier 1 SLVs, that sidewall(s) of the excavation will be extended a distance of 10 feet in that direction and a confirmation sidewall soil sample will be collected and analyzed for B(a)P compounds, and/or BTEX. Excavated soil with B(a)P

equivalent concentrations greater than 6 mg/kg or with BTEX concentrations greater than Tier 1 SLVs will be removed from the Property for disposal at a permitted, approved landfill.

Based on previous investigation results, it is estimated that at two of the eight remedial excavations it will be necessary to extend the excavation 10 feet in one direction. Based on the available investigation information, the estimated total amount of excavated soil with B(a)P equivalent concentrations exceeding 6 mg/kg and/or BTEX concentrations greater than Tier 1 SLVs is:

6 excavations with dimensions of 15' x 15' x 4' = 5,400 cubic feet = 200 cubic yards
2 excavations with dimensions of 25' x 15' x 4' = 3,000 cubic feet = 111 cubic yards
Estimated Total 311 cubic yards

Standard construction equipment will be used to excavate contaminated soil in the unsaturated zone. Loose debris encountered during contaminated soil excavation will be disposed offsite as contaminated material at a permitted, approved landfill. Buried foundation walls are expected to be encountered during construction activities, this concrete material and masonry will be separated from the soil and hauled to a demolition landfill.

### 3.6.2 Temporary Soil Stockpiles, Transport, and Disposal

Excavated soil from the eight remedial excavation described in Section 3.7.1 above will be placed in a temporary soil stock pile area located on the Property. Stockpile locations will be determined in the field based on proximity to the work area(s), and protection from surface water drainage. A flat hard surface such as a former building slab will be used if accessible to the work area and equipment. Ten mil-thick polyethylene sheeting (poly) will line the bottom, with a berm of woodchips or sand ringing the perimeter. Soil will be placed on the poly, be covered with poly that is weighted down to hold the cover in place. The stockpiled soil will be maintained in the covered stockpile until the Contractor can arrange for transport to the approved licensed landfill for off-site disposal.

It is anticipated that multiple stockpiles may be created based on field observations and screening results and construction work sequencing. Separate stockpiles may be used for managing soils of different textures, coloration, suspected contaminant, field screening observations, or debris content. If required for disposal characterization purposes, the stockpiles will be sampled and analyzed to characterize the particular COCs to determine its appropriate offsite or onsite management. Stockpiles will likely be composite samples from multiple, individual, small stockpiles.

Trucks transporting contaminated soil off-site from stockpiles for disposal will be covered during transportation. Waste characterization and disposal facility profiling will be completed prior to removal of the soil from the stockpile.

### 3.6.3 Dredged Sediments, Slip D

Sediment will be dredged to a depth of 29 feet in the northern half of Slip D to allow for ship access and docking in the slip. Dredged sediments from the area previously identified with B(a)P concentrations exceeding the Tier 2 SRV (SB-12-03) will be segregated on the Property separately from other dredged

sediment. Dredged material exceeding the Tier 2 SRV will be contained in an upland area or on a water-tight barge to drain and/or be solidified as needed.

Sampling and laboratory analysis of the dried / solidified dredged sediments will be conducted per MPCA Risk Based Site Characterization and Sampling Guidance (MPCA, 1998). If the segregated soil meets the on-site reuse criteria of less than 6.0 mg/kg, it then will be moved from temporary stockpile and placed in accordance with this RAP. Dredged sediment that contains B(a)P concentrations greater than 6.0 mg/kg will be disposed of at a permitted, approved landfill.

The area of dredged sediment to be segregated will be determined based on additional sediment core borings to be installed around SB-03-12. A work plan for this additional sediment investigation will be submitted to the MPCA for review and approval. Based on the assumed average thickness of the contaminated sediments in the vicinity of SB-03-12 of approximately 5 feet, and assuming the contamination is limited to a radius of 50 feet or less, it is expected that approximately 1000 yards of dredged sediments will be segregated and characterized as detailed above. The remaining dredged sediment with B(a)P concentrations less than the Tier 2 SRV will be hauled to Erie Pier by barge or truck.

## 3.7 On Site Soil Management Activities

### 3.7.1 Grading

Following remedial soil excavations, grading activities will take place at the Property. A grading plan is presented on Figure 9, including proposed locations for placement of soil meeting the on-site reuse criteria less than Tier 2 SRVs and/or 6.0 mg/kg BaP equivalent. Site grading and subcutting will be required for paved driveway entrances, addition of a railroad spur, a railroad crossing at Helberg Drive, concrete pavement along Dock D, and for general site drainage. The topography of the Property generally will slope towards Dock C to match existing conditions at Dock C. Areas of hard surface paving will be added to the Property along Dock D. It is expected that following final grading, the Property will be covered with geotextile fabric and 12 inches of imported class-5 gravel, except where new paving will be installed.

### 3.7.2 Construction Excavation

For construction/redevelopment soil excavation areas will include, at a minimum, two entrance areas to be paved from Helberg Drive, and tie-back anchor points along Dock D and the Channel Dock. The exact number and location of the tie-back trench excavations will be determined during construction based on location of old foundations, etc. It is estimated that tie-back trench excavations will be placed every 9 feet at a distance of approximately 90 feet from the dock walls (along Dock D and the Channel Dock) and will be disturbed to a depth of 4 feet.

Small spot excavations (approximately 6′ x 6′ x 5′) will be required for installation of bollards for ship tie-downs to be installed along Slip D and the Channel Dock. Installation of caissons for light poles , and posts for new security fencing likely will require augering with depth and diameter for light pole foundations of approximately 6 feet deep and 24 inches in diameter. Fence post foundations will be approximately 12 inches in diameter and 3 feet deep. Minimal trenching will be required to install a

shallow water line and electric utility lines (Figure 3). Additional excavation will be conducted for catch basins and outfall structures near the Dock C side. Soil removed for these activities will be placed back into the excavation from which it originated or graded out to subgrade elevation. Where the depth of excavation is greater than the water table level, special considerations will be given to managing construction water and to drain saturated excavated soil for management.

### 3.7.3 Sheet Pile Installation

Interlocking sheet pile will be installed along the perimeter of Dock D and the Channel Dock and a small length of Dock C as reinforcement of the existing deteriorating dock walls and to repair areas where existing dock walls have failed or collapsed. The new sheet piles will retain onsite fill soil from sloughing or eroding into Slip D or the harbor and prevent transport of potentially contaminated sediments to the waterway.

## 3.8 Construction Water Management

The groundwater table lies an estimated four to five feet below ground surface and excavation of contaminated soils could require excavation below the water table, particularly in the water utility line and catch basin installation areas. In addition, stockpiles of dredged sediment will be saturated. Excavated and dredged saturated soil and sediments will need to be dewatered so that they can be placed and compacted onsite or disposed offsite. The construction dewatering water from the utility and catch basin excavations will be re-infiltrated on site.

Management of water drained from excavated/dredged soil/sediment may involve construction of bermed areas where saturated soil/sediment can be placed to allow for drainage, water capture, conveyance of the water and infiltration back into the groundwater through existing Property soil.
Analytical Sampling

Previous investigation sample data will be used to document remaining soil impacts in areas where excavation is not necessary and only a gravel covering is planned. Additional sampling will be completed during the eight remedial excavations from the sidewalls to document that residual concentrations are below the Tier 2 SRVs (B(a)P less than 6.0 mg/kg).

Waste characterization samples will be collected as necessary for landfill profiling purposes. The sampling frequency and parameter list will be developed with the offsite disposal facility. It is anticipated that additional samples will be requested by the offsite disposal facility for analysis of arsenic, chromium, and lead by the Toxicity Characteristic Leaching Procedure (TCLP) due to elevated levels documented during previous investigations.

If water generated by construction dewatering activities is to be discharged or disposed of off-site, it will be sampled and analyzed for COCs, if required. . Laboratory analytical services will be performed by a Minnesota Department of Health-certified laboratory.

## 3.9 Offsite Disposal of Excavated Materials

It is anticipated that contaminated materials planned for off-site disposal will be staged, drained or solidified as necessary, and loaded into trucks for offsite transport and disposal.

Waste characterization and disposal facility profiling will be completed prior to transporting materials offsite. All trucks transporting contaminated soil and debris will be covered with tarps prior to their departure from the Property. It is anticipated that contaminated materials will be disposed of in a local, contractor-selected, permitted non-hazardous waste landfill such as Veit, SKB, or Waste Management.

## 3.10 Institutional Controls

Since the goal of this RAP is to remove soil exceeding B(a)P of 6.0 mg/kg it is anticipated that no institutional controls will be required following the implementation of this RAP.

## 3.11 Documentation of Response Actions

The implementation of the proposed RAP will be documented in a Response Action Implementation (RAI) Report after the conclusion of response action activities. The RAI Report will include drawings showing the excavation area and dredging area limits, depths of the excavations and dredged areas, and the soil and sediment sampling locations. Data from documentation and waste profile samples will be included in the RAI Report. Excavation/dredged quantities and disposal facilities will be documented along with on-site management details.

## 3.12 Permitting

Permits necessary to perform the proposed activities at the Property will be obtained by LHB and may include, but are not limited to:

- Dredging (MPCA, to be used as fill)
- Stormwater NPDES Permit (to be applied for just prior to construction)
- MNDNR Water Works Permit (obtained)
- Army Corps of Engineer Permit (obtained)

## 3.13 Implementation Schedule

The project will be advertised for bid in July of 2014. The bids will be due in August and the project will be awarded in mid-September 2014. It is anticipated that the remedial excavation work will be one of the first activities completed by the Contractor. The additional sediment investigation in the vicinity of SB-03-12 likely will take place in June or July 2014 and this RAP will be amended based on the results of that investigation. The dredging of Slip D likely will not occur until the summer or autumn of 2015.

# 4.0 Construction Contingency Plan

The CCP describes development of a project-specific health and safety plan and environmental construction contingency measures that may be necessary to protect human health and the environment during the planned Property development construction work.

## 4.1 Site Safety Plan

The contractor selected to implement the response action construction activities will be required to prepare a *Site Safety and Site Contingency Plan* to address requirements of 29 CFR 1910.120. Contractor personnel completing the response action excavations and related activities that involve potential contact with contaminated materials will be required to provide documentation of appropriate training as described in 29 CFR 1910. Copies of project health and safety documents will be made available to the MPCA and maintained onsite. The Contractor will be required to derive appropriate "action levels" for identified contaminants on-site and conduct air monitoring as necessary to identify and quantify levels of hazardous substances with periodic monitoring to assure that proper protective equipment is being used.

## 4.2 Construction Contingency Plan

The RAP described in this report was developed for contaminated soils that are known to be present on the Property. Although unexpected, contaminated soil that is different than anticipated (dissimilar soils) based on the Phase II results, underground storage tanks, drums/containers, asbestos-containing materials, other debris or water may be encountered in the excavations. Such contingent conditions will be managed as follows.

### 4.2.1 Dissimilar Contaminated Soil

If dissimilar contaminated soil is encountered during excavation activities at the Property (based upon visual evidence of contamination, and/or odor), excavation and earthwork activities of the potentially impacted area will temporarily cease until the owner's Environmental Representative familiar with the CCP is made aware of the situation.

The owner's Environmental Representative shall be present during the excavation of dissimilar soils to screen soils, classify materials, and collect analytical samples. If it is decided the material should be removed/segregated, dissimilar soil will be staged to a stockpile. A dissimilar contaminated soil staging area (CSSA) will be constructed by placing a 10-mil-thick (minimum) plastic sheet on the ground and constructing a 6-inch-high soil berm around the perimeter. The plastic will extend beyond the perimeter berm to prevent runoff from, and runon to, the dissimilar CSSA. A 10-mil-thick (minimum) plastic cover will be placed over contaminated soil that is stockpiled in the dissimilar CSSA. The cover will extend beyond the perimeter soil berm and it will be secured and maintained in place until disposition of the stockpile soil has been determined by the owner's Environmental Representative.

The excavation will proceed after appropriate notification has been made. During excavation, dissimilar contaminated soil will be segregated based on appearance, odor, headspace testing and other field screening methods. Contaminated soil will be transported directly to the dissimilar CSSA.

### 4.2.2 Underground Storage Tanks

If unexpected USTs are encountered during excavation activities at the Property, earthwork activities will be temporarily ceased until the owner and/or owner's Environmental Representative is notified. Following appropriate notification, a certified tank remover and onsite representative will be present to oversee the removal of the UST. If fluids are present in the UST, they will be removed and characterized for proper disposal, generally prior to tank removal. The UST will then be removed in accordance with MPCA guidelines by a licensed contractor. After the UST is emptied and removed it will be transported to an approved facility for proper recycling or disposal. The Environmental Representative or other qualified representative will collect appropriate tank excavation soil samples for submittal to an appropriate analytical testing laboratory for guidance-required parameter analysis. Tank removal documentation or other reports will be submitted to the MPCA to document the completed tank removal activities.

### 4.2.3 Drums, Containers or Other Waste

If drums, containers or other waste items are encountered during excavation activities, earthwork activities will temporarily cease until the Environmental Representative is made aware of the situation. The owner's Environmental Representative shall be present for removal of the drums, containers or other waste. Waste items shall be individually removed and their condition assessed. If excavated drums/containers are not in good condition (e.g., severe rusting, structural defects, leaking, etc.), the materials will be transferred to a new drum or other appropriate container or temporarily placed on plastic sheeting similar to Section 4.2.1. Prior to transport, these containers will meet the appropriate requirements of United States Department of Transportation (DOT), U.S. Occupational Safety and Health Administration (OSHA), and U.S. Environmental Protection Agency (EPA) regulations for the containment and transport of wastes.

Intact drums and repacked containers will be transported to a storage area and placed in roll-off boxes or other approved, appropriate containment areas. If appropriate, liquid wastes may be transferred to and bulk-stored in tanks. Each roll-off box or containment area will be lined to contain leaks, spills, or accumulated precipitation. Each roll-off box or containment area will be of sufficient capacity to contain the volume in drums or containers. Each roll-off box or containment area will be covered to prevent accumulation of precipitation.

### 4.2.4 Suspect Asbestos-Containing Materials (ACM)

If piping, debris or soil containing potential ACM is encountered during excavation, excavation activities in the affected location shall temporarily cease and the owner's Environmental Consultant shall be notified. Visual inspection by a MDH certified and licensed asbestos inspector will be conducted to determine if the materials encountered are ACM and to assess the proper separation, handling and disposal of the material. Samples will be collected by the certified asbestos inspector. If the material contains ACM, a certified asbestos abatement company will remove the material and provide the proper handling and

disposal of ACM in accordance with state and federal regulations. Proper notifications will be made to the MPCA.

All asbestos-related work will be conducted in accordance with Minnesota and Federal National Emission Standards for Hazardous Air Pollutants (NESHAP) requirements. Monitoring of airborne asbestos concentrations will be conducted in accordance with the Occupational Safety and Health Administration (OSHA) asbestos requirements for the construction industry, found in 29 CFR 1926.1101 (adopted by reference by Minnesota OSHA).

If significant quantities of ACM or ACM and soil mixtures are encountered during the excavation activities, an Asbestos-Containing Material Emission Control Plan will be developed and implemented for the work. The contractor will make required Agency notifications and implement appropriate operating procedures during excavation and abatement work to ensure protection and safeguard from asbestos exposure of the workers, visitors, employees and the environment. All soil containing potential ACM will be immediately wetted to minimize asbestos fiber release during excavation and loading activities. Soils will be segregated and disposed of at an offsite landfill based on visual observations and analytical testing results.

### 4.2.5 Excavation Water Management

If excavation water levels become too high after a storm event or excavation water COCs exceed desired concentrations then all activities in the affected location shall temporarily cease and the owner's Environmental Representative shall be notified.

Testing and possible treatment of accumulated water may be necessary to obtain a permit to discharge the water to the sanitary sewer or re-infiltrate back into site soil. If necessary, the construction contractor will obtain a sanitary sewer discharge permit from the City of Duluth for discharge to the sanitary sewer system and perform all necessary testing, treatment and flow measuring in accordance with the permit requirements. The Environmental Representative can assist as necessary, with collecting appropriate water samples.

### 4.2.6 Other Buried Debris

Concrete foundations or structures, asphalt or bricks buried in fill and other buried debris (greater than 50 percent by volume in soil) in the excavation area will be stockpiled separately from the excavated soil and other materials. The debris will be transported offsite for disposal in an approved landfill (i.e. demolition landfill facility).

# 5.0 References


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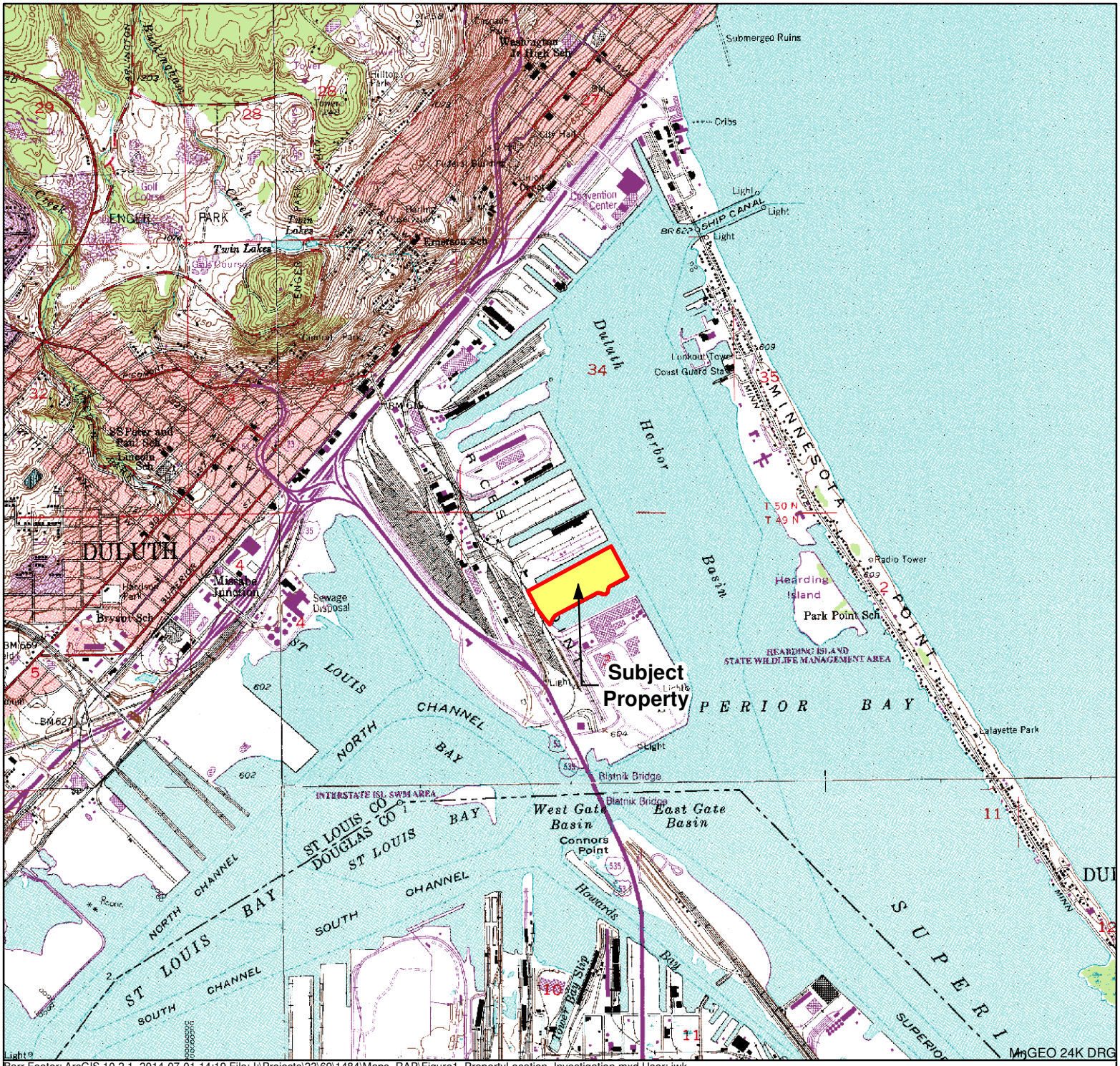
# Figures

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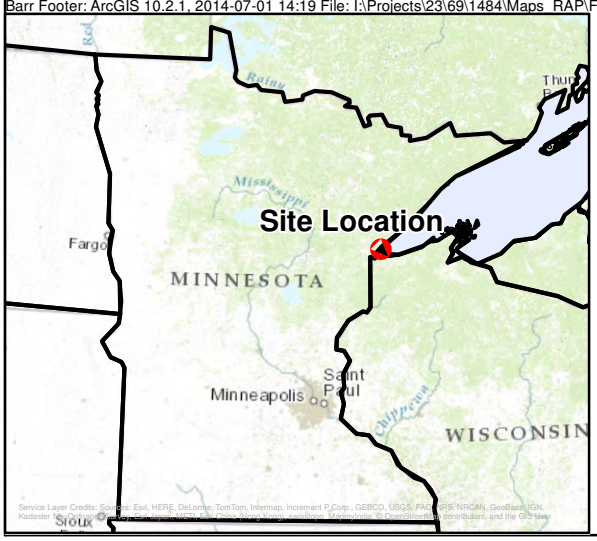


N

0 0.5 1

Miles

1 Inch = 2,640 Feet

Subject Property

FIGURE 1

PROPERTY LOCATION
**RICE'S POINT DOCKS C & D**
**RESPONSE ACTION PLAN**
Duluth, Minnesota

BARR

Slip C

Slip D

HELBERG DR

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*Imagery; Saint Louis County Pictometry, 2013*


0 200 400

Feet

1 Inch = 200 Feet

Subject Property

FIGURE 2

PROPERTY LAYOUT
**RICE'S POINT DOCKS C & D**
**RESPONSE ACTION PLAN**
Duluth, Minnesota

BARR

Construct New Dock Wall

Construct New Dock Wall

Potential Water Service

Provide Stablization Repairs to C-Dock Face

Dredge North Side of Slip

Extent Power to New Lighting

Potential Storm Water Site

Slip C

Slip D

New Paved Entrances

New Security Fencing

Extend Railroad Spur and Yardage onto Property

Barr Footer: ArcGIS 10.2.1, 2014-04-28 09:14 File: I:\Projects\23\69\14844\Maps RAP\Figure3 Conceptual ConstructionLayout Investigation.mxd User: jwk

*Imagery; Saint Louis County Pictometry, 2013*


0 200 400

Feet

1 Inch = 175 Feet

- Area Lighting
- Bollards (Typ.)
- New Dock Wall
- Security Fence
- Electric Utility
- Potental Water Service
- Railroad Spur
- Grading Contours

**Planned Soil Disturbance Area**

- Facilities Building (Pre-manufactured)
- Hard Surface Paving
- Paved Entrance
- Potential Stormwater Site
- RR Crossing

FIGURE 3

CONCEPTUAL DEVELOPMENT PLANS
**RICE'S POINT DOCKS C & D**
**RESPONSE ACTION PLAN**
Duluth, Minnesota

*(Originally Drawn by: LHB)*

BARR

Possible Coal Storage Area
Vacant Building (10' x 10')
Great Lakes Towing
Stack (Removed)
Concrete Foundation
Drainage Ditch
Powerhouse (Removed)
Railcar Dump (Removed)
Well
Water Well
Transformer House
"C" East Annex
Steel Roll Off Containers
"D" Headhouse
Train Shed
Existing "D" Annex # 1
Globe Elevators Division of Peavey Duluth Terminal Elevator Company
Grain Drying Room
Conveyors
Truck Dump (Removed)
Occident Terminal Division of Russell Miller Milling Company
"C" Train Shed
Covered Concrete Box
"C" Headhouse
Millwright
Railcar Dump (Removed)
"D" Annex # 2
Restroom
"C" West Annex
Slip C
Slip D
Garage
Burned Area
Garage
Debris Pile
City of Duluth Compost Facility
The Barnhart Lumber Company Saw Mill
Berm
HELBERG DR

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Imagery; Saint Louis County Pictometry 2013


0 200 400

Feet

1 Inch = 200 Feet

Subject Property

**Historical Site Features**

- Building
- Staging Area
- Dock
- Roads
- Railroads
- Shoreline

Recognized Environmental Condition (REC) [Refer to Phase I ESA]

**Field Observations**

- Unique Feature
- Conduit Pipes
- Railroad Tie Debris
- Water Well

FIGURE 4

HISTORICAL FEATURES WITH CONDITIONS AND FINDINGS OF PHASE I ESA

**RICE'S POINT DOCKS C & D RESPONSE ACTION PLAN**

Duluth, Minnesota

BARR



0 200 400

Feet

1 Inch = 200 Feet

**Historical Site Features**

- Building
- Staging Area
- Roads
- Railroads
- Shoreline

- Subject Property
- Excavation Location
- Incomplete Test Excavation Location*
- Dec. 2012/Oct. 2013; EPC - Sediment Sample
- Set. 2013; Icecor - Surface Soil Sample

**TP-10, TP-17, TP-25 were not completed after 3 attempts due to refusal at surface. (Excavations completed Dec.19, 2013 & Dec. 20, 2013.)*

FIGURE 5

SOIL SAMPLE, SEDIMENT SAMPLE & TEST PIT EXCAVATION LOCATIONS
**RICE'S POINT DOCKS C & D**
**RESPONSE ACTION PLAN**
Duluth, Minnesota

BARR

DRO: 100
SS-1
SB-13-08
TP-15
DRO: 190
SB-13-07
TP-14
DRO: 110
TP-13
SB-12-01
TP-12
DRO: 149
SS-2
SS-8
DRO: 180
TP-17
SS-3
SS-7
DRO: 300
TP-11
DRO: 100
DRO: 215
SS-4
TP-16
SB-12-02
SS-6
DRO: 137
SS-5
DRO: 119
TP-18
DRO: 430 & 1000
TP-10
SB-12-03
TP-19
TP-09
DRO: 100
TP-20
TP-25
SB-12-04
TP-08
Slip C
Slip D
TP-07
DRO: 510
TP-24
SB-13-05
DRO: 120
TP-21
TP-06
DRO: 150
TP-23
SB-13-06
TP-22
TP-05
DRO: 430
DRO: 170
TP-04
TP-01
TP-02
TP-03
ST-01
Helberg Dr

Imagery; Saint Louis County Pictometry, 2013


0 200 400

Feet

1 Inch = 200 Feet

**Historical Site Features**

- Building
- Staging Area
- Roads
- Railroads
- Shoreline

- Subject Property
- Excavation Location
- Diesel Range Organics (DRO) ≥ 100mg/kg *
- Incomplete Test Excavation Location**
- Dec. 2012/Oct. 2013; EPC - Sediment Sample
- Set. 2013; Icecor - Surface Soil Sample

*All Concentrations in Milligrams per Kilogram (mg/kg)

**TP-10, TP-17, TP-25 were not completed after 3 attempts due to refusal at surface. (Excavations completed Dec.19, 2013 & Dec. 20, 2013.)

FIGURE 6

DRO COMPARISON RESULTS
**Diesel Range Organics ≥ 100 mg/kg**
**RICE'S POINT DOCKS C & D**
**RESPONSE ACTION PLAN**
Duluth, Minnesota

BARR

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B(a)P 4.0
B(a)P 6.5
B(a)P 3.9
B(a)P 7.3
B(a)P 4.8
B(a)P 4.7
B(a)P 6.4
B(a)P 19
B(a)P 22 & 40
B(a)P 4.5
B(a)P 3.5
B(a)P 12
B(a)P 6.9
SB-13-08
SB-13-07
SB-12-01
SB-12-02
SB-12-03
SB-12-04
SB-13-05
SB-13-06
TP-15
TP-12
TP-16
TP-17
TP-10
TP-09
TP-25
TP-08
TP-24
TP-21
TP-06
TP-23
TP-22
TP-04
TP-01
TP-02
TP-03
ST-01
SS-1
SS-2
SS-8
SS-3
SS-7
SS-4
SS-6
SS-5
Slip C
Slip D
Helberg Dr

Barr Footer: ArcGIS 10.2.1, 2014-04-28 10:31 File: I:\Projects\23\69\1484\Maps_RAP\Figure7_SampleAnalyticalResults_MNTier2_SRV.mxd User: jwk

*Imagery; Saint Louis County Pictometry, 2013*


0 200 400

Feet
1 Inch = 200 Feet

**Historical Site Features**
- Building
- Staging Area
- Roads
- Railroads
- Shoreline

- Subject Property
- Excavation Location
- Exeeds Tier 2 SRV*
- Incomplete Test Excavation Location**

*All Concentrations in Milligrams per Kilogram (mg/kg)
B(a)P = B(a)P Equivalent
SRV = Soil Reference Value
No RCRA Metals, Herbicides or Pesticide Concentrations Greater than MN Tier 2 Industrial SRVs

**TP-10, TP-17, TP-25 were not completed after 3 attempts due to refusal at surface.
(Excavations completed Dec.19, 2013 & Dec. 20, 2013.)

FIGURE 7

SRV COMPARISON RESULTS
**Results ≥ MN Tier 2 Soil Reference Values**
**(Direct Contact Risk Pathway)**
**RICE'S POINT DOCKS C & D**
**RESPONSE ACTION PLAN**
Duluth, Minnesota

BARR

B(a)P 6.5
SB-13-08
SB-13-07
SB-12-01
SS-1
TP-15
TP-14
TP-13
TP-12
SS-2
B(a)P 6.4
TP-17
B(a)P 19
SS-8
SS-7
TP-16
TP-11
SB-12-02
SS-4
B(a)P 7.3
SS-6
SS-5
TP-18
TP-10
SB-12-03
B(a)P 22 & 40
B(a)P 4.5
TP-19
TP-09
TP-20
TP-25
SB-12-04
Slip C
Slip D
TP-08
B(a)P 12
TP-07
TP-24
SB-13-05
Ethylbenzene 1.1,
Toluene 2.9,
Total Xylenes 7.8,
Chromium 120
TP-21
TP-06
TP-23
B(a)P 6.9
SB-13-06
TP-22
TP-05
TP-04
TP-01
TP-02
TP-03
ST-01
Helberg Dr

*Imagery; Saint Louis County Pictometry, 2013*


0 200 400

Feet

1 Inch = 200 Feet

**Historical Site Features**

- Building
- Staging Area
- Roads
- Railroads
- Shoreline

- Subject Property
- Excavation Location
- Exceeds Tier 1 SLV*
- Incomplete Test Excavation Location**
- Anticipated Dredge Sediments to be Segregated
- Proposed Location of 15' x 15' x 4' Limited Remedial Soil Excavation
- Dec. 2012/Oct. 2013; EPC - Sediment Sample
- Set. 2013; Icecor - Surface Soil Sample

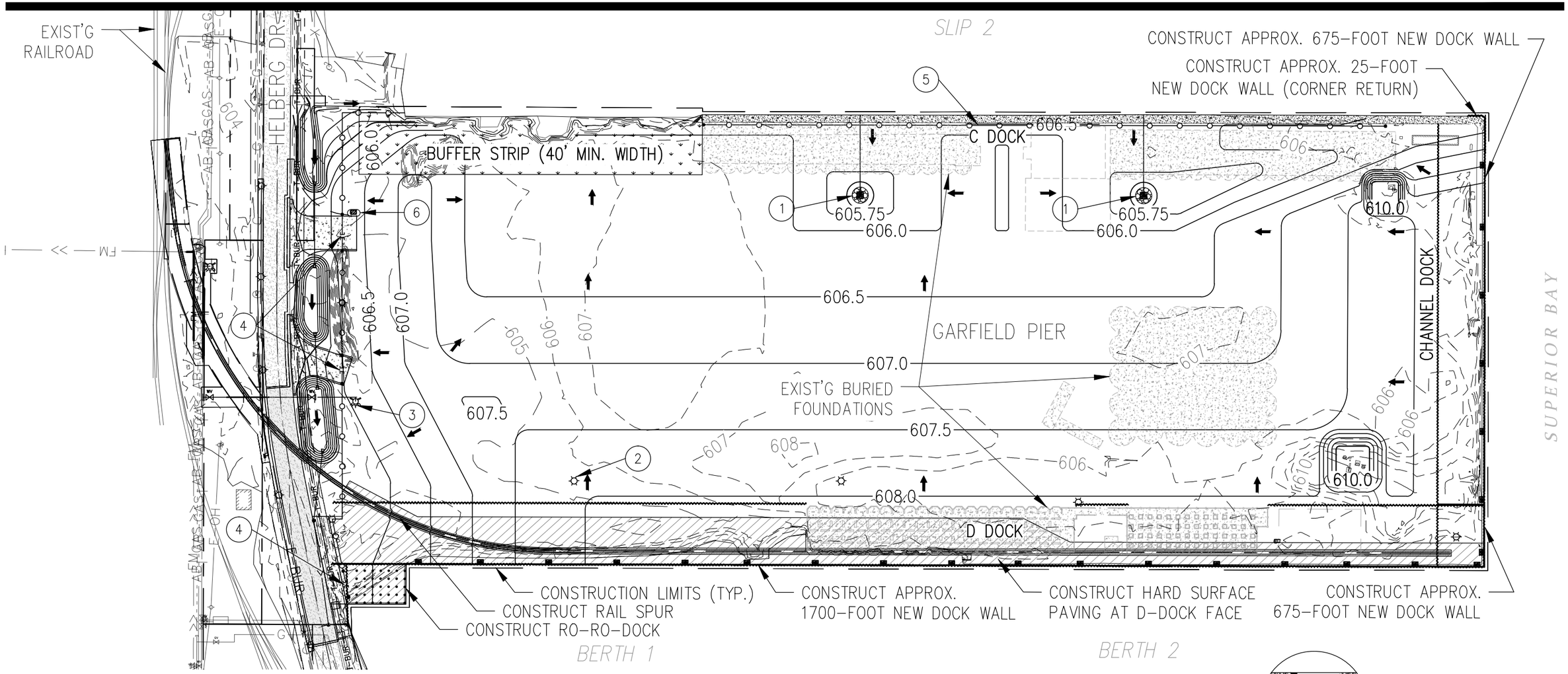
# FIGURE 8

## PROPOSED LIMITED REMEDIAL SOIL EXCAVATION LOCATIONS AND GRADING PLAN

**RICE'S POINT DOCKS C & D**
**RESPONSE ACTION PLAN**
Duluth, Minnesota

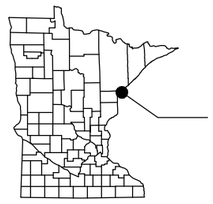
BARR

**SLV = Soil Leaching Value*
*Concentrations in Milligrams per Kilogram (mg/kg)*
***TP-10, TP-17, TP-25 were not completed after 3 attempts due to refusal at surface.*
*(Excavations completed Dec.19, 2013 & Dec. 20, 2013.)*

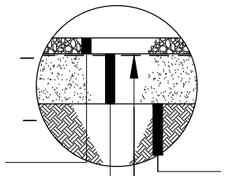



## KEY NOTES

1. PROPOSED CATCH BASIN WITH PERIMETER VEGETATION BUFFER
2. CONSTRUCT NEW AREA LIGHTING (TYP.)
3. FIRE PROTECTION SERVICE HYDRANT & VALVE ASSEMBLY
4. CONSTRUCT SECURITY GATE
5. CONSTRUCT 1120 LF OF 4-FT CHAIN LINK FENCE
6. PREMANUFACTURED SECURITY GUARD HOUSE



PROJECT LOCATION
ST. LOUIS COUNTY
SEC. 3, T-49-N, R-14-W




TYPICAL SECTION

APPLIES: GARFIELD PIER

LHB
PERFORMANCE DRIVEN DESIGN.
LHBcorp.com
21 W. Superior St., Ste. 500 | Duluth, MN 55802 | 218.727.8446

0' 150'

NO DATE REVISION

CLIENT: DULUTH SEAWAY PORT AUTHORITY

PROJECT NAME: DSPA C & D DOCK REHABILITATION

DRAWING TITLE: SITE IMPROVEMENTS & GRADING

FILE: 110493_04-SITE LOCATOR MAP.DWG
DRAWN BY: SMH
CHECKED BY: BPS
PROJ. NO: 110493
DRAWING NO:

# FIGURE 9

# Appendix A

## Sediment Sampling Reports for Dock D (EPC 2012 and 2013)

**EPC Engineering & Testing**
**Geotechnical • Environmental • Materials Engineering**
539 Garfield Avenue
Duluth, Minnesota 55802
(218) 727-1239
(218) 727-1248 fax

December 6, 2012
EPC # 12E0764

Mr. Joe Litman, P.E.
LHB Corp.
21 West Superior St., Suite 500
Duluth, MN 55802

Re: Sediment Sampling
Proposed Dredging Project
Duluth Seaway Port Authority, D Dock
Duluth, Minnesota

Dear Mr. Litman,

EPC Engineering & Testing (EPC) was contracted to perform sediment sampling in an area proposed for dredging for the above-referenced facility. It is our understanding that the results of the sampling will be used to assist in obtaining a dredging permit and in determining the end use of the dredged material. The following summarizes the methods and results of the sediment sampling.

## Methods

On November 16 and 19, 2012, EPC performed four (4) sediment cores along the D Dock (in the vicinity of the Great Lakes Towing company tugboat mooring area) in Duluth, Minnesota, using a split spoon sampler (3-inch diameter) using EPC's CME 55 truck mounted and 750 ATV drill rigs, from the side of the dock wall (3 borings) and off a barge (1 boring). The sample locations were selected in the areas proposed for dredging and are shown in Attachment 1 to this letter report. Sediment Sample SB-12-01 (channel side) was completed to approximately 8 ft below the sediment line to adequately get below the proposed dredge depth (approximate elevation 573.1). Sediment samples SB-12-02, SB-12-03 and SB-12-04 (slip side) were completed to approximately 1.5 ft, 6.5 ft., and 9.0 ft., resepcetively, below the sediment line to adequately get below the proposed dredge depth (approximate elevation 573.1).

Sediment samples were retrieved and logged in accordance with Minnesota Dregde guidelines. Copies of the core logs are included in Attachment 2. Laboratory analytical samples were selected from the sediment samples based on changes in material types or depth, and submitted under proper chain of custody procedures to Pace Analytical in Green Bay, Wisconsin. Two (2) samples were taken from SB-12-01 (one from the POORLY GRADED SAND with SILT(SP-SM) layer, and one from the POORLY GRADED SAND(SP) layer. One (1) sample was taken from SB-12-02 from the CLAY and/or SILT(CL-CH/ML-MH) layer. Two (2) samples were taken from SB-12-03 (one from the SILTY SAND with GRAVEL(SM) layer, and one from the SILTY SAND(SM) layer. Two (2) samples were taken from SB-12-04 (one from the SILTY SAND(SM) layer, and one from the POORLY GRADED SAND with SILT(SP-SM) layer. The seven samples were taken and analyzed for: MN Landfill metals, Phosphorus, Nitrate-Nitrite, Ammonia Nitrite,

Total Kjedahl nitrogen, Total Organic Carbon, PCBs and PAHs/PNAs. In addition, two gradations (passing the #200 sieve) and five (5) hydrometer sieve analyses were performed on various samples from the four sediment cores to determine the amount of fines present and to assist in classifying soils according to the ASTM.

## Results

As mentioned above, logs depicting the graphical results of each sediment sample were developed and are attached. The samples generally consisted of Silty Sand soils. A table providing more details on the sediment samples is included in Attachment 2.

Analytical laboratory results indicated a few "background level" RCRA metals were present in each of the samples tested. Samples from SB-12-02, -03, and -04 detected Arsenic and Mercury, but all at levels below the MPCA Tier 1 Residential Soil Reference Values (SRV). Sample S3(28.5-30) detected one low level PCB compound, which was well below the MPCA Tier 1 SRV. Sample S3(28.5-30) also indicated the presence of several low level PAHs, which were all below the MPCA Tier 1 SRV except for the Benzo(a)pyrene Equivalent (BaP). Analytical laboratory reports are included in Attachment 3.

Results of the Gradation and Hydrometer Sieve analyses were used to assist in classifying the following soil types in the four sediment cores: POORLY GRADED SAND with SILT (SP-SM), POORLY GRADED SAND(SP), CLAY and/or SILT (CL-CH/ML-MH), SILTY SAND with GRAVEL (SM), and SILTY SAND (SM). Gradation and Hydrometer gradation reports are included in Attachment 4.

## Conclusions

Results of the sediment samples taken in the project area generally indicated the presence of Silty Sandy soils. Only sample S3(28.5-30) detected a low level PCB and PAHs. The BaP equivalent for this sample exceeds the MPCA Tier 1 SRV. None of the low level metals detected exceed the MPCA Tier 1 SRV. Hydrometer sieve analyses were performed to provide insight into the amounts of silt and clay in each of the main soil layers encountered. The following silt and clay percentages were determined for each of the respective identified soil types: POORLY GRADED SAND with SILT (SP-SM)[6.0-7.3%], POORLY GRADED SAND(SP)[2.5%], CLAY and/or SILT (CL-CH/ML-MH)[61.6%], SILTY SAND with GRAVEL (SM)[22.2%], and SILTY SAND (SM)[13.2-26.6%].

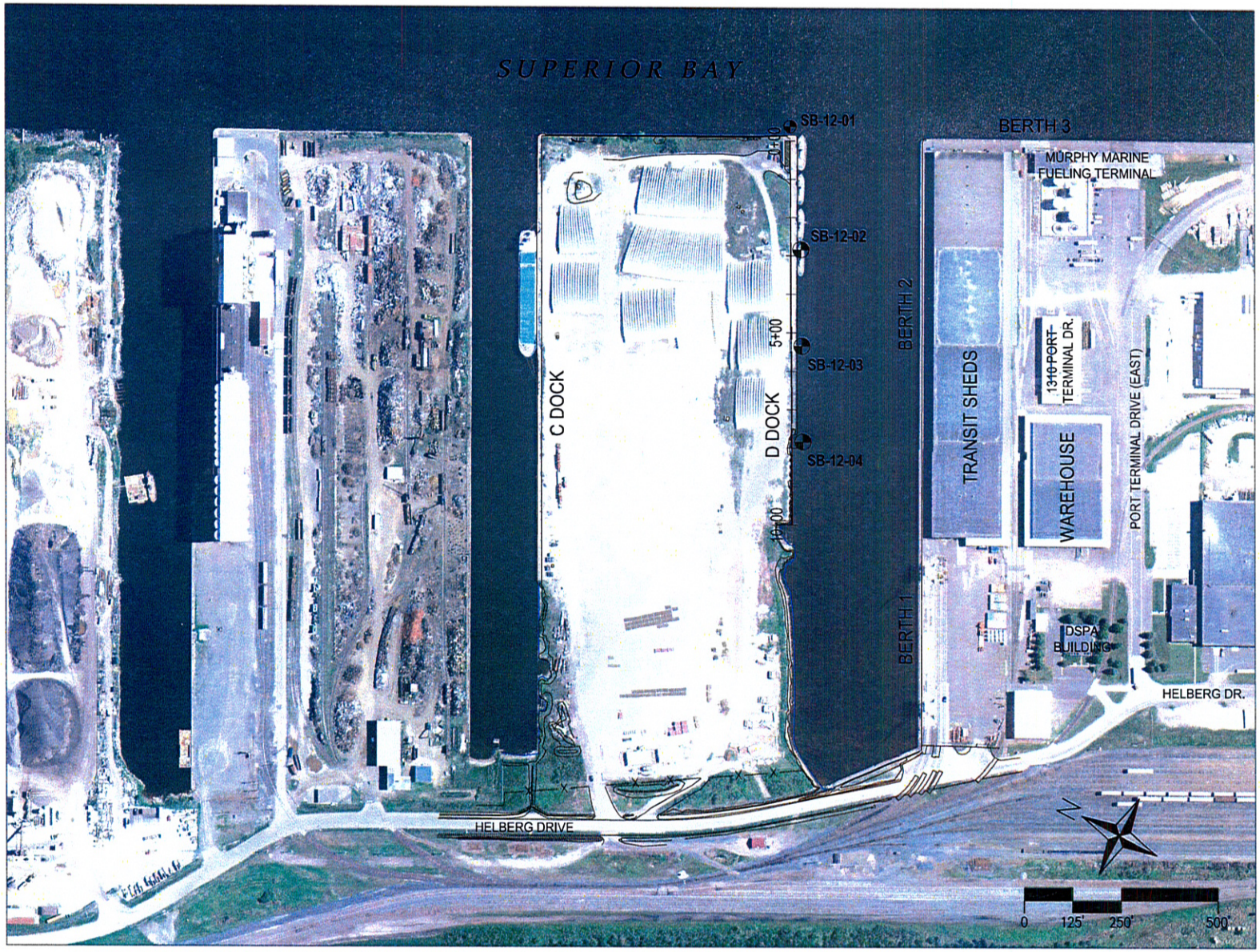
If you have any questions, please contact me at (218) 727-1239.

Sincerely,
**EPC Engineering & Testing**

Brian E. McVean, P.E.

Enclosures: Attachment 1 – Sediment Core Sample Location Map
Attachment 2 – Core Sample Logs and Summary Table
Attachment 3 – Analytical Laboratory Reports
Attachment 4 – Physical Laboratory Reports

# ATTACHMENT 1
## SEDIMENT CORE SAMPLE LOCATION MAP

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EPC Engineering & Testing
Materials Engineering
Environmental
Geotechnical

CLIENT:
Duluth Seaway Port Authority (DSPA)

1200 Port Terminal Drive
Duluth, MN 55802



| NO | DATE | REVISION |
|---|---|---|

PROJECT NAME:
C AND D DOCK IMPROVEMENTS

DRAWING TITLE:
SEDIMENT CORE LOCATIONS

FILE: ..\110493\600 Drawings\Base\110493 Borings Exhi
DRAWN BY: PAB
CHECKED BY: BPS
PROJ. NO: 110493
DRAWING NO:

EXHIBIT

# ATTACHMENT 2
## CORE SAMPLE LOGS AND SUMMARY TABLE

**EPC Engineering & Testing**
**Geotechnical • Environmental • Materials Engineering**
539 Garfield Avenue
Duluth, Minnesota 55802

# BORING NUMBER SB-12-01



**CLIENT** LHB Corporation
**PROJECT NAME** D Dock
**PROJECT NUMBER** 12E0764
**PROJECT LOCATION** Duluth, MN
**DATE STARTED** 11/16/12 **COMPLETED** 11/16/12
**GROUND ELEVATION** _____ **HOLE SIZE** 8"
**DRILLING CONTRACTOR** EPC Engineering & Testing
**GROUND WATER LEVELS:**
**DRILLING METHOD** CME 55 Truck Rig with HSA
▽ **AT TIME OF DRILLING** 0.0 ft
**LOGGED BY** BEM **CHECKED BY** CRL
**AT END OF DRILLING** ---
**NOTES** Cored from barge deck
**AFTER DRILLING** ---

| ELEVATION (ft) | DEPTH (ft) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE NUMBER | RECOVERY % (RQD) | BLOW COUNTS (N VALUE) | POCKET PENETROMETER (tsf) | DRY UNIT WT. (pcf) | ▲ SPT N VALUE ▲ 20 40 60 80 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80 |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | ▽ | WATER | | | | | | |
| | 5 | | | | | | | | |
| | 10 | | | AR | | | | | |
| | 15 | | | | | | | | |
| | 20 | | | | | | | | |
| | 25 | | POORLY GRADED SAND with SILT (SP-SM) brown, waterbearing, trace gravel, trace shells.<br>Composite Laboratory Tested Samples 1, 2 & 3.<br>Percent Passing #200 Sieve = 7.3% | SS 1 | 75 | 0-1-1-1 (2) | | | |
| | | | | SS 2 | 79 | 0-17-16-5 (33) | | | |
| | | | | SS 3 | 100 | 3-3-6-3 (9) | | | |
| | 30 | | POORLY GRADED SAND (SP-SM) brown, waterbearing, trace gravel, with wood.<br>Laboratory Tested<br>Percent Passing # 200 Sieve = 2.5% | SS 4 | 100 | 22-4-4-6 (8) | | | |
| | | | Bottom of hole at 31.0 feet. | | | | | | |

GEOTECH BH PLOTS 12E0764 D DOCK.GPJ GINT US LAB.GDT 11/29/12

**EPC Engineering & Testing**
**Geotechnical • Environmental • Materials Engineering**
539 Garfield Avenue
Duluth, Minnesota 55802

# BORING NUMBER SB-12-02



**CLIENT** LHB Corporation
**PROJECT NAME** D Dock
**PROJECT NUMBER** 12E0764
**PROJECT LOCATION** Duluth, MN
**DATE STARTED** 11/19/12 **COMPLETED** 11/19/12
**GROUND ELEVATION** _____ **HOLE SIZE** 8"
**DRILLING CONTRACTOR** EPC Engineering & Testing
**GROUND WATER LEVELS:**
**DRILLING METHOD** CME 750 ATV with HSA & SPT Cal. to N79.
▽ **AT TIME OF DRILLING** 0.0 ft
**LOGGED BY** BEM **CHECKED BY** CRL
**AT END OF DRILLING** ---
**NOTES** Cored from edge of dock
**AFTER DRILLING** ---

| ELEVATION (ft) | DEPTH (ft) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE NUMBER | RECOVERY % (RQD) | BLOW COUNTS (N VALUE) | POCKET PENETROMETER (tsf) | DRY UNIT WT. (pcf) | ▲ SPT N VALUE ▲ 20 40 60 80 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80 |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | ▽ | WATER | | | | | | |
| | 5 | | | | | | | | |
| | 10 | | | | | | | | |
| | 15 | | | AR | | | | | |
| | 20 | | | | | | | | |
| | 25 | | | | | | | | |
| | 30 | | CLAY (CL-CH) and/or SILT (ML-MH) gray, waterbearing, trace shells. | SS 1 | 100 | 0-0-0-0/0" | | | >> |
| | | | Laboratory Tested<br>Percent Passing #200 Sieve = 61.6% | | | | | | |
| | | | Bottom of hole at 31.0 feet. | | | | | | |

GEOTECH BH PLOTS 12E0764 D DOCK.GPJ GINT US LAB.GDT 11/29/12

**EPC Engineering & Testing**
**Geotechnical • Environmental • Materials Engineering**
539 Garfield Avenue
Duluth, Minnesota 55802

# BORING NUMBER SB-12-03



**CLIENT** LHB Corporation
**PROJECT NAME** D Dock
**PROJECT NUMBER** 12E0764
**PROJECT LOCATION** Duluth, MN
**DATE STARTED** 11/19/12 **COMPLETED** 11/19/12
**GROUND ELEVATION** _____ **HOLE SIZE** 8"
**DRILLING CONTRACTOR** EPC Engineering & Testing
**GROUND WATER LEVELS:**
**DRILLING METHOD** CME 750 ATV with HSA & SPT Cal. to N79.
▽ **AT TIME OF DRILLING** 0.0 ft
**LOGGED BY** BEM **CHECKED BY** CRL
**AT END OF DRILLING** ---
**NOTES** Cored from edge of dock
**AFTER DRILLING** ---

| ELEVATION (ft) | DEPTH (ft) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE NUMBER | RECOVERY % (RQD) | BLOW COUNTS (N VALUE) | POCKET PENETROMETER (tsf) | DRY UNIT WT. (pcf) |
|---|---|---|---|---|---|---|---|---|
| | 0 | | WATER | | | | | |
| | | | | AR | | | | |
| | 25 | | SILTY SAND with GRAVEL (SM) gray, waterbearing, trace shells and wood. | SS 1 | (75) | 0-0-0-0 (0) | | |
| | | | Composite Laboratory Tested Samples 1 & 2. Percent Passing #200 Sieve = 22.3% | SS 2 | (83) | 7-20-24-18 (44) | | |
| | | | SILTY SAND (SM) gray to brown, waterbearing. | SS 3 | (93) | 5-6-15-16 (21) | | |
| | 30 | | Laboratory Tested Percent Passing #200 Sieve = 13.2% | | | | | |
| | | | Bottom of hole at 30.0 feet. | | | | | |

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

**EPC Engineering & Testing**
**Geotechnical • Environmental • Materials Engineering**
539 Garfield Avenue
Duluth, Minnesota 55802

# BORING NUMBER SB-12-04



**CLIENT** LHB Corporation
**PROJECT NAME** D Dock
**PROJECT NUMBER** 12E0764
**PROJECT LOCATION** Duluth, MN
**DATE STARTED** 11/19/12 **COMPLETED** 11/19/12
**GROUND ELEVATION** _____ **HOLE SIZE** 8"
**DRILLING CONTRACTOR** EPC Engineering & Testing
**GROUND WATER LEVELS:**
**DRILLING METHOD** CME 750 ATV with HSA & SPT Cal. to N79.
▽ **AT TIME OF DRILLING** 0.0 ft
**LOGGED BY** BEM **CHECKED BY** CRL
**AT END OF DRILLING** ---
**NOTES** Cored from edge of dock
**AFTER DRILLING** ---

| ELEVATION (ft) | DEPTH (ft) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE NUMBER | RECOVERY % (RQD) | BLOW COUNTS (N VALUE) | POCKET PENETROMETER (tsf) | DRY UNIT WT. (pcf) |
|---|---|---|---|---|---|---|---|---|
| | 0 | ▽ | WATER | | | | | |
| | 5 | | | | | | | |
| | 10 | | | AR | | | | |
| | 15 | | | | | | | |
| | 20 | | | | | | | |
| | | | SILTY SAND (SM) dark brown to gray, waterbearing, trace shells. | SS 1 | 75 | 0-0-0-0 (0) | | |
| | | | Composite Laboratory Tested Samples 1, 2 & 3. Percent Passing #200 Sieve = 26.6% | SS 2 | 71 | 0-0-0-1 (0) | | |
| | 25 | | | SS 3 | 100 | 2-3-4 (7) | | |
| | | | POORLY GRADED SAND w/SILT (SP-SM) brown, waterbearing, trace wood. | SS 4 | 100 | 12-15 | | |
| | | | Composite Laboratory Tested Samples 4 & 5. Percent Passing #200 Sieve = 6.0% | SS 5 | 100 | 6-12-18-24 (30) | | |
| | 30 | | Bottom of hole at 30.0 feet. | | | | | |

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

## SEDIMENT SUMMARY TABLE

### D Dock Duluth, Minnesota

### November, 2012

| | | Top Sample Layer | | | Lower Sample Layer | | |
|---|---|---|---|---|---|---|---|
| Sediment Core | Water Column (ft) | ASTM Class. | Thickness (ft.) | Analyses | ASTM Class. | Thickness (ft.) | Analyses |
| SB-12-01 | 23.0 | SP-SM | 6 | E, H | SP | 2 | E, G |
| SB-12-02 | 29.5 | CL-CH/ML-MH | 1.5 | E, H | NA | NA | NA |
| SB-12-03 | 23.5 | SM | 5 | E, H | SM | 1.5 | E, H |
| SB-12-04 | 21.0 | SM | 5.5 | E, H | SP-SM | 3.5 | E, G |

ASTM Classifications =>

SP-SM = POORLEY GRADED SAND with SILT, SP = POORLY GRADED SAND,
CL-CH/ML-MH = CLAY and/or SILT, SM = SILTY SAND

Analyses Codes =>

E = MN LF metals, Phosphorus, Nitrate-Nitrite, Ammonia Nitrogen, TKN, PCBs, PAHs, TOC
G = mechanical gradation % passing #200 sieve
H = hydrometer gradation

# ATTACHMENT 3
## ANALYTICAL LABORATORY REPORTS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

December 05, 2012

Brian McVean
ENGINEERING PARTNERS CO.
539 Garfield Avenue
Duluth, MN 55802

RE: Project: D DOCK
Pace Project No.: 4070988

Dear Brian McVean:
Enclosed are the analytical results for sample(s) received by the laboratory on November 21, 2012. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Steven Mleczko

steve.mleczko@pacelabs.com
Project Manager

Enclosures

Pace Analytical®
www.pacelabs.com

**Pace Analytical Services, Inc.**
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

## CERTIFICATIONS

Project: D DOCK
Pace Project No.: 4070988

**Green Bay Certification IDs**
1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 11888
North Carolina Certification #: 503
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
US Dept of Agriculture #: S-76505
Wisconsin Certification #: 405132750

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

## SAMPLE SUMMARY

Project: D DOCK
Pace Project No.: 4070988

| Lab ID | Sample ID | Matrix | Date Collected | Date Received |
|---|---|---|---|---|
| 4070988001 | S1 (23-29) | Solid | 11/20/12 00:00 | 11/21/12 15:30 |
| 4070988002 | S1 (29-31) | Solid | 11/20/12 00:00 | 11/21/12 15:30 |
| 4070988003 | S2 (29.5-31) | Solid | 11/20/12 00:00 | 11/21/12 15:30 |
| 4070988004 | S3 (23.5-28.5) | Solid | 11/20/12 00:00 | 11/21/12 15:30 |
| 4070988005 | S3 (28.5-30) | Solid | 11/20/12 00:00 | 11/21/12 15:30 |
| 4070988006 | S4 (21-26.5) | Solid | 11/20/12 00:00 | 11/21/12 15:30 |
| 4070988007 | S4 (26.5-30) | Solid | 11/20/12 00:00 | 11/21/12 15:30 |

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

## SAMPLE ANALYTE COUNT

Project: D DOCK
Pace Project No.: 4070988

| Lab ID | Sample ID | Method | Analysts | Analytes Reported | Laboratory |
|---|---|---|---|---|---|
| 4070988001 | S1 (23-29) | EPA 8082 | BLM | 10 | PASI-G |
| | | EPA 6010 | DLB | 7 | PASI-G |
| | | EPA 7471 | CMS | 1 | PASI-G |
| | | EPA 8270 by SIM | ARO | 18 | PASI-G |
| | | ASTM D2974-87 | SKW | 1 | PASI-G |
| | | EPA 300.0 | JCJ | 3 | PASI-G |
| | | EPA 350.1 | HMB | 1 | PASI-G |
| | | EPA 351.2 | HMB | 1 | PASI-G |
| | | EPA 365.4 | DAW | 1 | PASI-G |
| | | EPA 9060 Modified | TJJ | 4 | PASI-G |
| 4070988002 | S1 (29-31) | EPA 8082 | BLM | 10 | PASI-G |
| | | EPA 6010 | DLB | 7 | PASI-G |
| | | EPA 7471 | CMS | 1 | PASI-G |
| | | EPA 8270 by SIM | ARO | 18 | PASI-G |
| | | ASTM D2974-87 | SKW | 1 | PASI-G |
| | | EPA 300.0 | JCJ | 3 | PASI-G |
| | | EPA 350.1 | HMB | 1 | PASI-G |
| | | EPA 351.2 | HMB | 1 | PASI-G |
| | | EPA 365.4 | DAW | 1 | PASI-G |
| | | EPA 9060 Modified | TJJ | 4 | PASI-G |
| 4070988003 | S2 (29.5-31) | EPA 8082 | BLM | 10 | PASI-G |
| | | EPA 6010 | DLB | 7 | PASI-G |
| | | EPA 7471 | CMS | 1 | PASI-G |
| | | EPA 8270 by SIM | ARO | 18 | PASI-G |
| | | ASTM D2974-87 | SKW | 1 | PASI-G |
| | | EPA 300.0 | JCJ | 3 | PASI-G |
| | | EPA 350.1 | HMB | 1 | PASI-G |
| | | EPA 351.2 | HMB | 1 | PASI-G |
| | | EPA 365.4 | DAW | 1 | PASI-G |
| | | EPA 9060 Modified | TJJ | 4 | PASI-G |
| 4070988004 | S3 (23.5-28.5) | EPA 8082 | BLM | 10 | PASI-G |
| | | EPA 6010 | DLB | 7 | PASI-G |
| | | EPA 7471 | CMS | 1 | PASI-G |
| | | EPA 8270 by SIM | ARO | 18 | PASI-G |
| | | ASTM D2974-87 | SKW | 1 | PASI-G |
| | | EPA 300.0 | JCJ | 3 | PASI-G |
| | | EPA 350.1 | HMB | 1 | PASI-G |

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## SAMPLE ANALYTE COUNT

Project: D DOCK
Pace Project No.: 4070988

| Lab ID | Sample ID | Method | Analysts | Analytes Reported | Laboratory |
|---|---|---|---|---|---|
| | | EPA 351.2 | HMB | 1 | PASI-G |
| | | EPA 365.4 | DAW | 1 | PASI-G |
| | | EPA 9060 Modified | TJJ | 4 | PASI-G |
| 4070988005 | S3 (28.5-30) | EPA 8082 | BLM | 10 | PASI-G |
| | | EPA 6010 | DLB | 7 | PASI-G |
| | | EPA 7471 | CMS | 1 | PASI-G |
| | | EPA 8270 by SIM | ARO | 18 | PASI-G |
| | | ASTM D2974-87 | SKW | 1 | PASI-G |
| | | EPA 300.0 | JCJ | 3 | PASI-G |
| | | EPA 350.1 | HMB | 1 | PASI-G |
| | | EPA 351.2 | HMB | 1 | PASI-G |
| | | EPA 365.4 | DAW | 1 | PASI-G |
| | | EPA 9060 Modified | TJJ | 4 | PASI-G |
| 4070988006 | S4 (21-26.5) | EPA 8082 | BLM | 10 | PASI-G |
| | | EPA 6010 | DLB | 7 | PASI-G |
| | | EPA 7471 | CMS | 1 | PASI-G |
| | | EPA 8270 by SIM | ARO | 18 | PASI-G |
| | | ASTM D2974-87 | SKW | 1 | PASI-G |
| | | EPA 300.0 | JCJ | 3 | PASI-G |
| | | EPA 350.1 | HMB | 1 | PASI-G |
| | | EPA 351.2 | HMB | 1 | PASI-G |
| | | EPA 365.4 | DAW | 1 | PASI-G |
| | | EPA 9060 Modified | TJJ | 4 | PASI-G |
| 4070988007 | S4 (26.5-30) | EPA 8082 | BLM | 10 | PASI-G |
| | | EPA 6010 | DLB | 7 | PASI-G |
| | | EPA 7471 | CMS | 1 | PASI-G |
| | | EPA 8270 by SIM | ARO | 18 | PASI-G |
| | | ASTM D2974-87 | SKW | 1 | PASI-G |
| | | EPA 300.0 | JCJ | 3 | PASI-G |
| | | EPA 350.1 | HMB | 1 | PASI-G |
| | | EPA 351.2 | HMB | 1 | PASI-G |
| | | EPA 365.4 | DAW | 1 | PASI-G |
| | | EPA 9060 Modified | TJJ | 4 | PASI-G |

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## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4070988

**Sample: S1 (23-29)** **Lab ID: 4070988001** Collected: 11/20/12 00:00 Received: 11/21/12 15:30 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **8082 GCS PCB** | Analytical Method: EPA 8082 Preparation Method: EPA 3541 | | | | | | | |
| PCB-1016 (Aroclor 1016) | ND | ug/kg | 127 | 1 | 11/26/12 12:00 | 11/27/12 13:11 | 12674-11-2 | |
| PCB-1221 (Aroclor 1221) | ND | ug/kg | 127 | 1 | 11/26/12 12:00 | 11/27/12 13:11 | 11104-28-2 | |
| PCB-1232 (Aroclor 1232) | ND | ug/kg | 127 | 1 | 11/26/12 12:00 | 11/27/12 13:11 | 11141-16-5 | |
| PCB-1242 (Aroclor 1242) | ND | ug/kg | 127 | 1 | 11/26/12 12:00 | 11/27/12 13:11 | 53469-21-9 | |
| PCB-1248 (Aroclor 1248) | ND | ug/kg | 127 | 1 | 11/26/12 12:00 | 11/27/12 13:11 | 12672-29-6 | |
| PCB-1254 (Aroclor 1254) | ND | ug/kg | 127 | 1 | 11/26/12 12:00 | 11/27/12 13:11 | 11097-69-1 | |
| PCB-1260 (Aroclor 1260) | ND | ug/kg | 127 | 1 | 11/26/12 12:00 | 11/27/12 13:11 | 11096-82-5 | |
| PCB, Total | ND | ug/kg | 127 | 1 | 11/26/12 12:00 | 11/27/12 13:11 | 1336-36-3 | |
| ***Surrogates*** | | | | | | | | |
| Tetrachloro-m-xylene (S) | 89 | %. | 43-130 | 1 | 11/26/12 12:00 | 11/27/12 13:11 | 877-09-8 | |
| Decachlorobiphenyl (S) | 85 | %. | 48-130 | 1 | 11/26/12 12:00 | 11/27/12 13:11 | 2051-24-3 | |
| **6010 MET ICP** | Analytical Method: EPA 6010 Preparation Method: EPA 3050 | | | | | | | |
| Arsenic | ND | mg/kg | 2.5 | 1 | 11/27/12 16:30 | 11/28/12 10:39 | 7440-38-2 | |
| Barium | **11.7** | mg/kg | 0.63 | 1 | 11/27/12 16:30 | 11/28/12 10:39 | 7440-39-3 | |
| Cadmium | ND | mg/kg | 0.63 | 1 | 11/27/12 16:30 | 11/28/12 10:39 | 7440-43-9 | |
| Chromium | **7.6** | mg/kg | 0.63 | 1 | 11/27/12 16:30 | 11/28/12 10:39 | 7440-47-3 | |
| Lead | **3.1** | mg/kg | 1.3 | 1 | 11/27/12 16:30 | 11/28/12 10:39 | 7439-92-1 | |
| Selenium | ND | mg/kg | 2.5 | 1 | 11/27/12 16:30 | 11/28/12 10:39 | 7782-49-2 | |
| Silver | ND | mg/kg | 1.3 | 1 | 11/27/12 16:30 | 11/28/12 10:39 | 7440-22-4 | |
| **7471 Mercury** | Analytical Method: EPA 7471 Preparation Method: EPA 7471 | | | | | | | |
| Mercury | **0.014** | mg/kg | 0.0073 | 1 | 12/03/12 10:03 | 12/03/12 13:54 | 7439-97-6 | |
| **8270 MSSV PAH by SIM** | Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546 | | | | | | | |
| Acenaphthene | ND | ug/kg | 127 | 1 | 11/27/12 05:25 | 11/27/12 14:42 | 83-32-9 | |
| Acenaphthylene | ND | ug/kg | 127 | 1 | 11/27/12 05:25 | 11/27/12 14:42 | 208-96-8 | |
| Anthracene | ND | ug/kg | 127 | 1 | 11/27/12 05:25 | 11/27/12 14:42 | 120-12-7 | |
| Benzo(a)anthracene | ND | ug/kg | 127 | 1 | 11/27/12 05:25 | 11/27/12 14:42 | 56-55-3 | |
| Benzo(a)pyrene | ND | ug/kg | 127 | 1 | 11/27/12 05:25 | 11/27/12 14:42 | 50-32-8 | |
| Benzo(b)fluoranthene | ND | ug/kg | 127 | 1 | 11/27/12 05:25 | 11/27/12 14:42 | 205-99-2 | |
| Benzo(g,h,i)perylene | ND | ug/kg | 127 | 1 | 11/27/12 05:25 | 11/27/12 14:42 | 191-24-2 | |
| Benzo(k)fluoranthene | ND | ug/kg | 127 | 1 | 11/27/12 05:25 | 11/27/12 14:42 | 207-08-9 | |
| Chrysene | ND | ug/kg | 127 | 1 | 11/27/12 05:25 | 11/27/12 14:42 | 218-01-9 | |
| Dibenz(a,h)anthracene | ND | ug/kg | 127 | 1 | 11/27/12 05:25 | 11/27/12 14:42 | 53-70-3 | |
| Fluoranthene | ND | ug/kg | 127 | 1 | 11/27/12 05:25 | 11/27/12 14:42 | 206-44-0 | |
| Fluorene | ND | ug/kg | 127 | 1 | 11/27/12 05:25 | 11/27/12 14:42 | 86-73-7 | |
| Indeno(1,2,3-cd)pyrene | ND | ug/kg | 127 | 1 | 11/27/12 05:25 | 11/27/12 14:42 | 193-39-5 | |
| Naphthalene | ND | ug/kg | 127 | 1 | 11/27/12 05:25 | 11/27/12 14:42 | 91-20-3 | |
| Phenanthrene | ND | ug/kg | 127 | 1 | 11/27/12 05:25 | 11/27/12 14:42 | 85-01-8 | |
| Pyrene | ND | ug/kg | 127 | 1 | 11/27/12 05:25 | 11/27/12 14:42 | 129-00-0 | |
| ***Surrogates*** | | | | | | | | |
| 2-Fluorobiphenyl (S) | 73 | %. | 43-130 | 1 | 11/27/12 05:25 | 11/27/12 14:42 | 321-60-8 | |
| Terphenyl-d14 (S) | 82 | %. | 32-130 | 1 | 11/27/12 05:25 | 11/27/12 14:42 | 1718-51-0 | |

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## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4070988

**Sample: S1 (23-29)** **Lab ID: 4070988001** Collected: 11/20/12 00:00 Received: 11/21/12 15:30 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **Percent Moisture** | Analytical Method: ASTM D2974-87 | | | | | | | |
| Percent Moisture | **21.0** | % | 0.10 | 1 | | 12/03/12 14:00 | | |
| **300.0 IC Anions** | Analytical Method: EPA 300.0 Preparation Method: EPA 300.0 | | | | | | | |
| Nitrate as N | ND | mg/kg | 5.0 | 1 | 11/27/12 21:31 | 11/29/12 01:22 | 14797-55-8 | |
| Nitrite as N | ND | mg/kg | 2.5 | 1 | 11/27/12 21:31 | 11/29/12 01:22 | 14797-65-0 | |
| Nitrogen, NO2 plus NO3 | ND | mg/kg | 5.0 | 1 | 11/27/12 21:31 | 11/29/12 01:22 | | |
| **350.1 Ammonia** | Analytical Method: EPA 350.1 Preparation Method: EPA 350.1 | | | | | | | |
| Nitrogen, Ammonia | **18.2** | mg/kg | 17.3 | 1 | 11/28/12 19:33 | 11/28/12 21:57 | 7664-41-7 | R1 |
| **351.2 Total Kjeldahl Nitrogen** | Analytical Method: EPA 351.2 Preparation Method: EPA 351.2 | | | | | | | |
| Nitrogen, Kjeldahl, Total | **117** | mg/kg | 55.0 | 1 | 12/04/12 16:31 | 12/05/12 12:24 | 7727-37-9 | |
| **365.4 Total Phosphorus** | Analytical Method: EPA 365.4 Preparation Method: EPA 365.4 | | | | | | | |
| Phosphorus | **269** | mg/kg | 31.6 | 1 | 11/29/12 08:46 | 11/29/12 14:07 | 7723-14-0 | |
| **Total Organic Carbon** | Analytical Method: EPA 9060 Modified | | | | | | | |
| ***Surrogates*** | | | | | | | | |
| RPD% | **9.0** | % | | 1 | | 11/29/12 13:58 | | |
| Total Organic Carbon | **2520** | mg/kg | 806 | 1 | | 11/29/12 13:54 | 7440-44-0 | |
| Total Organic Carbon | **2760** | mg/kg | 800 | 1 | | 11/29/12 13:58 | 7440-44-0 | |
| Mean Total Organic Carbon | **2640** | mg/kg | 803 | 1 | | 11/29/12 13:58 | 7440-44-0 | |

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## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4070988

**Sample: S1 (29-31)** **Lab ID: 4070988002** Collected: 11/20/12 00:00 Received: 11/21/12 15:30 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **8082 GCS PCB** | Analytical Method: EPA 8082 Preparation Method: EPA 3541 | | | | | | | |
| PCB-1016 (Aroclor 1016) | ND | ug/kg | 128 | 1 | 11/26/12 12:00 | 11/27/12 13:29 | 12674-11-2 | |
| PCB-1221 (Aroclor 1221) | ND | ug/kg | 128 | 1 | 11/26/12 12:00 | 11/27/12 13:29 | 11104-28-2 | |
| PCB-1232 (Aroclor 1232) | ND | ug/kg | 128 | 1 | 11/26/12 12:00 | 11/27/12 13:29 | 11141-16-5 | |
| PCB-1242 (Aroclor 1242) | ND | ug/kg | 128 | 1 | 11/26/12 12:00 | 11/27/12 13:29 | 53469-21-9 | |
| PCB-1248 (Aroclor 1248) | ND | ug/kg | 128 | 1 | 11/26/12 12:00 | 11/27/12 13:29 | 12672-29-6 | |
| PCB-1254 (Aroclor 1254) | ND | ug/kg | 128 | 1 | 11/26/12 12:00 | 11/27/12 13:29 | 11097-69-1 | |
| PCB-1260 (Aroclor 1260) | ND | ug/kg | 128 | 1 | 11/26/12 12:00 | 11/27/12 13:29 | 11096-82-5 | |
| PCB, Total | ND | ug/kg | 128 | 1 | 11/26/12 12:00 | 11/27/12 13:29 | 1336-36-3 | |
| ***Surrogates*** | | | | | | | | |
| Tetrachloro-m-xylene (S) | 87 | %. | 43-130 | 1 | 11/26/12 12:00 | 11/27/12 13:29 | 877-09-8 | |
| Decachlorobiphenyl (S) | 86 | %. | 48-130 | 1 | 11/26/12 12:00 | 11/27/12 13:29 | 2051-24-3 | |
| **6010 MET ICP** | Analytical Method: EPA 6010 Preparation Method: EPA 3050 | | | | | | | |
| Arsenic | ND | mg/kg | 2.3 | 1 | 11/27/12 16:30 | 11/28/12 10:45 | 7440-38-2 | |
| Barium | **16.3** | mg/kg | 0.58 | 1 | 11/27/12 16:30 | 11/28/12 10:45 | 7440-39-3 | |
| Cadmium | ND | mg/kg | 0.58 | 1 | 11/27/12 16:30 | 11/28/12 10:45 | 7440-43-9 | |
| Chromium | **4.9** | mg/kg | 0.58 | 1 | 11/27/12 16:30 | 11/28/12 10:45 | 7440-47-3 | |
| Lead | **3.3** | mg/kg | 1.2 | 1 | 11/27/12 16:30 | 11/28/12 10:45 | 7439-92-1 | |
| Selenium | ND | mg/kg | 2.3 | 1 | 11/27/12 16:30 | 11/28/12 10:45 | 7782-49-2 | |
| Silver | ND | mg/kg | 1.2 | 1 | 11/27/12 16:30 | 11/28/12 10:45 | 7440-22-4 | |
| **7471 Mercury** | Analytical Method: EPA 7471 Preparation Method: EPA 7471 | | | | | | | |
| Mercury | ND | mg/kg | 0.0082 | 1 | 12/03/12 10:03 | 12/03/12 13:56 | 7439-97-6 | |
| **8270 MSSV PAH by SIM** | Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546 | | | | | | | |
| Acenaphthene | ND | ug/kg | 128 | 1 | 11/28/12 06:18 | 11/28/12 17:54 | 83-32-9 | |
| Acenaphthylene | ND | ug/kg | 128 | 1 | 11/28/12 06:18 | 11/28/12 17:54 | 208-96-8 | |
| Anthracene | ND | ug/kg | 128 | 1 | 11/28/12 06:18 | 11/28/12 17:54 | 120-12-7 | |
| Benzo(a)anthracene | ND | ug/kg | 128 | 1 | 11/28/12 06:18 | 11/28/12 17:54 | 56-55-3 | |
| Benzo(a)pyrene | ND | ug/kg | 128 | 1 | 11/28/12 06:18 | 11/28/12 17:54 | 50-32-8 | |
| Benzo(b)fluoranthene | ND | ug/kg | 128 | 1 | 11/28/12 06:18 | 11/28/12 17:54 | 205-99-2 | |
| Benzo(g,h,i)perylene | ND | ug/kg | 128 | 1 | 11/28/12 06:18 | 11/28/12 17:54 | 191-24-2 | |
| Benzo(k)fluoranthene | ND | ug/kg | 128 | 1 | 11/28/12 06:18 | 11/28/12 17:54 | 207-08-9 | |
| Chrysene | ND | ug/kg | 128 | 1 | 11/28/12 06:18 | 11/28/12 17:54 | 218-01-9 | |
| Dibenz(a,h)anthracene | ND | ug/kg | 128 | 1 | 11/28/12 06:18 | 11/28/12 17:54 | 53-70-3 | |
| Fluoranthene | ND | ug/kg | 128 | 1 | 11/28/12 06:18 | 11/28/12 17:54 | 206-44-0 | |
| Fluorene | ND | ug/kg | 128 | 1 | 11/28/12 06:18 | 11/28/12 17:54 | 86-73-7 | |
| Indeno(1,2,3-cd)pyrene | ND | ug/kg | 128 | 1 | 11/28/12 06:18 | 11/28/12 17:54 | 193-39-5 | |
| Naphthalene | ND | ug/kg | 128 | 1 | 11/28/12 06:18 | 11/28/12 17:54 | 91-20-3 | |
| Phenanthrene | ND | ug/kg | 128 | 1 | 11/28/12 06:18 | 11/28/12 17:54 | 85-01-8 | |
| Pyrene | ND | ug/kg | 128 | 1 | 11/28/12 06:18 | 11/28/12 17:54 | 129-00-0 | |
| ***Surrogates*** | | | | | | | | |
| 2-Fluorobiphenyl (S) | 52 | %. | 43-130 | 1 | 11/28/12 06:18 | 11/28/12 17:54 | 321-60-8 | |
| Terphenyl-d14 (S) | 61 | %. | 32-130 | 1 | 11/28/12 06:18 | 11/28/12 17:54 | 1718-51-0 | |

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## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4070988

**Sample: S1 (29-31)** **Lab ID: 4070988002** Collected: 11/20/12 00:00 Received: 11/21/12 15:30 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **Percent Moisture** | Analytical Method: ASTM D2974-87 | | | | | | | |
| Percent Moisture | **21.9** | % | 0.10 | 1 | | 12/03/12 14:00 | | |
| **300.0 IC Anions** | Analytical Method: EPA 300.0 Preparation Method: EPA 300.0 | | | | | | | |
| Nitrate as N | ND | mg/kg | 5.1 | 1 | 11/27/12 21:31 | 11/29/12 02:13 | 14797-55-8 | |
| Nitrite as N | ND | mg/kg | 2.6 | 1 | 11/27/12 21:31 | 11/29/12 02:13 | 14797-65-0 | |
| Nitrogen, NO2 plus NO3 | ND | mg/kg | 5.1 | 1 | 11/27/12 21:31 | 11/29/12 02:13 | | |
| **350.1 Ammonia** | Analytical Method: EPA 350.1 Preparation Method: EPA 350.1 | | | | | | | |
| Nitrogen, Ammonia | ND | mg/kg | 19.2 | 1 | 11/28/12 19:33 | 11/28/12 22:00 | 7664-41-7 | |
| **351.2 Total Kjeldahl Nitrogen** | Analytical Method: EPA 351.2 Preparation Method: EPA 351.2 | | | | | | | |
| Nitrogen, Kjeldahl, Total | **151** | mg/kg | 116 | 1 | 12/04/12 16:31 | 12/05/12 12:26 | 7727-37-9 | |
| **365.4 Total Phosphorus** | Analytical Method: EPA 365.4 Preparation Method: EPA 365.4 | | | | | | | |
| Phosphorus | **140** | mg/kg | 22.3 | 1 | 11/29/12 08:46 | 11/29/12 14:07 | 7723-14-0 | |
| **Total Organic Carbon** | Analytical Method: EPA 9060 Modified | | | | | | | |
| ***Surrogates*** | | | | | | | | |
| RPD% | **8.6** | % | | 1 | | 11/29/12 14:08 | | |
| Total Organic Carbon | **2770** | mg/kg | 1010 | 1 | | 11/29/12 14:01 | 7440-44-0 | |
| Total Organic Carbon | **3020** | mg/kg | 962 | 1 | | 11/29/12 14:08 | 7440-44-0 | |
| Mean Total Organic Carbon | **2900** | mg/kg | 986 | 1 | | 11/29/12 14:08 | 7440-44-0 | |

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## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4070988

**Sample: S2 (29.5-31)** **Lab ID: 4070988003** Collected: 11/20/12 00:00 Received: 11/21/12 15:30 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **8082 GCS PCB** | Analytical Method: EPA 8082 Preparation Method: EPA 3541 | | | | | | | |
| PCB-1016 (Aroclor 1016) | ND | ug/kg | 199 | 1 | 11/26/12 12:00 | 11/27/12 13:47 | 12674-11-2 | |
| PCB-1221 (Aroclor 1221) | ND | ug/kg | 199 | 1 | 11/26/12 12:00 | 11/27/12 13:47 | 11104-28-2 | |
| PCB-1232 (Aroclor 1232) | ND | ug/kg | 199 | 1 | 11/26/12 12:00 | 11/27/12 13:47 | 11141-16-5 | |
| PCB-1242 (Aroclor 1242) | ND | ug/kg | 199 | 1 | 11/26/12 12:00 | 11/27/12 13:47 | 53469-21-9 | |
| PCB-1248 (Aroclor 1248) | ND | ug/kg | 199 | 1 | 11/26/12 12:00 | 11/27/12 13:47 | 12672-29-6 | |
| PCB-1254 (Aroclor 1254) | ND | ug/kg | 199 | 1 | 11/26/12 12:00 | 11/27/12 13:47 | 11097-69-1 | |
| PCB-1260 (Aroclor 1260) | ND | ug/kg | 199 | 1 | 11/26/12 12:00 | 11/27/12 13:47 | 11096-82-5 | |
| PCB, Total | ND | ug/kg | 199 | 1 | 11/26/12 12:00 | 11/27/12 13:47 | 1336-36-3 | |
| ***Surrogates*** | | | | | | | | |
| Tetrachloro-m-xylene (S) | 84 | %. | 43-130 | 1 | 11/26/12 12:00 | 11/27/12 13:47 | 877-09-8 | |
| Decachlorobiphenyl (S) | 80 | %. | 48-130 | 1 | 11/26/12 12:00 | 11/27/12 13:47 | 2051-24-3 | |
| **6010 MET ICP** | Analytical Method: EPA 6010 Preparation Method: EPA 3050 | | | | | | | |
| Arsenic | **5.3** | mg/kg | 3.6 | 1 | 11/27/12 16:30 | 11/28/12 10:48 | 7440-38-2 | |
| Barium | **95.6** | mg/kg | 0.90 | 1 | 11/27/12 16:30 | 11/28/12 10:48 | 7440-39-3 | |
| Cadmium | ND | mg/kg | 0.90 | 1 | 11/27/12 16:30 | 11/28/12 10:48 | 7440-43-9 | |
| Chromium | **24.8** | mg/kg | 0.90 | 1 | 11/27/12 16:30 | 11/28/12 10:48 | 7440-47-3 | |
| Lead | **14.1** | mg/kg | 1.8 | 1 | 11/27/12 16:30 | 11/28/12 10:48 | 7439-92-1 | |
| Selenium | ND | mg/kg | 3.6 | 1 | 11/27/12 16:30 | 11/28/12 10:48 | 7782-49-2 | |
| Silver | ND | mg/kg | 1.8 | 1 | 11/27/12 16:30 | 11/28/12 10:48 | 7440-22-4 | |
| **7471 Mercury** | Analytical Method: EPA 7471 Preparation Method: EPA 7471 | | | | | | | |
| Mercury | **0.059** | mg/kg | 0.011 | 1 | 12/03/12 10:03 | 12/03/12 13:58 | 7439-97-6 | |
| **8270 MSSV PAH by SIM** | Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546 | | | | | | | |
| Acenaphthene | ND | ug/kg | 199 | 1 | 11/28/12 06:18 | 11/28/12 18:12 | 83-32-9 | |
| Acenaphthylene | ND | ug/kg | 199 | 1 | 11/28/12 06:18 | 11/28/12 18:12 | 208-96-8 | |
| Anthracene | ND | ug/kg | 199 | 1 | 11/28/12 06:18 | 11/28/12 18:12 | 120-12-7 | |
| Benzo(a)anthracene | ND | ug/kg | 199 | 1 | 11/28/12 06:18 | 11/28/12 18:12 | 56-55-3 | |
| Benzo(a)pyrene | ND | ug/kg | 199 | 1 | 11/28/12 06:18 | 11/28/12 18:12 | 50-32-8 | |
| Benzo(b)fluoranthene | ND | ug/kg | 199 | 1 | 11/28/12 06:18 | 11/28/12 18:12 | 205-99-2 | |
| Benzo(g,h,i)perylene | ND | ug/kg | 199 | 1 | 11/28/12 06:18 | 11/28/12 18:12 | 191-24-2 | |
| Benzo(k)fluoranthene | ND | ug/kg | 199 | 1 | 11/28/12 06:18 | 11/28/12 18:12 | 207-08-9 | |
| Chrysene | ND | ug/kg | 199 | 1 | 11/28/12 06:18 | 11/28/12 18:12 | 218-01-9 | |
| Dibenz(a,h)anthracene | ND | ug/kg | 199 | 1 | 11/28/12 06:18 | 11/28/12 18:12 | 53-70-3 | |
| Fluoranthene | ND | ug/kg | 199 | 1 | 11/28/12 06:18 | 11/28/12 18:12 | 206-44-0 | |
| Fluorene | ND | ug/kg | 199 | 1 | 11/28/12 06:18 | 11/28/12 18:12 | 86-73-7 | |
| Indeno(1,2,3-cd)pyrene | ND | ug/kg | 199 | 1 | 11/28/12 06:18 | 11/28/12 18:12 | 193-39-5 | |
| Naphthalene | ND | ug/kg | 199 | 1 | 11/28/12 06:18 | 11/28/12 18:12 | 91-20-3 | |
| Phenanthrene | ND | ug/kg | 199 | 1 | 11/28/12 06:18 | 11/28/12 18:12 | 85-01-8 | |
| Pyrene | ND | ug/kg | 199 | 1 | 11/28/12 06:18 | 11/28/12 18:12 | 129-00-0 | |
| ***Surrogates*** | | | | | | | | |
| 2-Fluorobiphenyl (S) | 52 | %. | 43-130 | 1 | 11/28/12 06:18 | 11/28/12 18:12 | 321-60-8 | |
| Terphenyl-d14 (S) | 61 | %. | 32-130 | 1 | 11/28/12 06:18 | 11/28/12 18:12 | 1718-51-0 | |

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## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4070988

**Sample: S2 (29.5-31)** **Lab ID: 4070988003** Collected: 11/20/12 00:00 Received: 11/21/12 15:30 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **Percent Moisture** | Analytical Method: ASTM D2974-87 | | | | | | | |
| Percent Moisture | **49.8** | % | 0.10 | 1 | | 12/03/12 14:00 | | |
| **300.0 IC Anions** | Analytical Method: EPA 300.0 Preparation Method: EPA 300.0 | | | | | | | |
| Nitrate as N | ND | mg/kg | 8.1 | 1 | 11/27/12 21:31 | 11/29/12 02:23 | 14797-55-8 | |
| Nitrite as N | ND | mg/kg | 4.1 | 1 | 11/27/12 21:31 | 11/29/12 02:23 | 14797-65-0 | |
| Nitrogen, NO2 plus NO3 | ND | mg/kg | 8.1 | 1 | 11/27/12 21:31 | 11/29/12 02:23 | | |
| **350.1 Ammonia** | Analytical Method: EPA 350.1 Preparation Method: EPA 350.1 | | | | | | | |
| Nitrogen, Ammonia | **352** | mg/kg | 20.6 | 1 | 11/28/12 19:33 | 11/28/12 22:03 | 7664-41-7 | |
| **351.2 Total Kjeldahl Nitrogen** | Analytical Method: EPA 351.2 Preparation Method: EPA 351.2 | | | | | | | |
| Nitrogen, Kjeldahl, Total | **1470** | mg/kg | 114 | 1 | 12/04/12 16:31 | 12/05/12 12:27 | 7727-37-9 | |
| **365.4 Total Phosphorus** | Analytical Method: EPA 365.4 Preparation Method: EPA 365.4 | | | | | | | |
| Phosphorus | **697** | mg/kg | 66.4 | 1 | 11/29/12 08:46 | 11/29/12 14:08 | 7723-14-0 | |
| **Total Organic Carbon** | Analytical Method: EPA 9060 Modified | | | | | | | |
| ***Surrogates*** | | | | | | | | |
| RPD% | **15.4** | % | | 1 | | 11/29/12 14:15 | | |
| Total Organic Carbon | **11900** | mg/kg | 2130 | 1 | | 11/29/12 14:11 | 7440-44-0 | |
| Total Organic Carbon | **13900** | mg/kg | 2270 | 1 | | 11/29/12 14:15 | 7440-44-0 | |
| Mean Total Organic Carbon | **12900** | mg/kg | 2200 | 1 | | 11/29/12 14:15 | 7440-44-0 | |

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## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4070988

**Sample: S3 (23.5-28.5)** **Lab ID: 4070988004** Collected: 11/20/12 00:00 Received: 11/21/12 15:30 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **8082 GCS PCB** | Analytical Method: EPA 8082 Preparation Method: EPA 3541 | | | | | | | |
| PCB-1016 (Aroclor 1016) | ND | ug/kg | 173 | 1 | 11/26/12 12:00 | 11/27/12 14:05 | 12674-11-2 | |
| PCB-1221 (Aroclor 1221) | ND | ug/kg | 173 | 1 | 11/26/12 12:00 | 11/27/12 14:05 | 11104-28-2 | |
| PCB-1232 (Aroclor 1232) | ND | ug/kg | 173 | 1 | 11/26/12 12:00 | 11/27/12 14:05 | 11141-16-5 | |
| PCB-1242 (Aroclor 1242) | ND | ug/kg | 173 | 1 | 11/26/12 12:00 | 11/27/12 14:05 | 53469-21-9 | |
| PCB-1248 (Aroclor 1248) | ND | ug/kg | 173 | 1 | 11/26/12 12:00 | 11/27/12 14:05 | 12672-29-6 | |
| PCB-1254 (Aroclor 1254) | ND | ug/kg | 173 | 1 | 11/26/12 12:00 | 11/27/12 14:05 | 11097-69-1 | |
| PCB-1260 (Aroclor 1260) | ND | ug/kg | 173 | 1 | 11/26/12 12:00 | 11/27/12 14:05 | 11096-82-5 | |
| PCB, Total | ND | ug/kg | 173 | 1 | 11/26/12 12:00 | 11/27/12 14:05 | 1336-36-3 | |
| ***Surrogates*** | | | | | | | | |
| Tetrachloro-m-xylene (S) | 85 | %. | 43-130 | 1 | 11/26/12 12:00 | 11/27/12 14:05 | 877-09-8 | |
| Decachlorobiphenyl (S) | 77 | %. | 48-130 | 1 | 11/26/12 12:00 | 11/27/12 14:05 | 2051-24-3 | |
| **6010 MET ICP** | Analytical Method: EPA 6010 Preparation Method: EPA 3050 | | | | | | | |
| Arsenic | **4.6** | mg/kg | 3.2 | 1 | 11/27/12 16:30 | 11/28/12 10:56 | 7440-38-2 | |
| Barium | **77.6** | mg/kg | 0.79 | 1 | 11/27/12 16:30 | 11/28/12 10:56 | 7440-39-3 | |
| Cadmium | ND | mg/kg | 0.79 | 1 | 11/27/12 16:30 | 11/28/12 10:56 | 7440-43-9 | |
| Chromium | **22.0** | mg/kg | 0.79 | 1 | 11/27/12 16:30 | 11/28/12 10:56 | 7440-47-3 | |
| Lead | **13.2** | mg/kg | 1.6 | 1 | 11/27/12 16:30 | 11/28/12 10:56 | 7439-92-1 | |
| Selenium | ND | mg/kg | 3.2 | 1 | 11/27/12 16:30 | 11/28/12 10:56 | 7782-49-2 | |
| Silver | ND | mg/kg | 1.6 | 1 | 11/27/12 16:30 | 11/28/12 10:56 | 7440-22-4 | |
| **7471 Mercury** | Analytical Method: EPA 7471 Preparation Method: EPA 7471 | | | | | | | |
| Mercury | **0.061** | mg/kg | 0.0097 | 1 | 12/03/12 10:03 | 12/03/12 14:00 | 7439-97-6 | |
| **8270 MSSV PAH by SIM** | Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546 | | | | | | | |
| Acenaphthene | ND | ug/kg | 173 | 1 | 11/28/12 06:18 | 11/28/12 18:29 | 83-32-9 | |
| Acenaphthylene | ND | ug/kg | 173 | 1 | 11/28/12 06:18 | 11/28/12 18:29 | 208-96-8 | |
| Anthracene | ND | ug/kg | 173 | 1 | 11/28/12 06:18 | 11/28/12 18:29 | 120-12-7 | |
| Benzo(a)anthracene | ND | ug/kg | 173 | 1 | 11/28/12 06:18 | 11/28/12 18:29 | 56-55-3 | |
| Benzo(a)pyrene | ND | ug/kg | 173 | 1 | 11/28/12 06:18 | 11/28/12 18:29 | 50-32-8 | |
| Benzo(b)fluoranthene | ND | ug/kg | 173 | 1 | 11/28/12 06:18 | 11/28/12 18:29 | 205-99-2 | |
| Benzo(g,h,i)perylene | ND | ug/kg | 173 | 1 | 11/28/12 06:18 | 11/28/12 18:29 | 191-24-2 | |
| Benzo(k)fluoranthene | ND | ug/kg | 173 | 1 | 11/28/12 06:18 | 11/28/12 18:29 | 207-08-9 | |
| Chrysene | ND | ug/kg | 173 | 1 | 11/28/12 06:18 | 11/28/12 18:29 | 218-01-9 | |
| Dibenz(a,h)anthracene | ND | ug/kg | 173 | 1 | 11/28/12 06:18 | 11/28/12 18:29 | 53-70-3 | |
| Fluoranthene | ND | ug/kg | 173 | 1 | 11/28/12 06:18 | 11/28/12 18:29 | 206-44-0 | |
| Fluorene | ND | ug/kg | 173 | 1 | 11/28/12 06:18 | 11/28/12 18:29 | 86-73-7 | |
| Indeno(1,2,3-cd)pyrene | ND | ug/kg | 173 | 1 | 11/28/12 06:18 | 11/28/12 18:29 | 193-39-5 | |
| Naphthalene | ND | ug/kg | 173 | 1 | 11/28/12 06:18 | 11/28/12 18:29 | 91-20-3 | |
| Phenanthrene | ND | ug/kg | 173 | 1 | 11/28/12 06:18 | 11/28/12 18:29 | 85-01-8 | |
| Pyrene | ND | ug/kg | 173 | 1 | 11/28/12 06:18 | 11/28/12 18:29 | 129-00-0 | |
| ***Surrogates*** | | | | | | | | |
| 2-Fluorobiphenyl (S) | 61 | %. | 43-130 | 1 | 11/28/12 06:18 | 11/28/12 18:29 | 321-60-8 | |
| Terphenyl-d14 (S) | 69 | %. | 32-130 | 1 | 11/28/12 06:18 | 11/28/12 18:29 | 1718-51-0 | |

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## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4070988

**Sample: S3 (23.5-28.5)** **Lab ID: 4070988004** Collected: 11/20/12 00:00 Received: 11/21/12 15:30 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **Percent Moisture** | Analytical Method: ASTM D2974-87 | | | | | | | |
| Percent Moisture | **42.2** | % | 0.10 | 1 | | 12/03/12 14:00 | | |
| **300.0 IC Anions** | Analytical Method: EPA 300.0 Preparation Method: EPA 300.0 | | | | | | | |
| Nitrate as N | ND | mg/kg | 6.9 | 1 | 11/27/12 21:31 | 11/29/12 02:34 | 14797-55-8 | |
| Nitrite as N | ND | mg/kg | 3.5 | 1 | 11/27/12 21:31 | 11/29/12 02:34 | 14797-65-0 | |
| Nitrogen, NO2 plus NO3 | ND | mg/kg | 6.9 | 1 | 11/27/12 21:31 | 11/29/12 02:34 | | |
| **350.1 Ammonia** | Analytical Method: EPA 350.1 Preparation Method: EPA 350.1 | | | | | | | |
| Nitrogen, Ammonia | **237** | mg/kg | 16.2 | 1 | 11/28/12 19:33 | 11/28/12 22:04 | 7664-41-7 | |
| **351.2 Total Kjeldahl Nitrogen** | Analytical Method: EPA 351.2 Preparation Method: EPA 351.2 | | | | | | | |
| Nitrogen, Kjeldahl, Total | **2000** | mg/kg | 150 | 1 | 12/04/12 16:31 | 12/05/12 12:28 | 7727-37-9 | |
| **365.4 Total Phosphorus** | Analytical Method: EPA 365.4 Preparation Method: EPA 365.4 | | | | | | | |
| Phosphorus | **897** | mg/kg | 39.5 | 1 | 11/29/12 08:46 | 11/29/12 14:09 | 7723-14-0 | M0 |
| **Total Organic Carbon** | Analytical Method: EPA 9060 Modified | | | | | | | |
| ***Surrogates*** | | | | | | | | |
| RPD% | **19.9** | % | | 1 | | 11/29/12 14:21 | | |
| Total Organic Carbon | **14200** | mg/kg | 2130 | 1 | | 11/29/12 14:18 | 7440-44-0 | |
| Total Organic Carbon | **17300** | mg/kg | 2330 | 1 | | 11/29/12 14:21 | 7440-44-0 | |
| Mean Total Organic Carbon | **15700** | mg/kg | 2230 | 1 | | 11/29/12 14:21 | 7440-44-0 | |

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## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4070988

**Sample: S3 (28.5-30)** **Lab ID: 4070988005** Collected: 11/20/12 00:00 Received: 11/21/12 15:30 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **8082 GCS PCB** | Analytical Method: EPA 8082 Preparation Method: EPA 3541 | | | | | | | |
| PCB-1016 (Aroclor 1016) | ND | ug/kg | 139 | 1 | 11/26/12 12:00 | 11/27/12 14:23 | 12674-11-2 | |
| PCB-1221 (Aroclor 1221) | ND | ug/kg | 139 | 1 | 11/26/12 12:00 | 11/27/12 14:23 | 11104-28-2 | |
| PCB-1232 (Aroclor 1232) | ND | ug/kg | 139 | 1 | 11/26/12 12:00 | 11/27/12 14:23 | 11141-16-5 | |
| PCB-1242 (Aroclor 1242) | ND | ug/kg | 139 | 1 | 11/26/12 12:00 | 11/27/12 14:23 | 53469-21-9 | |
| PCB-1248 (Aroclor 1248) | ND | ug/kg | 139 | 1 | 11/26/12 12:00 | 11/27/12 14:23 | 12672-29-6 | |
| PCB-1254 (Aroclor 1254) | **214** | ug/kg | 139 | 1 | 11/26/12 12:00 | 11/27/12 14:23 | 11097-69-1 | |
| PCB-1260 (Aroclor 1260) | ND | ug/kg | 139 | 1 | 11/26/12 12:00 | 11/27/12 14:23 | 11096-82-5 | |
| PCB, Total | **253** | ug/kg | 139 | 1 | 11/26/12 12:00 | 11/27/12 14:23 | 1336-36-3 | |
| ***Surrogates*** | | | | | | | | |
| Tetrachloro-m-xylene (S) | 78 | %. | 43-130 | 1 | 11/26/12 12:00 | 11/27/12 14:23 | 877-09-8 | |
| Decachlorobiphenyl (S) | 74 | %. | 48-130 | 1 | 11/26/12 12:00 | 11/27/12 14:23 | 2051-24-3 | |
| **6010 MET ICP** | Analytical Method: EPA 6010 Preparation Method: EPA 3050 | | | | | | | |
| Arsenic | **3.2** | mg/kg | 2.4 | 1 | 11/27/12 16:30 | 11/28/12 10:58 | 7440-38-2 | |
| Barium | **32.6** | mg/kg | 0.60 | 1 | 11/27/12 16:30 | 11/28/12 10:58 | 7440-39-3 | |
| Cadmium | ND | mg/kg | 0.60 | 1 | 11/27/12 16:30 | 11/28/12 10:58 | 7440-43-9 | |
| Chromium | **15.0** | mg/kg | 0.60 | 1 | 11/27/12 16:30 | 11/28/12 10:58 | 7440-47-3 | |
| Lead | **15.0** | mg/kg | 1.2 | 1 | 11/27/12 16:30 | 11/28/12 10:58 | 7439-92-1 | |
| Selenium | ND | mg/kg | 2.4 | 1 | 11/27/12 16:30 | 11/28/12 10:58 | 7782-49-2 | |
| Silver | ND | mg/kg | 1.2 | 1 | 11/27/12 16:30 | 11/28/12 10:58 | 7440-22-4 | |
| **7471 Mercury** | Analytical Method: EPA 7471 Preparation Method: EPA 7471 | | | | | | | |
| Mercury | **0.061** | mg/kg | 0.0072 | 1 | 12/03/12 10:03 | 12/03/12 14:07 | 7439-97-6 | |
| **8270 MSSV PAH by SIM** | Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546 | | | | | | | |
| Acenaphthene | **979** | ug/kg | 695 | 5 | 11/28/12 06:18 | 11/29/12 21:49 | 83-32-9 | |
| Acenaphthylene | ND | ug/kg | 695 | 5 | 11/28/12 06:18 | 11/29/12 21:49 | 208-96-8 | |
| Anthracene | **3210** | ug/kg | 695 | 5 | 11/28/12 06:18 | 11/29/12 21:49 | 120-12-7 | |
| Benzo(a)anthracene | **3990** | ug/kg | 695 | 5 | 11/28/12 06:18 | 11/29/12 21:49 | 56-55-3 | |
| Benzo(a)pyrene | **3660** | ug/kg | 695 | 5 | 11/28/12 06:18 | 11/29/12 21:49 | 50-32-8 | |
| Benzo(b)fluoranthene | **2800** | ug/kg | 695 | 5 | 11/28/12 06:18 | 11/29/12 21:49 | 205-99-2 | |
| Benzo(g,h,i)perylene | **1730** | ug/kg | 695 | 5 | 11/28/12 06:18 | 11/29/12 21:49 | 191-24-2 | |
| Benzo(k)fluoranthene | **3590** | ug/kg | 695 | 5 | 11/28/12 06:18 | 11/29/12 21:49 | 207-08-9 | |
| Chrysene | **4440** | ug/kg | 695 | 5 | 11/28/12 06:18 | 11/29/12 21:49 | 218-01-9 | |
| Dibenz(a,h)anthracene | ND | ug/kg | 695 | 5 | 11/28/12 06:18 | 11/29/12 21:49 | 53-70-3 | |
| Fluoranthene | **11600** | ug/kg | 695 | 5 | 11/28/12 06:18 | 11/29/12 21:49 | 206-44-0 | |
| Fluorene | **1510** | ug/kg | 695 | 5 | 11/28/12 06:18 | 11/29/12 21:49 | 86-73-7 | |
| Indeno(1,2,3-cd)pyrene | **1620** | ug/kg | 695 | 5 | 11/28/12 06:18 | 11/29/12 21:49 | 193-39-5 | |
| Naphthalene | **930** | ug/kg | 695 | 5 | 11/28/12 06:18 | 11/29/12 21:49 | 91-20-3 | |
| Phenanthrene | **11600** | ug/kg | 695 | 5 | 11/28/12 06:18 | 11/29/12 21:49 | 85-01-8 | |
| Pyrene | **8400** | ug/kg | 695 | 5 | 11/28/12 06:18 | 11/29/12 21:49 | 129-00-0 | |
| ***Surrogates*** | | | | | | | | |
| 2-Fluorobiphenyl (S) | 54 | %. | 43-130 | 5 | 11/28/12 06:18 | 11/29/12 21:49 | 321-60-8 | |
| Terphenyl-d14 (S) | 58 | %. | 32-130 | 5 | 11/28/12 06:18 | 11/29/12 21:49 | 1718-51-0 | |

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## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4070988

**Sample: S3 (28.5-30)** **Lab ID: 4070988005** Collected: 11/20/12 00:00 Received: 11/21/12 15:30 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **Percent Moisture** | Analytical Method: ASTM D2974-87 | | | | | | | |
| Percent Moisture | **28.1** | % | 0.10 | 1 | | 12/03/12 14:01 | | |
| **300.0 IC Anions** | Analytical Method: EPA 300.0 | | Preparation Method: EPA 300.0 | | | | | |
| Nitrate as N | ND | mg/kg | 5.6 | 1 | 11/27/12 21:31 | 11/29/12 02:44 | 14797-55-8 | |
| Nitrite as N | ND | mg/kg | 2.8 | 1 | 11/27/12 21:31 | 11/29/12 02:44 | 14797-65-0 | |
| Nitrogen, NO2 plus NO3 | ND | mg/kg | 5.6 | 1 | 11/27/12 21:31 | 11/29/12 02:44 | | |
| **350.1 Ammonia** | Analytical Method: EPA 350.1 | | Preparation Method: EPA 350.1 | | | | | |
| Nitrogen, Ammonia | **72.1** | mg/kg | 19.0 | 1 | 11/28/12 19:33 | 11/28/12 22:05 | 7664-41-7 | |
| **351.2 Total Kjeldahl Nitrogen** | Analytical Method: EPA 351.2 | | Preparation Method: EPA 351.2 | | | | | |
| Nitrogen, Kjeldahl, Total | **507** | mg/kg | 116 | 1 | 12/04/12 16:31 | 12/05/12 12:29 | 7727-37-9 | |
| **365.4 Total Phosphorus** | Analytical Method: EPA 365.4 | | Preparation Method: EPA 365.4 | | | | | |
| Phosphorus | **393** | mg/kg | 38.4 | 1 | 12/03/12 09:55 | 12/03/12 15:39 | 7723-14-0 | |
| **Total Organic Carbon** | Analytical Method: EPA 9060 Modified | | | | | | | |
| ***Surrogates*** | | | | | | | | |
| RPD% | **0.89** | % | | 1 | | 11/29/12 14:55 | | |
| Total Organic Carbon | **8720** | mg/kg | 3330 | 1 | | 11/29/12 14:52 | 7440-44-0 | |
| Total Organic Carbon | **8650** | mg/kg | 3330 | 1 | | 11/29/12 14:55 | 7440-44-0 | |
| Mean Total Organic Carbon | **8690** | mg/kg | 3330 | 1 | | 11/29/12 14:55 | 7440-44-0 | |

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## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4070988

**Sample: S4 (21-26.5)** **Lab ID: 4070988006** Collected: 11/20/12 00:00 Received: 11/21/12 15:30 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **8082 GCS PCB** | Analytical Method: EPA 8082 Preparation Method: EPA 3541 | | | | | | | |
| PCB-1016 (Aroclor 1016) | ND | ug/kg | 225 | 1 | 11/26/12 12:00 | 11/27/12 14:41 | 12674-11-2 | |
| PCB-1221 (Aroclor 1221) | ND | ug/kg | 225 | 1 | 11/26/12 12:00 | 11/27/12 14:41 | 11104-28-2 | |
| PCB-1232 (Aroclor 1232) | ND | ug/kg | 225 | 1 | 11/26/12 12:00 | 11/27/12 14:41 | 11141-16-5 | |
| PCB-1242 (Aroclor 1242) | ND | ug/kg | 225 | 1 | 11/26/12 12:00 | 11/27/12 14:41 | 53469-21-9 | |
| PCB-1248 (Aroclor 1248) | ND | ug/kg | 225 | 1 | 11/26/12 12:00 | 11/27/12 14:41 | 12672-29-6 | |
| PCB-1254 (Aroclor 1254) | ND | ug/kg | 225 | 1 | 11/26/12 12:00 | 11/27/12 14:41 | 11097-69-1 | |
| PCB-1260 (Aroclor 1260) | ND | ug/kg | 225 | 1 | 11/26/12 12:00 | 11/27/12 14:41 | 11096-82-5 | |
| PCB, Total | ND | ug/kg | 225 | 1 | 11/26/12 12:00 | 11/27/12 14:41 | 1336-36-3 | |
| ***Surrogates*** | | | | | | | | |
| Tetrachloro-m-xylene (S) | 85 | %. | 43-130 | 1 | 11/26/12 12:00 | 11/27/12 14:41 | 877-09-8 | |
| Decachlorobiphenyl (S) | 79 | %. | 48-130 | 1 | 11/26/12 12:00 | 11/27/12 14:41 | 2051-24-3 | |
| **6010 MET ICP** | Analytical Method: EPA 6010 Preparation Method: EPA 3050 | | | | | | | |
| Arsenic | **6.2** | mg/kg | 3.8 | 1 | 11/27/12 16:30 | 11/28/12 11:00 | 7440-38-2 | |
| Barium | **128** | mg/kg | 0.96 | 1 | 11/27/12 16:30 | 11/28/12 11:00 | 7440-39-3 | |
| Cadmium | ND | mg/kg | 0.96 | 1 | 11/27/12 16:30 | 11/28/12 11:00 | 7440-43-9 | |
| Chromium | **28.0** | mg/kg | 0.96 | 1 | 11/27/12 16:30 | 11/28/12 11:00 | 7440-47-3 | |
| Lead | **21.1** | mg/kg | 1.9 | 1 | 11/27/12 16:30 | 11/28/12 11:00 | 7439-92-1 | |
| Selenium | ND | mg/kg | 3.8 | 1 | 11/27/12 16:30 | 11/28/12 11:00 | 7782-49-2 | |
| Silver | ND | mg/kg | 1.9 | 1 | 11/27/12 16:30 | 11/28/12 11:00 | 7440-22-4 | |
| **7471 Mercury** | Analytical Method: EPA 7471 Preparation Method: EPA 7471 | | | | | | | |
| Mercury | **0.096** | mg/kg | 0.014 | 1 | 12/03/12 10:03 | 12/03/12 14:09 | 7439-97-6 | |
| **8270 MSSV PAH by SIM** | Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546 | | | | | | | |
| Acenaphthene | ND | ug/kg | 225 | 1 | 11/28/12 06:18 | 11/28/12 19:04 | 83-32-9 | |
| Acenaphthylene | ND | ug/kg | 225 | 1 | 11/28/12 06:18 | 11/28/12 19:04 | 208-96-8 | |
| Anthracene | ND | ug/kg | 225 | 1 | 11/28/12 06:18 | 11/28/12 19:04 | 120-12-7 | |
| Benzo(a)anthracene | ND | ug/kg | 225 | 1 | 11/28/12 06:18 | 11/28/12 19:04 | 56-55-3 | |
| Benzo(a)pyrene | ND | ug/kg | 225 | 1 | 11/28/12 06:18 | 11/28/12 19:04 | 50-32-8 | |
| Benzo(b)fluoranthene | ND | ug/kg | 225 | 1 | 11/28/12 06:18 | 11/28/12 19:04 | 205-99-2 | |
| Benzo(g,h,i)perylene | ND | ug/kg | 225 | 1 | 11/28/12 06:18 | 11/28/12 19:04 | 191-24-2 | |
| Benzo(k)fluoranthene | ND | ug/kg | 225 | 1 | 11/28/12 06:18 | 11/28/12 19:04 | 207-08-9 | |
| Chrysene | ND | ug/kg | 225 | 1 | 11/28/12 06:18 | 11/28/12 19:04 | 218-01-9 | |
| Dibenz(a,h)anthracene | ND | ug/kg | 225 | 1 | 11/28/12 06:18 | 11/28/12 19:04 | 53-70-3 | |
| Fluoranthene | ND | ug/kg | 225 | 1 | 11/28/12 06:18 | 11/28/12 19:04 | 206-44-0 | |
| Fluorene | ND | ug/kg | 225 | 1 | 11/28/12 06:18 | 11/28/12 19:04 | 86-73-7 | |
| Indeno(1,2,3-cd)pyrene | ND | ug/kg | 225 | 1 | 11/28/12 06:18 | 11/28/12 19:04 | 193-39-5 | |
| Naphthalene | ND | ug/kg | 225 | 1 | 11/28/12 06:18 | 11/28/12 19:04 | 91-20-3 | |
| Phenanthrene | ND | ug/kg | 225 | 1 | 11/28/12 06:18 | 11/28/12 19:04 | 85-01-8 | |
| Pyrene | ND | ug/kg | 225 | 1 | 11/28/12 06:18 | 11/28/12 19:04 | 129-00-0 | |
| ***Surrogates*** | | | | | | | | |
| 2-Fluorobiphenyl (S) | 53 | %. | 43-130 | 1 | 11/28/12 06:18 | 11/28/12 19:04 | 321-60-8 | |
| Terphenyl-d14 (S) | 61 | %. | 32-130 | 1 | 11/28/12 06:18 | 11/28/12 19:04 | 1718-51-0 | |

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## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4070988

**Sample: S4 (21-26.5)** **Lab ID: 4070988006** Collected: 11/20/12 00:00 Received: 11/21/12 15:30 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **Percent Moisture** | Analytical Method: ASTM D2974-87 | | | | | | | |
| Percent Moisture | **55.6** | % | 0.10 | 1 | | 12/03/12 14:01 | | |
| **300.0 IC Anions** | Analytical Method: EPA 300.0 Preparation Method: EPA 300.0 | | | | | | | |
| Nitrate as N | ND | mg/kg | 9.0 | 1 | 11/27/12 21:31 | 11/29/12 02:54 | 14797-55-8 | |
| Nitrite as N | ND | mg/kg | 4.5 | 1 | 11/27/12 21:31 | 11/29/12 02:54 | 14797-65-0 | |
| Nitrogen, NO2 plus NO3 | ND | mg/kg | 9.0 | 1 | 11/27/12 21:31 | 11/29/12 02:54 | | |
| **350.1 Ammonia** | Analytical Method: EPA 350.1 Preparation Method: EPA 350.1 | | | | | | | |
| Nitrogen, Ammonia | **253** | mg/kg | 30.7 | 1 | 11/28/12 19:33 | 11/28/12 22:06 | 7664-41-7 | |
| **351.2 Total Kjeldahl Nitrogen** | Analytical Method: EPA 351.2 Preparation Method: EPA 351.2 | | | | | | | |
| Nitrogen, Kjeldahl, Total | **2330** | mg/kg | 180 | 1 | 12/04/12 16:31 | 12/05/12 12:29 | 7727-37-9 | |
| **365.4 Total Phosphorus** | Analytical Method: EPA 365.4 Preparation Method: EPA 365.4 | | | | | | | |
| Phosphorus | **1010** | mg/kg | 69.2 | 1 | 12/03/12 09:55 | 12/03/12 15:39 | 7723-14-0 | |
| **Total Organic Carbon** | Analytical Method: EPA 9060 Modified | | | | | | | |
| ***Surrogates*** | | | | | | | | |
| RPD% | **1.0** | % | | 1 | | 11/29/12 15:25 | | |
| Total Organic Carbon | **12500** | mg/kg | 2500 | 1 | | 11/29/12 15:14 | 7440-44-0 | |
| Total Organic Carbon | **12600** | mg/kg | 2560 | 1 | | 11/29/12 15:25 | 7440-44-0 | |
| Mean Total Organic Carbon | **12600** | mg/kg | 2530 | 1 | | 11/29/12 15:25 | 7440-44-0 | |

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## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4070988

**Sample: S4 (26.5-30)** **Lab ID: 4070988007** Collected: 11/20/12 00:00 Received: 11/21/12 15:30 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **8082 GCS PCB** | Analytical Method: EPA 8082 Preparation Method: EPA 3541 | | | | | | | |
| PCB-1016 (Aroclor 1016) | ND | ug/kg | 124 | 1 | 11/26/12 12:00 | 11/27/12 14:59 | 12674-11-2 | |
| PCB-1221 (Aroclor 1221) | ND | ug/kg | 124 | 1 | 11/26/12 12:00 | 11/27/12 14:59 | 11104-28-2 | |
| PCB-1232 (Aroclor 1232) | ND | ug/kg | 124 | 1 | 11/26/12 12:00 | 11/27/12 14:59 | 11141-16-5 | |
| PCB-1242 (Aroclor 1242) | ND | ug/kg | 124 | 1 | 11/26/12 12:00 | 11/27/12 14:59 | 53469-21-9 | |
| PCB-1248 (Aroclor 1248) | ND | ug/kg | 124 | 1 | 11/26/12 12:00 | 11/27/12 14:59 | 12672-29-6 | |
| PCB-1254 (Aroclor 1254) | ND | ug/kg | 124 | 1 | 11/26/12 12:00 | 11/27/12 14:59 | 11097-69-1 | |
| PCB-1260 (Aroclor 1260) | ND | ug/kg | 124 | 1 | 11/26/12 12:00 | 11/27/12 14:59 | 11096-82-5 | |
| PCB, Total | ND | ug/kg | 124 | 1 | 11/26/12 12:00 | 11/27/12 14:59 | 1336-36-3 | |
| ***Surrogates*** | | | | | | | | |
| Tetrachloro-m-xylene (S) | 87 | %. | 43-130 | 1 | 11/26/12 12:00 | 11/27/12 14:59 | 877-09-8 | |
| Decachlorobiphenyl (S) | 83 | %. | 48-130 | 1 | 11/26/12 12:00 | 11/27/12 14:59 | 2051-24-3 | |
| **6010 MET ICP** | Analytical Method: EPA 6010 Preparation Method: EPA 3050 | | | | | | | |
| Arsenic | ND | mg/kg | 2.1 | 1 | 11/29/12 10:15 | 11/29/12 18:48 | 7440-38-2 | |
| Barium | **42.2** | mg/kg | 0.52 | 1 | 11/29/12 10:15 | 11/29/12 18:48 | 7440-39-3 | |
| Cadmium | ND | mg/kg | 0.52 | 1 | 11/29/12 10:15 | 11/29/12 18:48 | 7440-43-9 | |
| Chromium | **16.8** | mg/kg | 0.52 | 1 | 11/29/12 10:15 | 11/29/12 18:48 | 7440-47-3 | |
| Lead | **3.0** | mg/kg | 1.0 | 1 | 11/29/12 10:15 | 11/29/12 18:48 | 7439-92-1 | |
| Selenium | ND | mg/kg | 2.1 | 1 | 11/29/12 10:15 | 11/29/12 18:48 | 7782-49-2 | |
| Silver | ND | mg/kg | 1.0 | 1 | 11/29/12 10:15 | 11/29/12 18:48 | 7440-22-4 | |
| **7471 Mercury** | Analytical Method: EPA 7471 Preparation Method: EPA 7471 | | | | | | | |
| Mercury | **0.034** | mg/kg | 0.0072 | 1 | 12/03/12 10:03 | 12/03/12 14:11 | 7439-97-6 | |
| **8270 MSSV PAH by SIM** | Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546 | | | | | | | |
| Acenaphthene | ND | ug/kg | 124 | 1 | 11/28/12 06:18 | 11/28/12 19:22 | 83-32-9 | |
| Acenaphthylene | ND | ug/kg | 124 | 1 | 11/28/12 06:18 | 11/28/12 19:22 | 208-96-8 | |
| Anthracene | ND | ug/kg | 124 | 1 | 11/28/12 06:18 | 11/28/12 19:22 | 120-12-7 | |
| Benzo(a)anthracene | ND | ug/kg | 124 | 1 | 11/28/12 06:18 | 11/28/12 19:22 | 56-55-3 | |
| Benzo(a)pyrene | ND | ug/kg | 124 | 1 | 11/28/12 06:18 | 11/28/12 19:22 | 50-32-8 | |
| Benzo(b)fluoranthene | ND | ug/kg | 124 | 1 | 11/28/12 06:18 | 11/28/12 19:22 | 205-99-2 | |
| Benzo(g,h,i)perylene | ND | ug/kg | 124 | 1 | 11/28/12 06:18 | 11/28/12 19:22 | 191-24-2 | |
| Benzo(k)fluoranthene | ND | ug/kg | 124 | 1 | 11/28/12 06:18 | 11/28/12 19:22 | 207-08-9 | |
| Chrysene | ND | ug/kg | 124 | 1 | 11/28/12 06:18 | 11/28/12 19:22 | 218-01-9 | |
| Dibenz(a,h)anthracene | ND | ug/kg | 124 | 1 | 11/28/12 06:18 | 11/28/12 19:22 | 53-70-3 | |
| Fluoranthene | ND | ug/kg | 124 | 1 | 11/28/12 06:18 | 11/28/12 19:22 | 206-44-0 | |
| Fluorene | ND | ug/kg | 124 | 1 | 11/28/12 06:18 | 11/28/12 19:22 | 86-73-7 | |
| Indeno(1,2,3-cd)pyrene | ND | ug/kg | 124 | 1 | 11/28/12 06:18 | 11/28/12 19:22 | 193-39-5 | |
| Naphthalene | ND | ug/kg | 124 | 1 | 11/28/12 06:18 | 11/28/12 19:22 | 91-20-3 | |
| Phenanthrene | ND | ug/kg | 124 | 1 | 11/28/12 06:18 | 11/28/12 19:22 | 85-01-8 | |
| Pyrene | ND | ug/kg | 124 | 1 | 11/28/12 06:18 | 11/28/12 19:22 | 129-00-0 | |
| ***Surrogates*** | | | | | | | | |
| 2-Fluorobiphenyl (S) | 60 | %. | 43-130 | 1 | 11/28/12 06:18 | 11/28/12 19:22 | 321-60-8 | |
| Terphenyl-d14 (S) | 71 | %. | 32-130 | 1 | 11/28/12 06:18 | 11/28/12 19:22 | 1718-51-0 | |

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## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4070988

**Sample: S4 (26.5-30)** **Lab ID: 4070988007** Collected: 11/20/12 00:00 Received: 11/21/12 15:30 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **Percent Moisture** | Analytical Method: ASTM D2974-87 | | | | | | | |
| Percent Moisture | **19.1** | % | 0.10 | 1 | | 12/03/12 14:42 | | |
| **300.0 IC Anions** | Analytical Method: EPA 300.0 | | Preparation Method: EPA 300.0 | | | | | |
| Nitrate as N | ND | mg/kg | 4.9 | 1 | 11/27/12 21:31 | 11/29/12 03:04 | 14797-55-8 | |
| Nitrite as N | ND | mg/kg | 2.4 | 1 | 11/27/12 21:31 | 11/29/12 03:04 | 14797-65-0 | |
| Nitrogen, NO2 plus NO3 | ND | mg/kg | 4.9 | 1 | 11/27/12 21:31 | 11/29/12 03:04 | | |
| **350.1 Ammonia** | Analytical Method: EPA 350.1 | | Preparation Method: EPA 350.1 | | | | | |
| Nitrogen, Ammonia | **44.4** | mg/kg | 15.5 | 1 | 11/28/12 19:33 | 11/28/12 22:07 | 7664-41-7 | |
| **351.2 Total Kjeldahl Nitrogen** | Analytical Method: EPA 351.2 | | Preparation Method: EPA 351.2 | | | | | |
| Nitrogen, Kjeldahl, Total | **480** | mg/kg | 107 | 1 | 12/04/12 16:31 | 12/05/12 12:32 | 7727-37-9 | |
| **365.4 Total Phosphorus** | Analytical Method: EPA 365.4 | | Preparation Method: EPA 365.4 | | | | | |
| Phosphorus | **308** | mg/kg | 23.0 | 1 | 12/03/12 09:55 | 12/03/12 15:40 | 7723-14-0 | |
| **Total Organic Carbon** | Analytical Method: EPA 9060 Modified | | | | | | | |
| ***Surrogates*** | | | | | | | | |
| RPD% | **20.0** | % | | 1 | | 11/29/12 15:32 | | |
| Total Organic Carbon | **322** | mg/kg | 254 | 1 | | 11/29/12 15:28 | 7440-44-0 | |
| Total Organic Carbon | **393** | mg/kg | 248 | 1 | | 11/29/12 15:32 | 7440-44-0 | |
| Mean Total Organic Carbon | **358** | mg/kg | 251 | 1 | | 11/29/12 15:32 | 7440-44-0 | |

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## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4070988

QC Batch: MERP/3407 Analysis Method: EPA 7471
QC Batch Method: EPA 7471 Analysis Description: 7471 Mercury
Associated Lab Samples: 4070988001, 4070988002, 4070988003, 4070988004, 4070988005, 4070988006, 4070988007

METHOD BLANK: 720104 Matrix: Solid
Associated Lab Samples: 4070988001, 4070988002, 4070988003, 4070988004, 4070988005, 4070988006, 4070988007

| Parameter | Units | Blank Result | Reporting Limit | Analyzed | Qualifiers |
|---|---|---|---|---|---|
| Mercury | mg/kg | ND | 0.0067 | 12/03/12 13:42 | |

LABORATORY CONTROL SAMPLE: 720105

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Mercury | mg/kg | .17 | 0.17 | 102 | 85-115 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 720106 720107

| Parameter | Units | 4070847032 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mercury | mg/kg | 0.015 | .33 | .33 | 0.36 | 0.36 | 100 | 101 | 85-115 | 1 | 20 | |

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## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4070988

QC Batch: MPRP/7841 Analysis Method: EPA 6010
QC Batch Method: EPA 3050 Analysis Description: 6010 MET
Associated Lab Samples: 4070988001, 4070988002, 4070988003, 4070988004, 4070988005, 4070988006

METHOD BLANK: 718127 Matrix: Solid
Associated Lab Samples: 4070988001, 4070988002, 4070988003, 4070988004, 4070988005, 4070988006

| Parameter | Units | Blank Result | Reporting Limit | Analyzed | Qualifiers |
|---|---|---|---|---|---|
| Arsenic | mg/kg | ND | 2.0 | 11/28/12 10:35 | |
| Barium | mg/kg | ND | 0.50 | 11/28/12 10:35 | |
| Cadmium | mg/kg | ND | 0.50 | 11/28/12 10:35 | |
| Chromium | mg/kg | ND | 0.50 | 11/28/12 10:35 | |
| Lead | mg/kg | ND | 1.0 | 11/28/12 10:35 | |
| Selenium | mg/kg | ND | 2.0 | 11/28/12 10:35 | |
| Silver | mg/kg | ND | 1.0 | 11/28/12 10:35 | |

LABORATORY CONTROL SAMPLE: 718128

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Arsenic | mg/kg | 50 | 48.7 | 97 | 80-120 | |
| Barium | mg/kg | 50 | 48.4 | 97 | 80-120 | |
| Cadmium | mg/kg | 50 | 48.3 | 97 | 80-120 | |
| Chromium | mg/kg | 50 | 48.0 | 96 | 80-120 | |
| Lead | mg/kg | 50 | 49.2 | 98 | 80-120 | |
| Selenium | mg/kg | 50 | 47.9 | 96 | 80-120 | |
| Silver | mg/kg | 25 | 23.9 | 95 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 718129 718130

| Parameter | Units | 4070988001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | mg/kg | ND | 63.3 | 63.3 | 57.4 | 58.1 | 88 | 89 | 75-125 | 1 | 20 | |
| Barium | mg/kg | 11.7 | 63.3 | 63.3 | 70.1 | 69.2 | 92 | 91 | 75-125 | 1 | 20 | |
| Cadmium | mg/kg | ND | 63.3 | 63.3 | 56.7 | 57.4 | 90 | 91 | 75-125 | 1 | 20 | |
| Chromium | mg/kg | 7.6 | 63.3 | 63.3 | 62.8 | 64.2 | 87 | 89 | 75-125 | 2 | 20 | |
| Lead | mg/kg | 3.1 | 63.3 | 63.3 | 59.1 | 60.2 | 88 | 90 | 75-125 | 2 | 20 | |
| Selenium | mg/kg | ND | 63.3 | 63.3 | 55.1 | 55.2 | 87 | 87 | 75-125 | 0 | 20 | |
| Silver | mg/kg | ND | 31.6 | 31.6 | 28.0 | 28.5 | 88 | 90 | 75-125 | 2 | 20 | |

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## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4070988

QC Batch: MPRP/7854
QC Batch Method: EPA 3050
Analysis Method: EPA 6010
Analysis Description: 6010 MET
Associated Lab Samples: 4070988007

METHOD BLANK: 719264 Matrix: Solid
Associated Lab Samples: 4070988007

| Parameter | Units | Blank Result | Reporting Limit | Analyzed | Qualifiers |
|---|---|---|---|---|---|
| Arsenic | mg/kg | ND | 2.0 | 11/29/12 18:18 | |
| Barium | mg/kg | ND | 0.50 | 11/29/12 18:18 | |
| Cadmium | mg/kg | ND | 0.50 | 11/29/12 18:18 | |
| Chromium | mg/kg | ND | 0.50 | 11/29/12 18:18 | |
| Lead | mg/kg | ND | 1.0 | 11/29/12 18:18 | |
| Selenium | mg/kg | ND | 2.0 | 11/29/12 18:18 | |
| Silver | mg/kg | ND | 1.0 | 11/29/12 18:18 | |

LABORATORY CONTROL SAMPLE: 719265

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Arsenic | mg/kg | 50 | 45.4 | 91 | 80-120 | |
| Barium | mg/kg | 50 | 46.6 | 93 | 80-120 | |
| Cadmium | mg/kg | 50 | 45.9 | 92 | 80-120 | |
| Chromium | mg/kg | 50 | 46.9 | 94 | 80-120 | |
| Lead | mg/kg | 50 | 46.2 | 92 | 80-120 | |
| Selenium | mg/kg | 50 | 44.6 | 89 | 80-120 | |
| Silver | mg/kg | 25 | 23.0 | 92 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 719266 719267

| Parameter | Units | 4071083001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | mg/kg | 0.97J | 51.1 | 51 | 46.7 | 45.4 | 89 | 87 | 75-125 | 3 | 20 | |
| Barium | mg/kg | 12.4 | 51.1 | 51 | 63.6 | 60.0 | 100 | 93 | 75-125 | 6 | 20 | |
| Cadmium | mg/kg | <0.032 | 51.1 | 51 | 44.7 | 45.1 | 88 | 88 | 75-125 | 1 | 20 | |
| Chromium | mg/kg | 6.7 | 51.1 | 51 | 56.1 | 52.4 | 97 | 90 | 75-125 | 7 | 20 | |
| Lead | mg/kg | 1.1 | 51.1 | 51 | 46.6 | 47.2 | 89 | 90 | 75-125 | 1 | 20 | |
| Selenium | mg/kg | <0.50 | 51.1 | 51 | 43.1 | 43.9 | 84 | 86 | 75-125 | 2 | 20 | |
| Silver | mg/kg | <0.23 | 25.6 | 25.5 | 22.5 | 22.5 | 88 | 88 | 75-125 | 0 | 20 | |

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## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4070988

QC Batch: OEXT/17037 Analysis Method: EPA 8082
QC Batch Method: EPA 3541 Analysis Description: 8082 GCS PCB
Associated Lab Samples: 4070988001, 4070988002, 4070988003, 4070988004, 4070988005, 4070988006, 4070988007

METHOD BLANK: 717444 Matrix: Solid
Associated Lab Samples: 4070988001, 4070988002, 4070988003, 4070988004, 4070988005, 4070988006, 4070988007

| Parameter | Units | Blank Result | Reporting Limit | Analyzed | Qualifiers |
|---|---|---|---|---|---|
| PCB-1016 (Aroclor 1016) | ug/kg | ND | 100 | 11/27/12 10:30 | |
| PCB-1221 (Aroclor 1221) | ug/kg | ND | 100 | 11/27/12 10:30 | |
| PCB-1232 (Aroclor 1232) | ug/kg | ND | 100 | 11/27/12 10:30 | |
| PCB-1242 (Aroclor 1242) | ug/kg | ND | 100 | 11/27/12 10:30 | |
| PCB-1248 (Aroclor 1248) | ug/kg | ND | 100 | 11/27/12 10:30 | |
| PCB-1254 (Aroclor 1254) | ug/kg | ND | 100 | 11/27/12 10:30 | |
| PCB-1260 (Aroclor 1260) | ug/kg | ND | 100 | 11/27/12 10:30 | |
| Decachlorobiphenyl (S) | %. | 85 | 48-130 | 11/27/12 10:30 | |
| Tetrachloro-m-xylene (S) | %. | 90 | 43-130 | 11/27/12 10:30 | |

LABORATORY CONTROL SAMPLE: 717445

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| PCB-1016 (Aroclor 1016) | ug/kg | | ND | | | |
| PCB-1221 (Aroclor 1221) | ug/kg | | ND | | | |
| PCB-1232 (Aroclor 1232) | ug/kg | | ND | | | |
| PCB-1242 (Aroclor 1242) | ug/kg | | ND | | | |
| PCB-1248 (Aroclor 1248) | ug/kg | | ND | | | |
| PCB-1254 (Aroclor 1254) | ug/kg | | ND | | | |
| PCB-1260 (Aroclor 1260) | ug/kg | 500 | 481 | 96 | 57-130 | |
| Decachlorobiphenyl (S) | %. | | | 87 | 48-130 | |
| Tetrachloro-m-xylene (S) | %. | | | 90 | 43-130 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 717446 717447

| Parameter | Units | 4070996001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1016 (Aroclor 1016) | ug/kg | <27.5 | | | ND | ND | | | | | 20 | |
| PCB-1221 (Aroclor 1221) | ug/kg | <27.5 | | | ND | ND | | | | | 20 | |
| PCB-1232 (Aroclor 1232) | ug/kg | <27.5 | | | ND | ND | | | | | 20 | |
| PCB-1242 (Aroclor 1242) | ug/kg | <27.5 | | | ND | ND | | | | | 20 | |
| PCB-1248 (Aroclor 1248) | ug/kg | <27.5 | | | ND | ND | | | | | 20 | |
| PCB-1254 (Aroclor 1254) | ug/kg | <27.5 | | | ND | ND | | | | | 20 | |
| PCB-1260 (Aroclor 1260) | ug/kg | <27.5 | 582 | 582 | 562 | 551 | 97 | 95 | 33-164 | 2 | 20 | |
| Decachlorobiphenyl (S) | %. | | | | | | 87 | 85 | 48-130 | | | |
| Tetrachloro-m-xylene (S) | %. | | | | | | 87 | 86 | 43-130 | | | |

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## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4070988

QC Batch: OEXT/17040
QC Batch Method: EPA 3546
Analysis Method: EPA 8270 by SIM
Analysis Description: 8270/3546 MSSV PAH by SIM
Associated Lab Samples: 4070988001

METHOD BLANK: 717640
Matrix: Solid
Associated Lab Samples: 4070988001

| Parameter | Units | Blank Result | Reporting Limit | Analyzed | Qualifiers |
|---|---|---|---|---|---|
| Acenaphthene | ug/kg | ND | 16.7 | 11/27/12 08:46 | |
| Acenaphthylene | ug/kg | ND | 16.7 | 11/27/12 08:46 | |
| Anthracene | ug/kg | ND | 16.7 | 11/27/12 08:46 | |
| Benzo(a)anthracene | ug/kg | ND | 16.7 | 11/27/12 08:46 | |
| Benzo(a)pyrene | ug/kg | ND | 16.7 | 11/27/12 08:46 | |
| Benzo(b)fluoranthene | ug/kg | ND | 16.7 | 11/27/12 08:46 | |
| Benzo(g,h,i)perylene | ug/kg | ND | 16.7 | 11/27/12 08:46 | |
| Benzo(k)fluoranthene | ug/kg | ND | 16.7 | 11/27/12 08:46 | |
| Chrysene | ug/kg | ND | 16.7 | 11/27/12 08:46 | |
| Dibenz(a,h)anthracene | ug/kg | ND | 16.7 | 11/27/12 08:46 | |
| Fluoranthene | ug/kg | ND | 16.7 | 11/27/12 08:46 | |
| Fluorene | ug/kg | ND | 16.7 | 11/27/12 08:46 | |
| Indeno(1,2,3-cd)pyrene | ug/kg | ND | 16.7 | 11/27/12 08:46 | |
| Naphthalene | ug/kg | ND | 16.7 | 11/27/12 08:46 | |
| Phenanthrene | ug/kg | ND | 16.7 | 11/27/12 08:46 | |
| Pyrene | ug/kg | ND | 16.7 | 11/27/12 08:46 | |
| 2-Fluorobiphenyl (S) | %. | 77 | 43-130 | 11/27/12 08:46 | |
| Terphenyl-d14 (S) | %. | 97 | 32-130 | 11/27/12 08:46 | |

LABORATORY CONTROL SAMPLE: 717641

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Acenaphthene | ug/kg | 333 | 229 | 69 | 51-130 | |
| Acenaphthylene | ug/kg | 333 | 225 | 67 | 53-130 | |
| Anthracene | ug/kg | 333 | 271 | 81 | 48-130 | |
| Benzo(a)anthracene | ug/kg | 333 | 226 | 68 | 55-130 | |
| Benzo(a)pyrene | ug/kg | 333 | 260 | 78 | 56-130 | |
| Benzo(b)fluoranthene | ug/kg | 333 | 228 | 68 | 53-130 | |
| Benzo(g,h,i)perylene | ug/kg | 333 | 251 | 75 | 58-130 | |
| Benzo(k)fluoranthene | ug/kg | 333 | 257 | 77 | 55-130 | |
| Chrysene | ug/kg | 333 | 246 | 74 | 59-130 | |
| Dibenz(a,h)anthracene | ug/kg | 333 | 259 | 78 | 56-130 | |
| Fluoranthene | ug/kg | 333 | 259 | 78 | 56-130 | |
| Fluorene | ug/kg | 333 | 237 | 71 | 54-130 | |
| Indeno(1,2,3-cd)pyrene | ug/kg | 333 | 250 | 75 | 57-130 | |
| Naphthalene | ug/kg | 333 | 243 | 73 | 43-130 | |
| Phenanthrene | ug/kg | 333 | 246 | 74 | 56-130 | |
| Pyrene | ug/kg | 333 | 221 | 66 | 54-130 | |
| 2-Fluorobiphenyl (S) | %. | | | 76 | 43-130 | |
| Terphenyl-d14 (S) | %. | | | 93 | 32-130 | |

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## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4070988

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 717642 717643

| Parameter | Units | 4070945001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | ug/kg | 30.9J | 333 | 333 | 288 | 249 | 77 | 65 | 40-130 | 15 | 20 | |
| Acenaphthylene | ug/kg | <16.7 | 333 | 333 | 257 | 227 | 74 | 65 | 40-130 | 13 | 20 | |
| Anthracene | ug/kg | 69.1 | 333 | 333 | 325 | 297 | 77 | 68 | 46-130 | 9 | 24 | |
| Benzo(a)anthracene | ug/kg | 230 | 333 | 333 | 433 | 455 | 61 | 67 | 42-130 | 5 | 25 | |
| Benzo(a)pyrene | ug/kg | 540 | 333 | 333 | 769 | 819 | 69 | 84 | 40-130 | 6 | 31 | |
| Benzo(b)fluoranthene | ug/kg | 367 | 333 | 333 | 779 | 660 | 123 | 88 | 45-130 | 16 | 29 | |
| Benzo(g,h,i)perylene | ug/kg | 427 | 333 | 333 | 522 | 494 | 28 | 20 | 16-143 | 5 | 23 | |
| Benzo(k)fluoranthene | ug/kg | 376 | 333 | 333 | 586 | 729 | 63 | 106 | 38-130 | 22 | 33 | |
| Chrysene | ug/kg | 373 | 333 | 333 | 579 | 604 | 62 | 69 | 38-130 | 4 | 31 | |
| Dibenz(a,h)anthracene | ug/kg | 122 | 333 | 333 | 290 | 261 | 50 | 42 | 30-135 | 10 | 23 | |
| Fluoranthene | ug/kg | 539 | 333 | 333 | 716 | 772 | 53 | 70 | 42-133 | 7 | 28 | |
| Fluorene | ug/kg | 31.4J | 333 | 333 | 287 | 250 | 77 | 66 | 43-130 | 14 | 22 | |
| Indeno(1,2,3-cd)pyrene | ug/kg | 152 | 333 | 333 | 296 | 267 | 43 | 35 | 15-150 | 10 | 27 | |
| Naphthalene | ug/kg | 29.5J | 333 | 333 | 294 | 255 | 79 | 68 | 24-130 | 14 | 33 | |
| Phenanthrene | ug/kg | 316 | 333 | 333 | 558 | 542 | 73 | 68 | 27-135 | 3 | 27 | |
| Pyrene | ug/kg | 555 | 333 | 333 | 769 | 791 | 64 | 71 | 36-130 | 3 | 23 | |
| 2-Fluorobiphenyl (S) | %. | | | | | | 84 | 74 | 43-130 | | | |
| Terphenyl-d14 (S) | %. | | | | | | 109 | 95 | 32-130 | | | |

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## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4070988

QC Batch: OEXT/17054 Analysis Method: EPA 8270 by SIM
QC Batch Method: EPA 3546 Analysis Description: 8270/3546 MSSV PAH by SIM
Associated Lab Samples: 4070988002, 4070988003, 4070988004, 4070988005, 4070988006, 4070988007

METHOD BLANK: 718310 Matrix: Solid
Associated Lab Samples: 4070988002, 4070988003, 4070988004, 4070988005, 4070988006, 4070988007

| Parameter | Units | Blank Result | Reporting Limit | Analyzed | Qualifiers |
|---|---|---|---|---|---|
| Acenaphthene | ug/kg | ND | 16.7 | 11/28/12 12:05 | |
| Acenaphthylene | ug/kg | ND | 16.7 | 11/28/12 12:05 | |
| Anthracene | ug/kg | ND | 16.7 | 11/28/12 12:05 | |
| Benzo(a)anthracene | ug/kg | ND | 16.7 | 11/28/12 12:05 | |
| Benzo(a)pyrene | ug/kg | ND | 16.7 | 11/28/12 12:05 | |
| Benzo(b)fluoranthene | ug/kg | ND | 16.7 | 11/28/12 12:05 | |
| Benzo(g,h,i)perylene | ug/kg | ND | 16.7 | 11/28/12 12:05 | |
| Benzo(k)fluoranthene | ug/kg | ND | 16.7 | 11/28/12 12:05 | |
| Chrysene | ug/kg | ND | 16.7 | 11/28/12 12:05 | |
| Dibenz(a,h)anthracene | ug/kg | ND | 16.7 | 11/28/12 12:05 | |
| Fluoranthene | ug/kg | ND | 16.7 | 11/28/12 12:05 | |
| Fluorene | ug/kg | ND | 16.7 | 11/28/12 12:05 | |
| Indeno(1,2,3-cd)pyrene | ug/kg | ND | 16.7 | 11/28/12 12:05 | |
| Naphthalene | ug/kg | ND | 16.7 | 11/28/12 12:05 | |
| Phenanthrene | ug/kg | ND | 16.7 | 11/28/12 12:05 | |
| Pyrene | ug/kg | ND | 16.7 | 11/28/12 12:05 | |
| 2-Fluorobiphenyl (S) | %. | 74 | 43-130 | 11/28/12 12:05 | |
| Terphenyl-d14 (S) | %. | 86 | 32-130 | 11/28/12 12:05 | |

LABORATORY CONTROL SAMPLE: 718311

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Acenaphthene | ug/kg | 333 | 227 | 68 | 51-130 | |
| Acenaphthylene | ug/kg | 333 | 229 | 69 | 53-130 | |
| Anthracene | ug/kg | 333 | 268 | 80 | 48-130 | |
| Benzo(a)anthracene | ug/kg | 333 | 221 | 66 | 55-130 | |
| Benzo(a)pyrene | ug/kg | 333 | 242 | 72 | 56-130 | |
| Benzo(b)fluoranthene | ug/kg | 333 | 244 | 73 | 53-130 | |
| Benzo(g,h,i)perylene | ug/kg | 333 | 234 | 70 | 58-130 | |
| Benzo(k)fluoranthene | ug/kg | 333 | 220 | 66 | 55-130 | |
| Chrysene | ug/kg | 333 | 231 | 69 | 59-130 | |
| Dibenz(a,h)anthracene | ug/kg | 333 | 242 | 73 | 56-130 | |
| Fluoranthene | ug/kg | 333 | 246 | 74 | 56-130 | |
| Fluorene | ug/kg | 333 | 235 | 71 | 54-130 | |
| Indeno(1,2,3-cd)pyrene | ug/kg | 333 | 237 | 71 | 57-130 | |
| Naphthalene | ug/kg | 333 | 234 | 70 | 43-130 | |
| Phenanthrene | ug/kg | 333 | 237 | 71 | 56-130 | |
| Pyrene | ug/kg | 333 | 223 | 67 | 54-130 | |
| 2-Fluorobiphenyl (S) | %. | | | 75 | 43-130 | |
| Terphenyl-d14 (S) | %. | | | 87 | 32-130 | |

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## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4070988

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 718312 718313

| Parameter | Units | 4070994008 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | ug/kg | <8.3 | 333 | 333 | 206 | 205 | 62 | 61 | 40-130 | 1 | 20 | |
| Acenaphthylene | ug/kg | <8.3 | 333 | 333 | 210 | 207 | 63 | 62 | 40-130 | 1 | 20 | |
| Anthracene | ug/kg | <1.7 | 333 | 333 | 240 | 239 | 72 | 72 | 46-130 | 1 | 24 | |
| Benzo(a)anthracene | ug/kg | <8.3 | 333 | 333 | 197 | 199 | 59 | 60 | 42-130 | 1 | 25 | |
| Benzo(a)pyrene | ug/kg | <8.3 | 333 | 333 | 220 | 220 | 66 | 66 | 40-130 | 0 | 31 | |
| Benzo(b)fluoranthene | ug/kg | <2.4 | 333 | 333 | 188 | 191 | 57 | 57 | 45-130 | 1 | 29 | |
| Benzo(g,h,i)perylene | ug/kg | <8.3 | 333 | 333 | 222 | 210 | 67 | 63 | 16-143 | 5 | 23 | |
| Benzo(k)fluoranthene | ug/kg | <8.3 | 333 | 333 | 234 | 231 | 70 | 69 | 38-130 | 1 | 33 | |
| Chrysene | ug/kg | <1.9 | 333 | 333 | 210 | 219 | 63 | 66 | 38-130 | 4 | 31 | |
| Dibenz(a,h)anthracene | ug/kg | <8.3 | 333 | 333 | 233 | 218 | 70 | 65 | 30-135 | 6 | 23 | |
| Fluoranthene | ug/kg | <8.3 | 333 | 333 | 225 | 227 | 67 | 68 | 42-133 | 1 | 28 | |
| Fluorene | ug/kg | <8.3 | 333 | 333 | 214 | 217 | 64 | 65 | 43-130 | 1 | 22 | |
| Indeno(1,2,3-cd)pyrene | ug/kg | <8.3 | 333 | 333 | 224 | 210 | 67 | 63 | 15-150 | 7 | 27 | |
| Naphthalene | ug/kg | 34.9 | 333 | 333 | 241 | 212 | 62 | 53 | 24-130 | 13 | 33 | |
| Phenanthrene | ug/kg | <2.1 | 333 | 333 | 213 | 215 | 64 | 64 | 27-135 | 1 | 27 | |
| Pyrene | ug/kg | <8.3 | 333 | 333 | 195 | 199 | 59 | 60 | 36-130 | 2 | 23 | |
| 2-Fluorobiphenyl (S) | %. | | | | | | 68 | 69 | 43-130 | | | |
| Terphenyl-d14 (S) | %. | | | | | | 77 | 81 | 32-130 | | | |

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## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4070988

QC Batch: PMST/7982 Analysis Method: ASTM D2974-87
QC Batch Method: ASTM D2974-87 Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 4070988001, 4070988002, 4070988003, 4070988004, 4070988005, 4070988006

SAMPLE DUPLICATE: 721325

| Parameter | Units | 4070847018 Result | Dup Result | RPD | Max RPD | Qualifiers |
|---|---|---|---|---|---|---|
| Percent Moisture | % | 52.5 | 52.1 | 1 | 10 | |

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## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4070988

QC Batch: PMST/7983
QC Batch Method: ASTM D2974-87
Associated Lab Samples: 4070988007

Analysis Method: ASTM D2974-87
Analysis Description: Dry Weight/Percent Moisture

SAMPLE DUPLICATE: 721369

| Parameter | Units | 4070988007 Result | Dup Result | RPD | Max RPD | Qualifiers |
|---|---|---|---|---|---|---|
| Percent Moisture | % | 19.1 | 20.0 | 5 | 10 | |

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## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4070988

QC Batch: WETA/15297 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 4070988001, 4070988002, 4070988003, 4070988004, 4070988005, 4070988006, 4070988007

METHOD BLANK: 718202 Matrix: Solid
Associated Lab Samples: 4070988001, 4070988002, 4070988003, 4070988004, 4070988005, 4070988006, 4070988007

| Parameter | Units | Blank Result | Reporting Limit | Analyzed | Qualifiers |
|---|---|---|---|---|---|
| Nitrate as N | mg/kg | ND | 4.0 | 11/28/12 23:51 | |
| Nitrite as N | mg/kg | ND | 2.0 | 11/28/12 23:51 | |
| Nitrogen, NO2 plus NO3 | mg/kg | ND | 4.0 | 11/28/12 23:51 | |

LABORATORY CONTROL SAMPLE: 718203

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Nitrate as N | mg/kg | 20 | 19.4 | 97 | 80-120 | |
| Nitrite as N | mg/kg | 10 | 10.1 | 101 | 80-120 | |
| Nitrogen, NO2 plus NO3 | mg/kg | 30 | 29.5 | 98 | | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 718204 718205

| Parameter | Units | 10213325001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nitrate as N | mg/kg | ND | 20.2 | 20.2 | 23.9 | 24.2 | 104 | 105 | 80-120 | 1 | 20 | |
| Nitrite as N | mg/kg | ND | 10.1 | 10.1 | 10.7 | 10.7 | 96 | 96 | 80-120 | 0 | 20 | |
| Nitrogen, NO2 plus NO3 | mg/kg | 4.0 | 30.2 | 30.2 | 34.6 | 34.9 | 101 | 102 | | 1 | | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 718206 718207

| Parameter | Units | 4070988001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nitrate as N | mg/kg | ND | 24.9 | 24.9 | 24.5 | 24.9 | 90 | 91 | 80-120 | 2 | 20 | |
| Nitrite as N | mg/kg | ND | 12.4 | 12.4 | 12.6 | 12.6 | 101 | 101 | 80-120 | 0 | 20 | |
| Nitrogen, NO2 plus NO3 | mg/kg | ND | 37.3 | 37.3 | 37.1 | 37.5 | 93 | 94 | | 1 | | |

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## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4070988

QC Batch: WETA/15265 Analysis Method: EPA 350.1
QC Batch Method: EPA 350.1 Analysis Description: 350.1 Ammonia
Associated Lab Samples: 4070988001, 4070988002, 4070988003, 4070988004, 4070988005, 4070988006, 4070988007

METHOD BLANK: 717549 Matrix: Solid
Associated Lab Samples: 4070988001, 4070988002, 4070988003, 4070988004, 4070988005, 4070988006, 4070988007

| Parameter | Units | Blank Result | Reporting Limit | Analyzed | Qualifiers |
|---|---|---|---|---|---|
| Nitrogen, Ammonia | mg/kg | ND | 15.0 | 11/28/12 21:45 | |

LABORATORY CONTROL SAMPLE: 717550

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Nitrogen, Ammonia | mg/kg | 300 | 292 | 97 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 717551 717552

| Parameter | Units | 4070942001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nitrogen, Ammonia | mg/kg | 108 | 286 | 300 | 381 | 400 | 96 | 97 | 80-120 | 5 | 20 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 717553 717554

| Parameter | Units | 4070988001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nitrogen, Ammonia | mg/kg | 18.2 | 271 | 346 | 294 | 385 | 102 | 106 | 80-120 | 27 | 20 | R1 |

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## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4070988

QC Batch: WETA/15405 Analysis Method: EPA 351.2
QC Batch Method: EPA 351.2 Analysis Description: 351.2 TKN
Associated Lab Samples: 4070988001, 4070988002, 4070988003, 4070988004, 4070988005, 4070988006, 4070988007

METHOD BLANK: 721453 Matrix: Solid
Associated Lab Samples: 4070988001, 4070988002, 4070988003, 4070988004, 4070988005, 4070988006, 4070988007

| Parameter | Units | Blank Result | Reporting Limit | Analyzed | Qualifiers |
|---|---|---|---|---|---|
| Nitrogen, Kjeldahl, Total | mg/kg | ND | 100 | 12/05/12 12:22 | |

LABORATORY CONTROL SAMPLE: 721454

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Nitrogen, Kjeldahl, Total | mg/kg | 500 | 530 | 106 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 721455 721456

| Parameter | Units | 4070988001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nitrogen, Kjeldahl, Total | mg/kg | 117 | 275 | 270 | 410 | 408 | 106 | 108 | 80-120 | 1 | 20 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 721457 721458

| Parameter | Units | 4071174002 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nitrogen, Kjeldahl, Total | mg/kg | 69.1J | 435 | 400 | 525 | 466 | 105 | 99 | 80-120 | 12 | 20 | |

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## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4070988

QC Batch: WETA/15337 Analysis Method: EPA 365.4
QC Batch Method: EPA 365.4 Analysis Description: 365.4 Total Phosphorus
Associated Lab Samples: 4070988001, 4070988002, 4070988003, 4070988004

METHOD BLANK: 719248 Matrix: Solid
Associated Lab Samples: 4070988001, 4070988002, 4070988003, 4070988004

| Parameter | Units | Blank Result | Reporting Limit | Analyzed | Qualifiers |
|---|---|---|---|---|---|
| Phosphorus | mg/kg | ND | 40.0 | 11/29/12 13:53 | |

LABORATORY CONTROL SAMPLE: 719249

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Phosphorus | mg/kg | 500 | 509 | 102 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 719250 719251

| Parameter | Units | 4070815015 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phosphorus | mg/kg | 784 | 664 | 664 | 1310 | 1360 | 80 | 87 | 80-120 | 3 | 20 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 719252 719253

| Parameter | Units | 4070988004 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phosphorus | mg/kg | 897 | 495 | 495 | 1270 | 1310 | 76 | 83 | 80-120 | 3 | 20 | M0 |

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## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4070988

QC Batch: WETA/15375 Analysis Method: EPA 365.4
QC Batch Method: EPA 365.4 Analysis Description: 365.4 Total Phosphorus
Associated Lab Samples: 4070988005, 4070988006, 4070988007

METHOD BLANK: 721176 Matrix: Solid
Associated Lab Samples: 4070988005, 4070988006, 4070988007

| Parameter | Units | Blank Result | Reporting Limit | Analyzed | Qualifiers |
|---|---|---|---|---|---|
| Phosphorus | mg/kg | ND | 40.0 | 12/03/12 15:38 | |

LABORATORY CONTROL SAMPLE: 721177

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Phosphorus | mg/kg | 500 | 493 | 99 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 721178 721179

| Parameter | Units | 4071174003 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phosphorus | mg/kg | <11.1 | 278 | 278 | 294 | 296 | 104 | 104 | 80-120 | 1 | 20 | |

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## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4070988

QC Batch: WETA/15319 Analysis Method: EPA 9060 Modified
QC Batch Method: EPA 9060 Modified Analysis Description: 9060 TOC Average
Associated Lab Samples: 4070988001, 4070988002, 4070988003, 4070988004

METHOD BLANK: 718663 Matrix: Solid
Associated Lab Samples: 4070988001, 4070988002, 4070988003, 4070988004

| Parameter | Units | Blank Result | Reporting Limit | Analyzed | Qualifiers |
|---|---|---|---|---|---|
| Mean Total Organic Carbon | mg/kg | ND | 250 | 11/28/12 13:20 | |

LABORATORY CONTROL SAMPLE: 718664

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Mean Total Organic Carbon | mg/kg | 1000 | 1060 | 106 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 718665 718666

| Parameter | Units | 4070847018 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mean Total Organic Carbon | mg/kg | 8940 | 9090 | 10800 | 18300 | 21600 | 103 | 117 | 50-150 | 16 | 30 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 718667 718668

| Parameter | Units | 4070847019 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mean Total Organic Carbon | mg/kg | 8100 | 11100 | 12100 | 19200 | 20700 | 100 | 104 | 50-150 | 7 | 30 | |

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## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4070988

QC Batch: WETA/15346 Analysis Method: EPA 9060 Modified
QC Batch Method: EPA 9060 Modified Analysis Description: 9060 TOC Average
Associated Lab Samples: 4070988005, 4070988006, 4070988007

METHOD BLANK: 719713 Matrix: Solid
Associated Lab Samples: 4070988005, 4070988006, 4070988007

| Parameter | Units | Blank Result | Reporting Limit | Analyzed | Qualifiers |
|---|---|---|---|---|---|
| Mean Total Organic Carbon | mg/kg | ND | 250 | 11/29/12 14:43 | |

LABORATORY CONTROL SAMPLE: 719714

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Mean Total Organic Carbon | mg/kg | 1000 | 1050 | 105 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 719715 719716

| Parameter | Units | 4070988005 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mean Total Organic Carbon | mg/kg | 8690 | 6600 | 6560 | 14600 | 17700 | 90 | 137 | 50-150 | 19 | 30 | |



**REPORT OF LABORATORY ANALYSIS**

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# QUALIFIERS

Project: D DOCK
Pace Project No.: 4070988

## DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

## LABORATORIES

PASI-G Pace Analytical Services - Green Bay

## BATCH QUALIFIERS

Batch: MSSV/5207

[IP] Benzo(b)fluoranthene and benzo(k)fluoranthene were in the check standard but did not meet the resolution criteria in SW846 Method 8270C. Whereas sample results included are reported as individual isomers, the lab and the customer must recognize them as an isomeric pair.

Batch: MSSV/5213

[IP] Benzo(b)fluoranthene and benzo(k)fluoranthene were in the check standard but did not meet the resolution criteria in SW846 Method 8270C. Whereas sample results included are reported as individual isomers, the lab and the customer must recognize them as an isomeric pair.

Batch: WETA/15319

[WB] Results reported on dry weight basis per cited method.

Batch: WETA/15320

[WB] Results reported on dry weight basis per cited method.

Batch: WETA/15346

[WB] Results reported on dry weight basis per cited method.

Batch: WETA/15347

[WB] Results reported on dry weight basis per cited method.

## ANALYTE QUALIFIERS

M0 Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

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## QUALIFIERS

Project: D DOCK
Pace Project No.: 4070988

**ANALYTE QUALIFIERS**

R1 RPD value was outside control limits.

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## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: D DOCK
Pace Project No.: 4070988

| Lab ID | Sample ID | QC Batch Method | QC Batch | Analytical Method | Analytical Batch |
|---|---|---|---|---|---|
| 4070988001 | S1 (23-29) | EPA 3541 | OEXT/17037 | EPA 8082 | GCSV/8810 |
| 4070988002 | S1 (29-31) | EPA 3541 | OEXT/17037 | EPA 8082 | GCSV/8810 |
| 4070988003 | S2 (29.5-31) | EPA 3541 | OEXT/17037 | EPA 8082 | GCSV/8810 |
| 4070988004 | S3 (23.5-28.5) | EPA 3541 | OEXT/17037 | EPA 8082 | GCSV/8810 |
| 4070988005 | S3 (28.5-30) | EPA 3541 | OEXT/17037 | EPA 8082 | GCSV/8810 |
| 4070988006 | S4 (21-26.5) | EPA 3541 | OEXT/17037 | EPA 8082 | GCSV/8810 |
| 4070988007 | S4 (26.5-30) | EPA 3541 | OEXT/17037 | EPA 8082 | GCSV/8810 |
| 4070988001 | S1 (23-29) | EPA 3050 | MPRP/7841 | EPA 6010 | ICP/6873 |
| 4070988002 | S1 (29-31) | EPA 3050 | MPRP/7841 | EPA 6010 | ICP/6873 |
| 4070988003 | S2 (29.5-31) | EPA 3050 | MPRP/7841 | EPA 6010 | ICP/6873 |
| 4070988004 | S3 (23.5-28.5) | EPA 3050 | MPRP/7841 | EPA 6010 | ICP/6873 |
| 4070988005 | S3 (28.5-30) | EPA 3050 | MPRP/7841 | EPA 6010 | ICP/6873 |
| 4070988006 | S4 (21-26.5) | EPA 3050 | MPRP/7841 | EPA 6010 | ICP/6873 |
| 4070988007 | S4 (26.5-30) | EPA 3050 | MPRP/7854 | EPA 6010 | ICP/6886 |
| 4070988001 | S1 (23-29) | EPA 7471 | MERP/3407 | EPA 7471 | MERC/4089 |
| 4070988002 | S1 (29-31) | EPA 7471 | MERP/3407 | EPA 7471 | MERC/4089 |
| 4070988003 | S2 (29.5-31) | EPA 7471 | MERP/3407 | EPA 7471 | MERC/4089 |
| 4070988004 | S3 (23.5-28.5) | EPA 7471 | MERP/3407 | EPA 7471 | MERC/4089 |
| 4070988005 | S3 (28.5-30) | EPA 7471 | MERP/3407 | EPA 7471 | MERC/4089 |
| 4070988006 | S4 (21-26.5) | EPA 7471 | MERP/3407 | EPA 7471 | MERC/4089 |
| 4070988007 | S4 (26.5-30) | EPA 7471 | MERP/3407 | EPA 7471 | MERC/4089 |
| 4070988001 | S1 (23-29) | EPA 3546 | OEXT/17040 | EPA 8270 by SIM | MSSV/5207 |
| 4070988002 | S1 (29-31) | EPA 3546 | OEXT/17054 | EPA 8270 by SIM | MSSV/5213 |
| 4070988003 | S2 (29.5-31) | EPA 3546 | OEXT/17054 | EPA 8270 by SIM | MSSV/5213 |
| 4070988004 | S3 (23.5-28.5) | EPA 3546 | OEXT/17054 | EPA 8270 by SIM | MSSV/5213 |
| 4070988005 | S3 (28.5-30) | EPA 3546 | OEXT/17054 | EPA 8270 by SIM | MSSV/5213 |
| 4070988006 | S4 (21-26.5) | EPA 3546 | OEXT/17054 | EPA 8270 by SIM | MSSV/5213 |
| 4070988007 | S4 (26.5-30) | EPA 3546 | OEXT/17054 | EPA 8270 by SIM | MSSV/5213 |
| 4070988001 | S1 (23-29) | ASTM D2974-87 | PMST/7982 | | |
| 4070988002 | S1 (29-31) | ASTM D2974-87 | PMST/7982 | | |
| 4070988003 | S2 (29.5-31) | ASTM D2974-87 | PMST/7982 | | |
| 4070988004 | S3 (23.5-28.5) | ASTM D2974-87 | PMST/7982 | | |
| 4070988005 | S3 (28.5-30) | ASTM D2974-87 | PMST/7982 | | |
| 4070988006 | S4 (21-26.5) | ASTM D2974-87 | PMST/7982 | | |
| 4070988007 | S4 (26.5-30) | ASTM D2974-87 | PMST/7983 | | |
| 4070988001 | S1 (23-29) | EPA 300.0 | WETA/15297 | EPA 300.0 | WETA/15327 |
| 4070988002 | S1 (29-31) | EPA 300.0 | WETA/15297 | EPA 300.0 | WETA/15327 |
| 4070988003 | S2 (29.5-31) | EPA 300.0 | WETA/15297 | EPA 300.0 | WETA/15327 |
| 4070988004 | S3 (23.5-28.5) | EPA 300.0 | WETA/15297 | EPA 300.0 | WETA/15327 |
| 4070988005 | S3 (28.5-30) | EPA 300.0 | WETA/15297 | EPA 300.0 | WETA/15327 |
| 4070988006 | S4 (21-26.5) | EPA 300.0 | WETA/15297 | EPA 300.0 | WETA/15327 |
| 4070988007 | S4 (26.5-30) | EPA 300.0 | WETA/15297 | EPA 300.0 | WETA/15327 |
| 4070988001 | S1 (23-29) | EPA 350.1 | WETA/15265 | EPA 350.1 | WETA/15333 |
| 4070988002 | S1 (29-31) | EPA 350.1 | WETA/15265 | EPA 350.1 | WETA/15333 |

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## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: D DOCK
Pace Project No.: 4070988

| Lab ID | Sample ID | QC Batch Method | QC Batch | Analytical Method | Analytical Batch |
|---|---|---|---|---|---|
| 4070988003 | S2 (29.5-31) | EPA 350.1 | WETA/15265 | EPA 350.1 | WETA/15333 |
| 4070988004 | S3 (23.5-28.5) | EPA 350.1 | WETA/15265 | EPA 350.1 | WETA/15333 |
| 4070988005 | S3 (28.5-30) | EPA 350.1 | WETA/15265 | EPA 350.1 | WETA/15333 |
| 4070988006 | S4 (21-26.5) | EPA 350.1 | WETA/15265 | EPA 350.1 | WETA/15333 |
| 4070988007 | S4 (26.5-30) | EPA 350.1 | WETA/15265 | EPA 350.1 | WETA/15333 |
| 4070988001 | S1 (23-29) | EPA 351.2 | WETA/15405 | EPA 351.2 | WETA/15424 |
| 4070988002 | S1 (29-31) | EPA 351.2 | WETA/15405 | EPA 351.2 | WETA/15424 |
| 4070988003 | S2 (29.5-31) | EPA 351.2 | WETA/15405 | EPA 351.2 | WETA/15424 |
| 4070988004 | S3 (23.5-28.5) | EPA 351.2 | WETA/15405 | EPA 351.2 | WETA/15424 |
| 4070988005 | S3 (28.5-30) | EPA 351.2 | WETA/15405 | EPA 351.2 | WETA/15424 |
| 4070988006 | S4 (21-26.5) | EPA 351.2 | WETA/15405 | EPA 351.2 | WETA/15424 |
| 4070988007 | S4 (26.5-30) | EPA 351.2 | WETA/15405 | EPA 351.2 | WETA/15424 |
| 4070988001 | S1 (23-29) | EPA 365.4 | WETA/15337 | EPA 365.4 | WETA/15339 |
| 4070988002 | S1 (29-31) | EPA 365.4 | WETA/15337 | EPA 365.4 | WETA/15339 |
| 4070988003 | S2 (29.5-31) | EPA 365.4 | WETA/15337 | EPA 365.4 | WETA/15339 |
| 4070988004 | S3 (23.5-28.5) | EPA 365.4 | WETA/15337 | EPA 365.4 | WETA/15339 |
| 4070988005 | S3 (28.5-30) | EPA 365.4 | WETA/15375 | EPA 365.4 | WETA/15392 |
| 4070988006 | S4 (21-26.5) | EPA 365.4 | WETA/15375 | EPA 365.4 | WETA/15392 |
| 4070988007 | S4 (26.5-30) | EPA 365.4 | WETA/15375 | EPA 365.4 | WETA/15392 |
| 4070988001 | S1 (23-29) | EPA 9060 Modified | WETA/15319 | | |
| 4070988001 | S1 (23-29) | EPA 9060 Modified | WETA/15320 | | |
| 4070988002 | S1 (29-31) | EPA 9060 Modified | WETA/15319 | | |
| 4070988002 | S1 (29-31) | EPA 9060 Modified | WETA/15320 | | |
| 4070988003 | S2 (29.5-31) | EPA 9060 Modified | WETA/15319 | | |
| 4070988003 | S2 (29.5-31) | EPA 9060 Modified | WETA/15320 | | |
| 4070988004 | S3 (23.5-28.5) | EPA 9060 Modified | WETA/15319 | | |
| 4070988004 | S3 (23.5-28.5) | EPA 9060 Modified | WETA/15320 | | |
| 4070988005 | S3 (28.5-30) | EPA 9060 Modified | WETA/15346 | | |
| 4070988005 | S3 (28.5-30) | EPA 9060 Modified | WETA/15347 | | |
| 4070988006 | S4 (21-26.5) | EPA 9060 Modified | WETA/15346 | | |
| 4070988006 | S4 (21-26.5) | EPA 9060 Modified | WETA/15347 | | |
| 4070988007 | S4 (26.5-30) | EPA 9060 Modified | WETA/15346 | | |
| 4070988007 | S4 (26.5-30) | EPA 9060 Modified | WETA/15347 | | |

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# CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

4070988

| Section A Required Client Information: | Section B Required Project Information: | Section C Invoice Information: | Page: of |
|---|---|---|---|
| Company: EPC | Report To: | Attention: | 1504651 |
| Address: 339 GARFIELD DULUTH MN 55802 | Copy To: | Company Name: | REGULATORY AGENCY |
| Email To: bmcvean@epcduluth.com | Purchase Order No.: | Address: | ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER |
| Phone: (218)727-1239 Fax: | Project Name: D DOCK | Pace Quote Reference: | ☐ UST ☐ RCRA ☐ OTHER |
| Requested Due Date/TAT: | Project Number: | Pace Project Manager: | Site Location STATE: MN |
| | | Pace Profile #: | |

| ITEM # | Section D Required Client Information: SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE | Matrix Codes MATRIX / CODE | MATRIX CODE (see valid codes to left) | SAMPLE TYPE (G=GRAB C=COMP) | COLLECTED COMPOSITE START DATE | COLLECTED COMPOSITE START TIME | COLLECTED COMPOSITE END/GRAB DATE | COLLECTED COMPOSITE END/GRAB TIME | SAMPLE TEMP AT COLLECTION | # OF CONTAINERS | Preservatives: Unpreserved | $H_2SO_4$ | $HNO_3$ | HCl | NaOH | $Na_2S_2O_3$ | Methanol | Other | Requested Analysis Filtered (Y/N) Y/N | Analysis Test: PAHs | LF METALS | PHOSPHORUS | NITRATE-NITRITE | AMMONIA NITRO | TOTAL KJELDAHL | PCBs | TOTAL ORG. CARBON | Residual Chlorine (Y/N) | Pace Project No./ Lab I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | S1 (23-29) 001 | Drinking Water DW, Water WT, Waste Water WW, Product P, Soil/Solid SL, Oil OL, Wipe WP, Air AR, Tissue TS, Other OT | SL | C | 11/20/12 | | | | | 3 | X | | | | | | | | | X | X | X | X | X | X | X | X | | 3-462 |
| 2 | S1 (29-31) 002 | | SL | G | | | | | | 3 | X | | | | | | | | | X | X | X | X | X | X | X | X | | |
| 3 | S2 (29.5-31) 003 | | SL | G | | | | | | 3 | X | | | | | | | | | X | X | X | X | X | X | X | X | | |
| 4 | S3 (23.5-28.5) 004 | | SL | C | | | | | | 3 | X | | | | | | | | | X | X | X | X | X | X | X | X | | |
| 5 | S3 (28.5-30) 005 | | SL | G | | | | | | 3 | X | | | | | | | | | X | X | X | X | X | X | X | X | | |
| 6 | S4 (21-26.5) 006 | | SL | C | | | | | | 3 | X | | | | | | | | | X | X | X | X | X | X | X | X | | |
| 7 | S4 (26.5-30) 007 | | SL | C | | | | | | 3 | X | | | | | | | | | X | X | X | X | X | X | X | X | | |
| 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| ADDITIONAL COMMENTS | RELINQUISHED BY / AFFILIATION | DATE | TIME | ACCEPTED BY / AFFILIATION | DATE | TIME | SAMPLE CONDITIONS |
|---|---|---|---|---|---|---|---|
| | EPC | 11/20/12 | 1235 | | 11/20/12 | 1235 | |
| | | 11/20/12 | 1530 | | 11/20/12 | 1530 | 2 |

| Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N) |
|---|---|---|---|
| | Y | | |
| 2 | Y | Y | Y |

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: BRIAN McVEAN

SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY):

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Pace Analytical Services, Inc.
1241 Bellevue Street, Suite 9
Green Bay, WI 54302

Pace Analytical

# Sample Condition Upon Receipt

Client Name: EQC Project # 4070988

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Tracking #: 7941 2101 4136

Custody Seal on Cooler/Box Present: ☑ yes ☐ no Seals intact: ☑ yes ☐ no

Custody Seal on Samples Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None Other

Thermometer Used SR-36 Type of Ice: (Wet) Blue Dry None ☑ Samples on ice, cooling process has begun.

Cooler Temperature 2 Biological Tissue is Frozen: ☐ yes ☐ no

Temp Blank Present: ☐ yes ☐ no

Optional
Proj. Due Date
Proj. Name

Person examining contents:
Date: 11-21-12
Initials: S

Temp should be above freezing to 6°C for all sample except Biota.
Biota Samples should be received ≤ 0°C.

| | | Comments: |
|---|---|---|
| Chain of Custody Present: | ☑Yes ☐No ☐N/A | 1. |
| Chain of Custody Filled Out: | ☑Yes ☐No ☐N/A | 2. |
| Chain of Custody Relinquished: | ☑Yes ☐No ☐N/A | 3. |
| Sampler Name & Signature on COC: | ☑Yes ☐No ☐N/A | 4. |
| Samples Arrived within Hold Time: | ☑Yes ☐No ☐N/A | 5. |
| **Short Hold Time Analysis (<72hr):** | ☐Yes ☑No ☐N/A | 6. |
| **Rush Turn Around Time Requested:** | ☐Yes ☑No ☐N/A | 7. |
| Sufficient Volume: | ☑Yes ☐No ☐N/A | 8. |
| Correct Containers Used: | ☑Yes ☐No ☐N/A | 9. |
| -Pace Containers Used: | ☑Yes ☐No ☐N/A | |
| Containers Intact: | ☑Yes ☐No ☐N/A | 10. |
| Filtered volume received for Dissolved tests | ☐Yes ☐No ☑N/A | 11. |
| Sample Labels match COC: -Includes date/time/ID/Analysis Matrix: S | ☑Yes ☐No ☐N/A | 12. no times on COC or Label S.B 11/21/12 |
| All containers needing preservation have been checked. | ☐Yes ☐No ☑N/A | 13. |
| All containers needing preservation are found to be in compliance with EPA recommendation. | ☐Yes ☐No ☐N/A | |
| exceptions: VOA, coliform, TOC, O&G, WI-DRO (water) | ☐Yes ☐No | Initial when completed / Lot # of added preservative |
| Samples checked for dechlorination: | ☐Yes ☐No ☑N/A | 14. |
| Headspace in VOA Vials ( >6mm): | ☐Yes ☐No ☑N/A | 15. |
| Trip Blank Present: | ☐Yes ☐No ☑N/A | 16. |
| Trip Blank Custody Seals Present | ☐Yes ☐No ☐N/A | |
| Pace Trip Blank Lot # (if purchased): | | |

**Client Notification/ Resolution:** Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

**Project Manager Review:** _____ **Date:** 11/21/12

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office ( i.e out of hold, incorrect preservative, out of temp, incorrect containers)

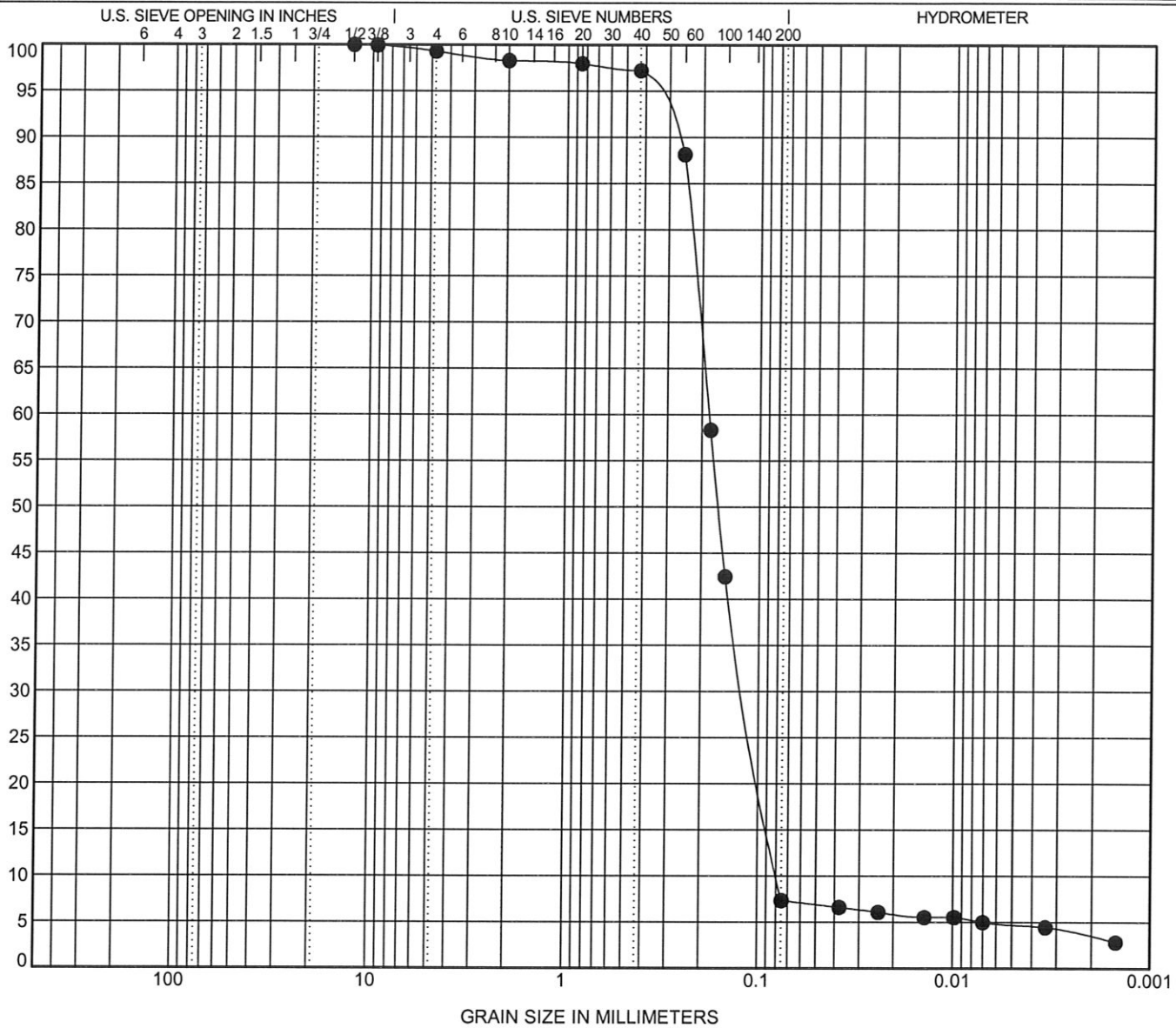
# ATTACHMENT 4
## PHYSICAL LABORATORY REPORTS

**EPC Engineering & Testing**
**Geotechnical • Environmental • Materials Engineering**
539 Garfield Avenue
Duluth, Minnesota 55802

# GRAIN SIZE DISTRIBUTION

**CLIENT** LHB Corporation **PROJECT NAME** D Dock

**PROJECT NUMBER** 12E0764 **PROJECT LOCATION** Duluth, NN




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| Specimen Identification | Classification | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|
| ● **Lab Sample # 2429** | **POORLY GRADED SAND with SILT (SP-SM)** | | | | **0.95** | **2.32** |

| D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|
| **12.5** | **0.183** | **0.117** | **0.079** | **0.7** | **92.0** | **2.6** | **4.7** |

| SIEVE | % PASS | SPEC | SIEVE | % PASS | SPEC | NOTES |
|---|---|---|---|---|---|---|
| 3" | | | #10 | 98 | | Composite sample of |
| 2" | | | #16 | | | SB-1, sample's 1, 2 & 3 |
| 1.5" | | | #20 | 98 | | (23' - 29') |
| 1" | | | #30 | | | |
| 3/4" | | | #40 | 97 | | |
| 5/8" | | | #50 | | | |
| 1/2" | 100 | | #60 | 88 | | |
| 3/8" | 100 | | #80 | 58 | | |
| #4 | 99 | | #100 | 42 | | |
| #8 | | | #200 | 7.3 | | |

GRAIN SIZE WITH SPEC BANDS 12E0764 LHB D DOCK.GPJ GINT US LAB.GDT 11/28/12

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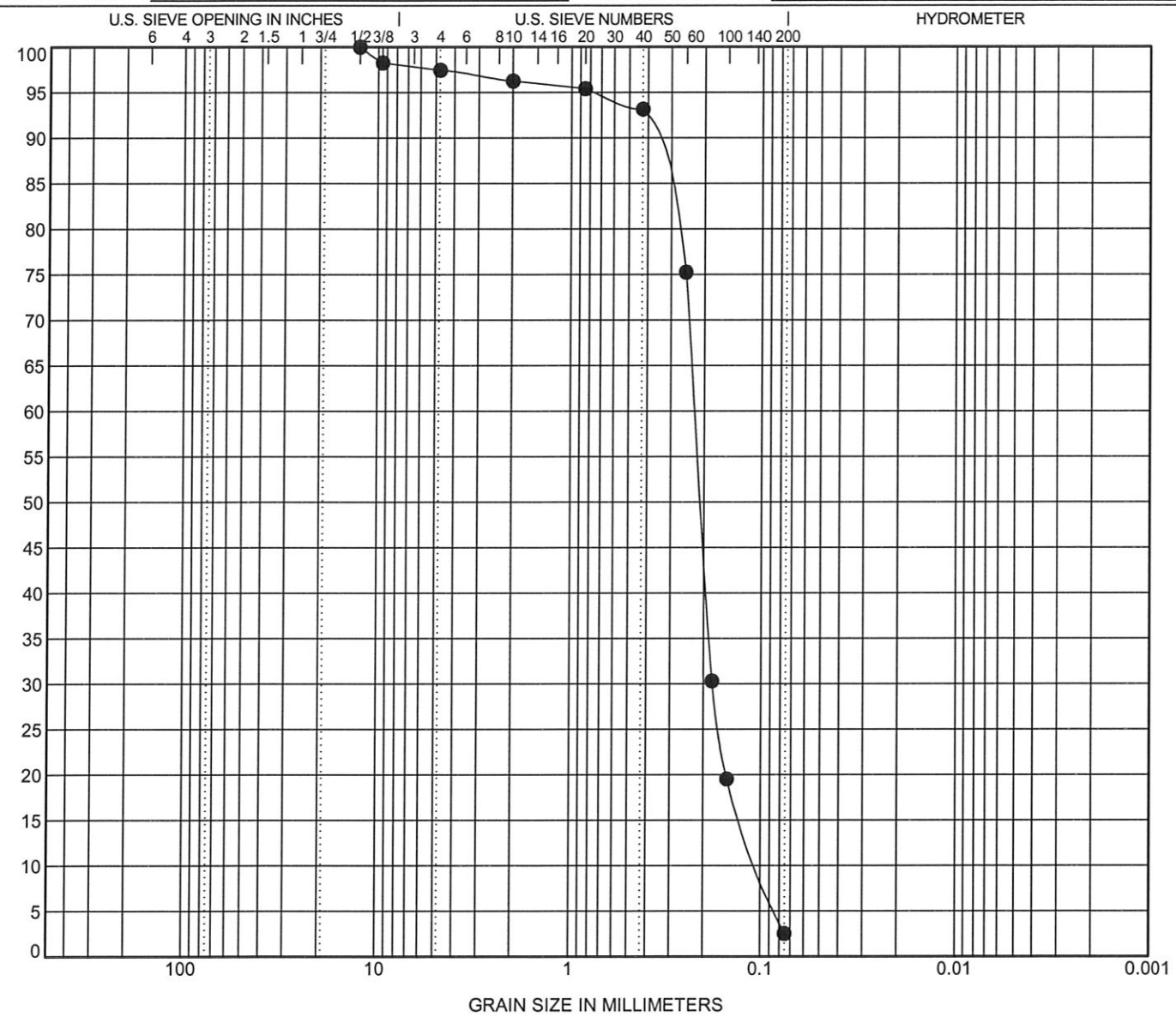
**Geotechnical • Environmental • Materials Engineering**
539 Garfield Avenue
Duluth, Minnesota 55802

# GRAIN SIZE DISTRIBUTION

**CLIENT** LHB Corporation **PROJECT NAME** D Dock

**PROJECT NUMBER** 12E0764 **PROJECT LOCATION** Duluth, NN




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| Specimen Identification | Classification | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|
| ● **Lab Sample # 2426** | **POORLY GRADED SAND(SP)** | | | | **1.41** | **2.20** |

| D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|
| **12.5** | **0.224** | **0.179** | **0.102** | **2.5** | **94.9** | **2.5** | |

| SIEVE | % PASS | SPEC | SIEVE | % PASS | SPEC | NOTES |
|---|---|---|---|---|---|---|
| 3" | | | #10 | 96 | | Sample obtained from |
| 2" | | | #16 | | | SB-1, sample #4 (29' - |
| 1.5" | | | #20 | 95 | | 31'). |
| 1" | | | #30 | | | |
| 3/4" | | | #40 | 93 | | |
| 5/8" | | | #50 | | | |
| 1/2" | 100 | | #60 | 75 | | |
| 3/8" | 98 | | #80 | 30 | | |
| #4 | 97 | | #100 | 20 | | |
| #8 | | | #200 | 2.5 | | |

GRAIN SIZE WITH SPEC BANDS 12E0764 LHB D DOCK.GPJ GINT US LAB.GDT 11/28/12

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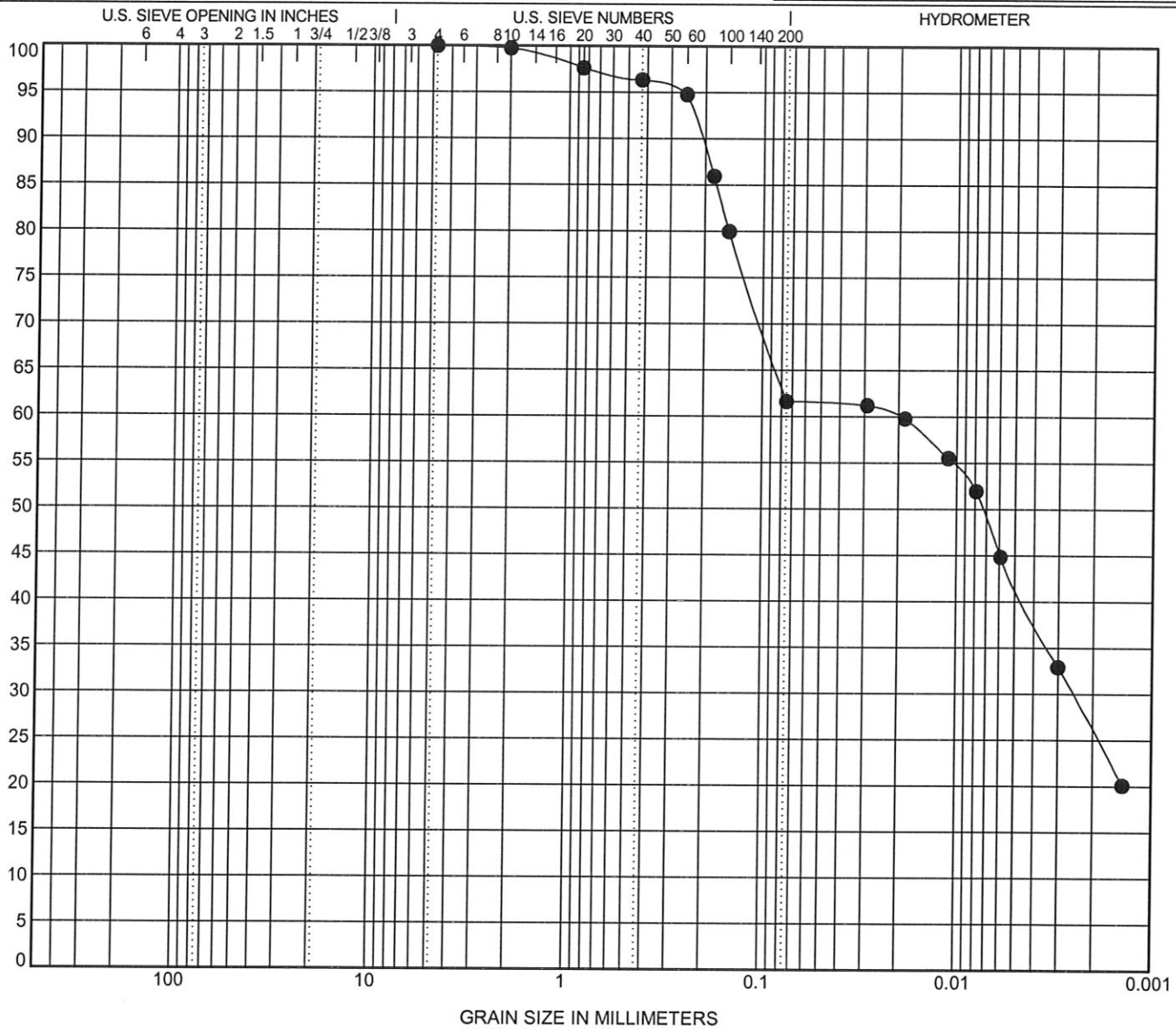
Duluth, Minnesota 55802

# GRAIN SIZE DISTRIBUTION

**CLIENT** LHB Corporation
**PROJECT NAME** D Dock
**PROJECT NUMBER** 12E0764
**PROJECT LOCATION** Duluth, NN




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| Specimen Identification | Classification | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|
| ● **Lab Sample # 2430** | **CLAY (CL-CH) and/or SILT (ML-MH)** | | | | | |

| D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|
| **4.75** | **0.02** | **0.003** | | **0.0** | **38.4** | **19.7** | **41.9** |

| SIEVE | % PASS | SPEC | SIEVE | % PASS | SPEC | NOTES |
|---|---|---|---|---|---|---|
| 3" | | | #10 | 100 | | Sample obtained from |
| 2" | | | #16 | | | SB-2, sample #1 (29.5' |
| 1.5" | | | #20 | 98 | | - 31') |
| 1" | | | #30 | | | |
| 3/4" | | | #40 | 96 | | |
| 5/8" | | | #50 | | | |
| 1/2" | | | #60 | 95 | | |
| 3/8" | | | #80 | 86 | | |
| #4 | 100 | | #100 | 80 | | |
| #8 | | | #200 | 61.6 | | |

GRAIN SIZE WITH SPEC BANDS 12E0764 LHB D DOCK.GPJ GINT US LAB.GDT 11/28/12

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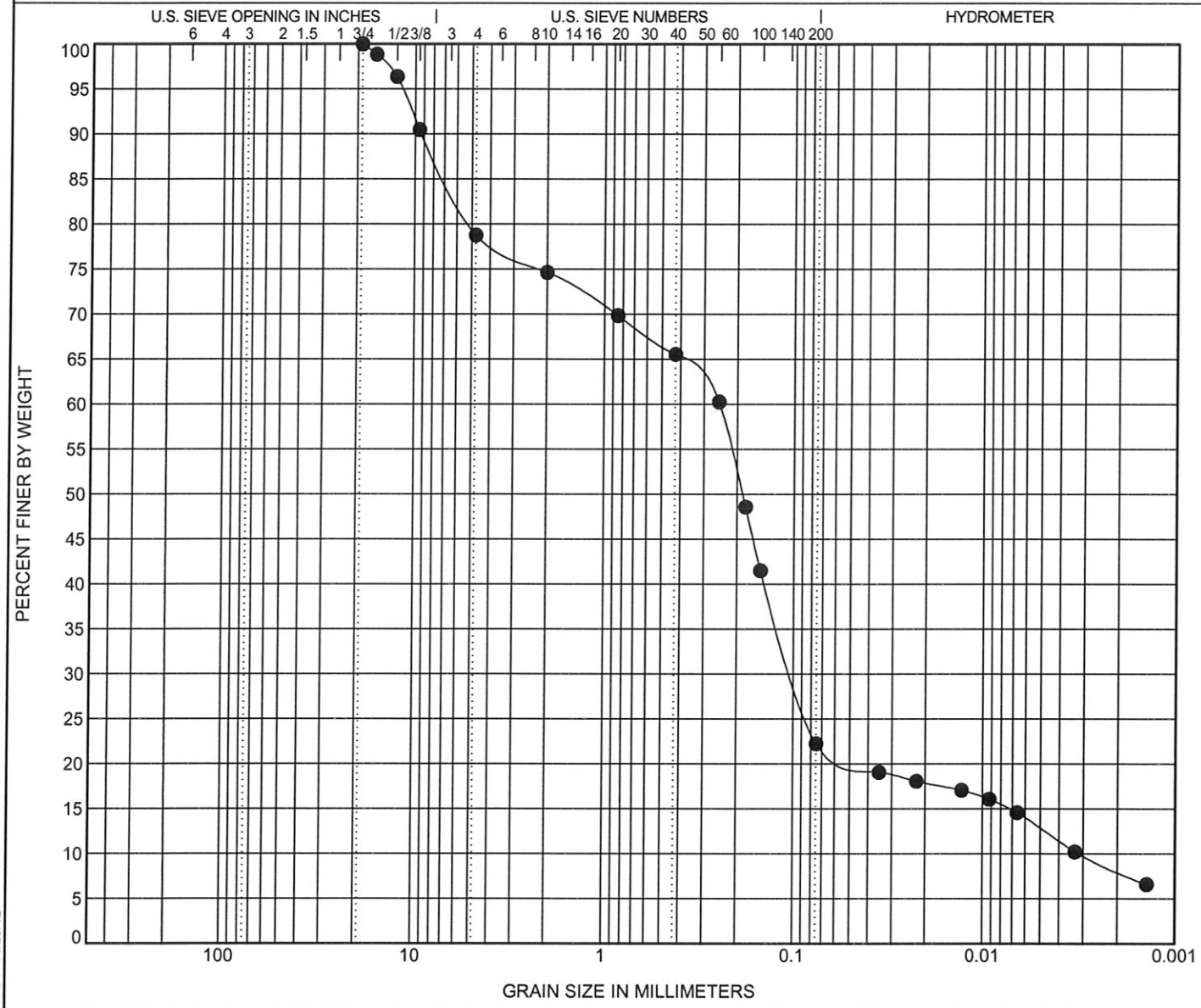
# GRAIN SIZE DISTRIBUTION

**CLIENT** LHB Corporation **PROJECT NAME** D Dock

**PROJECT NUMBER** 12E0764 **PROJECT LOCATION** Duluth, NN




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| Specimen Identification | Classification | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|
| ● **Lab Sample # 2431** | **SILTY SAND with GRAVEL (SM)** | | | | **12.65** | **79.25** |

| D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|
| **19** | **0.248** | **0.099** | **0.003** | **21.2** | **56.5** | **9.4** | **12.8** |

| SIEVE | % PASS | SPEC | SIEVE | % PASS | SPEC | NOTES |
|---|---|---|---|---|---|---|
| 3" | | | #10 | 75 | | Composite sample of |
| 2" | | | #16 | | | SB-3, samples 1 & 2 |
| 1.5" | | | #20 | 70 | | (23.5' - 28.5') |
| 1" | | | #30 | | | |
| 3/4" | 100 | | #40 | 66 | | |
| 5/8" | 99 | | #50 | | | |
| 1/2" | 96 | | #60 | 60 | | |
| 3/8" | 90 | | #80 | 49 | | |
| #4 | 79 | | #100 | 42 | | |
| #8 | | | #200 | 22.3 | | |

GRAIN SIZE WITH SPEC BANDS 12E0764 LHB D DOCK.GPJ GINT US LAB.GDT 11/29/12

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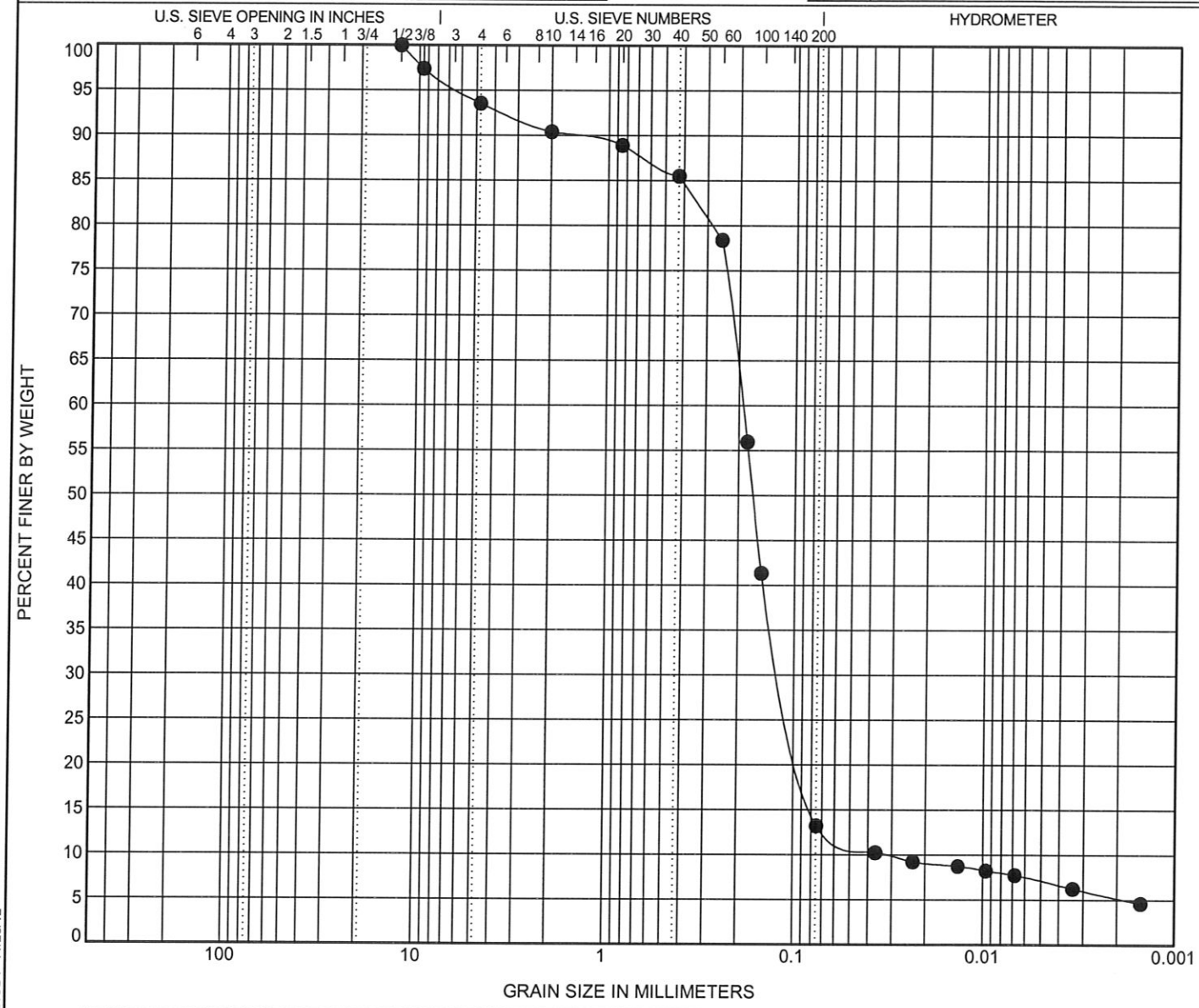
# GRAIN SIZE DISTRIBUTION

**CLIENT** LHB Corporation **PROJECT NAME** D Dock

**PROJECT NUMBER** 12E0764 **PROJECT LOCATION** Duluth, NN




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| Specimen Identification | Classification | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|
| ● **Lab Sample # 2427** | **SILTY SAND (SM)** | | | | **2.06** | **5.84** |

| D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|
| **12.5** | **0.191** | **0.113** | **0.033** | **6.4** | **80.3** | **6.1** | **7.1** |

| SIEVE | % PASS | SPEC | SIEVE | % PASS | SPEC | NOTES |
|---|---|---|---|---|---|---|
| 3" | | | #10 | 90 | | Sample obtained from |
| 2" | | | #16 | | | SB-3 , sample #3 (28.5' |
| 1.5" | | | #20 | 89 | | - 30') |
| 1" | | | #30 | | | |
| 3/4" | | | #40 | 86 | | |
| 5/8" | | | #50 | | | |
| 1/2" | 100 | | #60 | 78 | | |
| 3/8" | 97 | | #80 | 56 | | |
| #4 | 94 | | #100 | 41 | | |
| #8 | | | #200 | 13.2 | | |

GRAIN SIZE WITH SPEC BANDS 12E0764 LHB D DOCK.GPJ GINT US LAB.GDT 11/28/12

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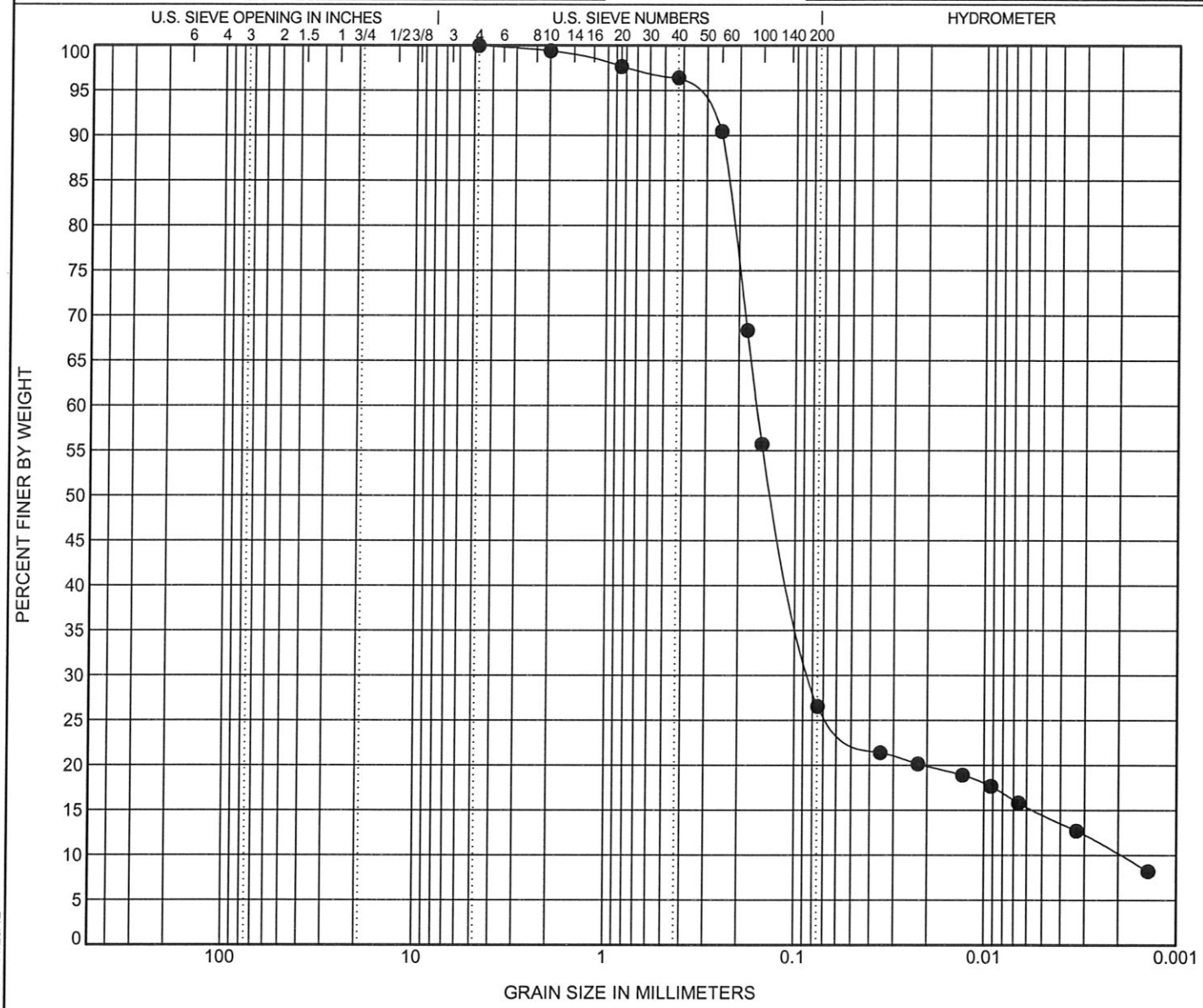
# GRAIN SIZE DISTRIBUTION

**CLIENT** LHB Corporation **PROJECT NAME** D Dock

**PROJECT NUMBER** 12E0764 **PROJECT LOCATION** Duluth, NN




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| Specimen Identification | Classification | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|
| ● **Lab Sample # 2432** | **SILTY SAND (SM)** | | | | **21.13** | **81.19** |

| D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|
| **4.75** | **0.16** | **0.081** | **0.002** | **0.0** | **73.4** | **12.0** | **14.6** |

| SIEVE | % PASS | SPEC | SIEVE | % PASS | SPEC | NOTES |
|---|---|---|---|---|---|---|
| 3" | | | #10 | 99 | | Composite sample of |
| 2" | | | #16 | | | SB-4, samples 1, 2 & 3 |
| 1.5" | | | #20 | 98 | | (21' - 26.5) |
| 1" | | | #30 | | | |
| 3/4" | | | #40 | 96 | | |
| 5/8" | | | #50 | | | |
| 1/2" | | | #60 | 90 | | |
| 3/8" | | | #80 | 68 | | |
| #4 | 100 | | #100 | 56 | | |
| #8 | | | #200 | 26.6 | | |

GRAIN SIZE WITH SPEC BANDS 12E0764 LHB D DOCK.GPJ GINT US LAB.GDT 11/28/12

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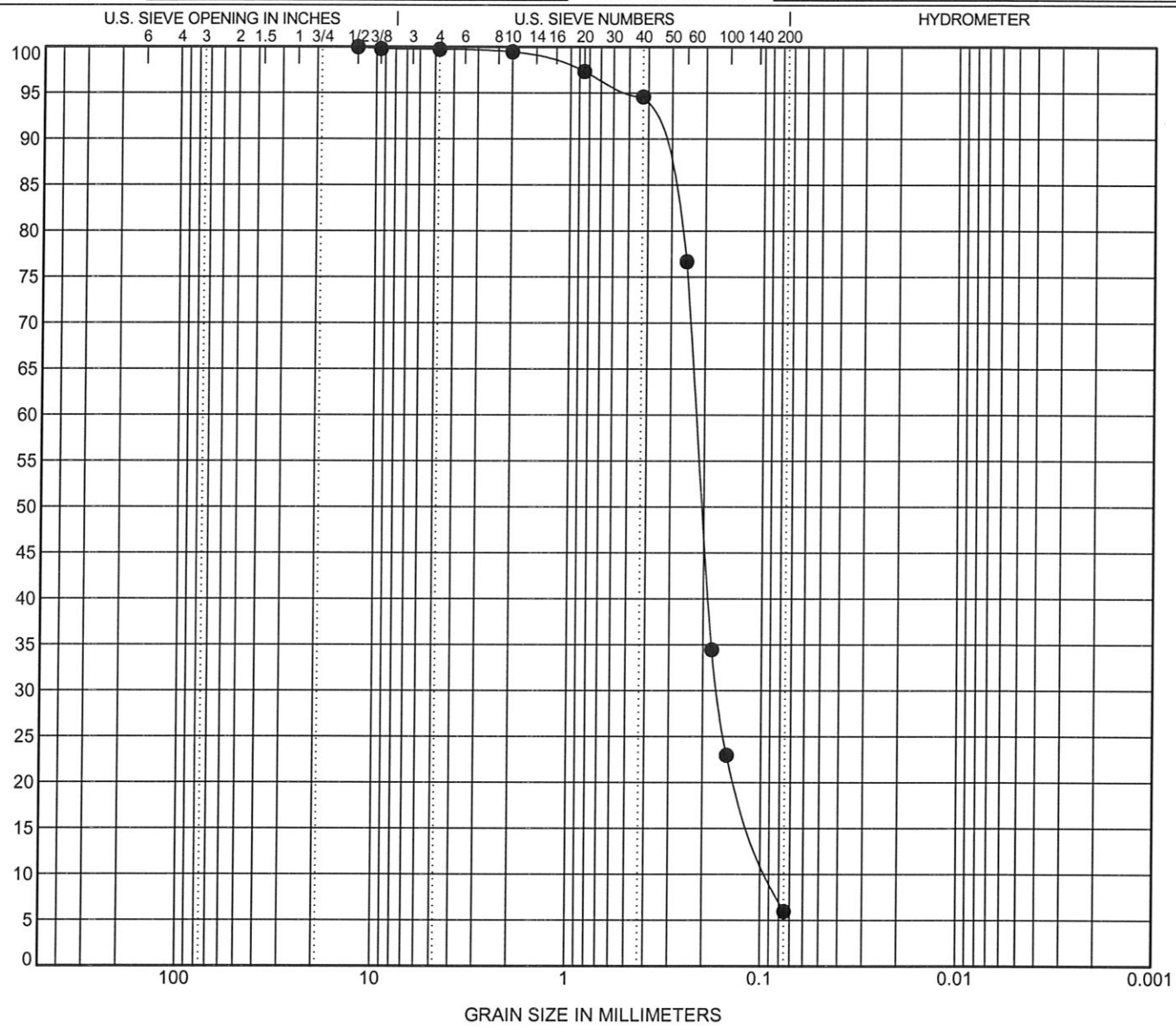
Duluth, Minnesota 55802

# GRAIN SIZE DISTRIBUTION

**CLIENT** LHB Corporation **PROJECT NAME** D Dock

**PROJECT NUMBER** 12E0764 **PROJECT LOCATION** Duluth, NN




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| Specimen Identification | Classification | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|
| ● **Lab Sample # 2428** | **POORLY GRADED SAND w/SILT (SP-SM)** | | | | **1.45** | **2.48** |

| D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|
| **12.5** | **0.22** | **0.168** | **0.088** | **0.2** | **93.8** | **6.0** | |

| SIEVE | % PASS | SPEC | SIEVE | % PASS | SPEC | NOTES |
|---|---|---|---|---|---|---|
| 3" | | | #10 | 99 | | Composite sample of |
| 2" | | | #16 | | | SB-4, samples 4 & 5 |
| 1.5" | | | #20 | 97 | | (26.5' - 30'). |
| 1" | | | #30 | | | |
| 3/4" | | | #40 | 95 | | |
| 5/8" | | | #50 | | | |
| 1/2" | 100 | | #60 | 77 | | |
| 3/8" | 100 | | #80 | 34 | | |
| #4 | 100 | | #100 | 23 | | |
| #8 | | | #200 | 6.0 | | |

GRAIN SIZE WITH SPEC BANDS 12E0764 LHB D DOCK.GPJ GINT US LAB.GDT 11/28/12

**EPC Engineering & Testing**
**Geotechnical • Environmental • Materials Engineering**
539 Garfield Avenue (218) 727-1239
Duluth, Minnesota 55802 (218) 727-1248 fax

October 22, 2013
EPC # 13E0837

Mr. Joe Litman, P.E.
LHB Corp.
21 West Superior St., Suite 500
Duluth, MN 55802

Re: Additional Sediment Sampling (2013)
Proposed Dredging Project
Duluth Seaway Port Authority, D Dock
Duluth, Minnesota

Dear Mr. Litman,

EPC Engineering & Testing (EPC) was contracted to perform additional sediment sampling in an area proposed for dredging for the above-referenced facility. It is our understanding that the results of the sampling will be used to assist in obtaining a dredging permit and in determining the end use of the dredged material. The following summarizes the methods and results of the sediment sampling.

**Methods**

On September 30 and October 1, 2013, EPC performed four (4) sediment cores in the vicinity of the D Dock, including the slip and channel sides of the dock, in Duluth, Minnesota. The cores were accomplished using a split spoon sampler (3-inch diameter) using EPC's CME 55 truck mounted drill rig off a barge. The sample locations were selected in the areas proposed for dredging and are shown in Attachment 1 to this letter report. Sediment samples SB-13-07 and SB-13-08 (channel side) were completed to approximately 12.5 ft and 17.5 ft below the sediment line, respectively, to adequately get below the proposed dredge elevation 572. Sediment samples SB-13-05 and SB-13-06 (slip side) were completed to approximately 17.5 ft and 23.0 ft., respectively, below the sediment line to adequately get below the proposed dredge elevation 572.

Sediment samples were retrieved and logged in accordance with Minnesota Dregde guidelines. Copies of the core logs are included in Attachment 2. Laboratory analytical samples were selected from the sediment samples based on changes in material types or depth, and submitted under proper chain of custody procedures to Pace Analytical in Green Bay, Wisconsin. The Sediment Summary Table, included in Attachment 2, shows the analyses performed in each sediment core by sediment depth / layer. A total of eleven (11) composite samples were taken and eight (8) were analyzed for: MN Landfill metals, Phosphorus, Nitrate-Nitrite, Ammonia Nitrite, Total Kjedahl nitrogen, Total Organic Carbon, PCBs and PAHs/PNAs. In addition, 11 gradations (passing the #200 sieve) and eight (8) hydrometer sieve analyses were performed on the composite samples from the four sediment cores to determine the amount of fines present and to assist in classifying soils according to the ASTM.

## Results

As mentioned above, logs depicting the graphical results of each sediment sample were developed and are included in Attachment 2, along with additional details on the sediment samples and their associated analyses. The samples generally consisted of Silty Sand soils.

Analytical laboratory results indicated the presence of low level RCRA metals in each of the samples tested. All detected heavy metal levels were below the MPCA Tier 1 Residential Soil Reference Values (SRV). No PCB compounds were detected in any of the samples tested. Each of the samples tested indicated the presence of several low level PAHs. All the detections were below the MPCA Tier 1 SRVs, except for the Benzo(a)pyrene Equivalent (BaP) in the sample from slip boring SB-13-05 (26-31ft). Analytical laboratory reports are included in Attachment 3.

Results of the Gradation and Hydrometer Sieve analyses were used to assist in classifying the following soil types in the four sediment cores: POORLY GRADED SAND with SILTY CLAY (SP-SC), POORLY GRADED SAND(SP), POORLY GRADED GRAVEL with SILTY CLAY GP-GC), SILTY SAND(SM), POORLY GRADED GRAVEL with SAND (GP), and SILTY CLAYEY SAND (SC-SM). Gradation and Hydrometer gradation reports are included in Attachment 4.

## Conclusions

Results of the sediment samples taken in the project area generally indicated the presence of Silty Sandy soils. Only slip boring sample SB-13-05(26-31) detected a BaP equivalent that exceeds the MPCA Tier 1 SRV. None of the other PAHs or metals detected exceed the MPCA Tier 1 SRV. Hydrometer sieve analyses were performed to provide insight into the amounts of silt and clay in each of the main soil layers encountered. The following silt and clay percentages were determined for each of the respective identified soil types: POORLY GRADED SAND with SILTY CLAY (SP-SC)[19.9%], POORLY GRADED SAND(SP)[8.5%], POORLY GRADED GRAVEL with SILTY CLAY GP-GC))[11.2%], SILTY SAND(SM)[32.7-33.1%], POORLY GRADED GRAVEL with SAND (GP)[3.3%], and SILTY CLAYEY SAND (SC-SM)[12.5-15.0%].

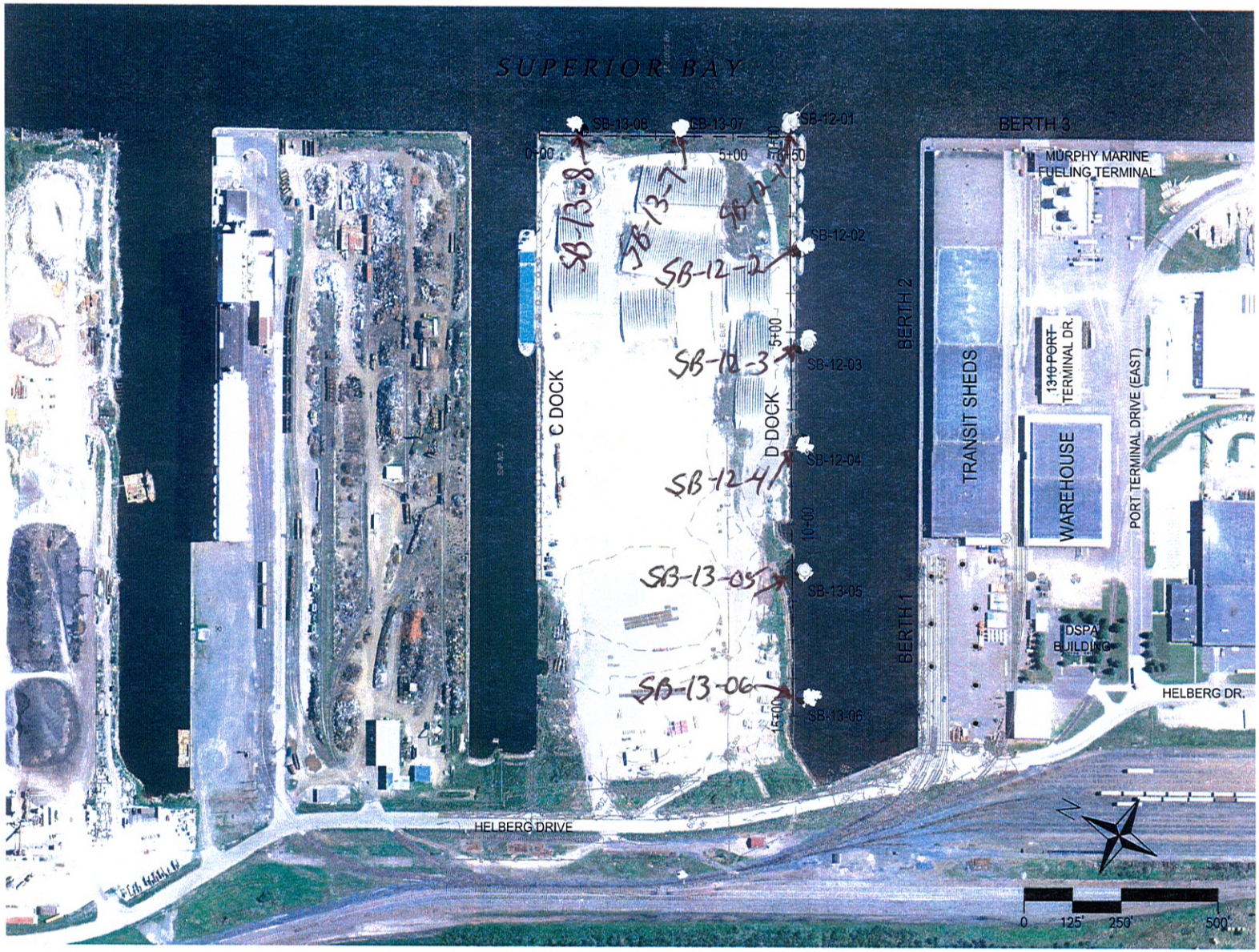
If you have any questions, please contact me at (218) 727-1239.

Sincerely,
**EPC Engineering & Testing**

Brian E. McVean, P.E.

Enclosures: Attachment 1 – Sediment Core Sample Location Map
Attachment 2 – Core Sample Logs and Summary Table
Attachment 3 – Analytical Laboratory Reports
Attachment 4 – Physical Laboratory Reports

# ATTACHMENT 1
## SEDIMENT CORE SAMPLE LOCATION MAP




LHB
PERFORMANCE DRIVEN DESIGN.
LHBcorp.com
21 W. Superior St., Ste. 500 | Duluth, MN 55802 | 218.727.8446

CLIENT:
Duluth Seaway Port Authority (DSPA)

1200 Port Terminal Drive
Duluth, MN 55802



| NO | DATE | REVISION |
|---|---|---|

PROJECT NAME:
C AND D DOCK IMPROVEMENTS

DRAWING TITLE:
SEDIMENT CORE LOCATIONS

FILE: ..\110493\600 Drawings\Base\110493 Borings Exhi
DRAWN BY: PAB
CHECKED BY: BPS
PROJ. NO: 110493
DRAWING NO:

EXHIBIT

# ATTACHMENT 2
## CORE SAMPLE LOGS AND SUMMARY TABLE

## SEDIMENT SUMMARY TABLE

**D Dock Duluth, Minnesota**

**October, 2013**

| Sediment Core | Water Column (ft) | **Begin Layer Depth / Thickness (ft)** | ASTM Class. | Analyses |
|---|---|---|---|---|
| SB-13-05 | 13.5 | --- | --- | --- |
| | | 13.5 / 4.5 | GP-GC | E, G, H |
| | | 18.0 / 8.0 | SM | E, G, H |
| | | 26.0 / 5.0 | SC-SM | E, G, H |
| | | | | |
| SB-13-06 | 7.5 | --- | --- | --- |
| | | 7.5 / 5.0 | GP | E, G, H |
| | | 12.5 / 5.0 | SP - SC | E, G, H |
| | | 17.5 / 5.0 | SM | E, G, H |
| | | 24.0 / 6.5 | SP | G |
| | | | | |
| SB-13-07 | 19.0 | --- | --- | --- |
| | | 19.0 / 2.5 | SC - SM | E, G, H |
| | | 21.5 / 10.0 | SP | G |
| | | | | |
| SB-13-08 | 21.0 | --- | --- | --- |
| | | 14.5 / 2.5 | SP - SC | E, G, H |
| | | 17.0 / 15.0 | SP | G |

ASTM Classifications =>

SP-SC = POORLY GRADED SAND with SILTY CLAY, SP = POORLY GRADED SAND,
GP-GC = POORLY GRADED GRAVEL with SILTY CLAY, SM = SILTY SAND,
GP = POORLY GRADED GRAVEL with SAND, SC-SM = SILTY CLAYEY SAND

Analyses Codes =>

E = MN LF metals, Phosphorus, Nitrate-Nitrite, Ammonia Nitrogen, TKN, PCBs, PAHs, TOC
G = mechanical gradation % passing #200 sieve
H = hydrometer gradation

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Duluth, Minnesota 55802

# BORING NUMBER SB-13-05



**CLIENT** LHB
**PROJECT NAME** D Dock
**PROJECT NUMBER** 13M0937
**PROJECT LOCATION** St. Louis Bay
**DATE STARTED** 10/1/13 **COMPLETED** 10/1/13
**GROUND ELEVATION** 601 ft **HOLE SIZE** 7-Inch
**DRILLING CONTRACTOR** EPC Engineering & Testing
**GROUND WATER LEVELS:**
**DRILLING METHOD** CME 55 Truck Rig with HSA Cal. to N68
▽ **AT TIME OF DRILLING** 0.0 ft / Elev 601.0 ft
**LOGGED BY** BEM **CHECKED BY** GH
**AT END OF DRILLING** ---
**NOTES** Station 11+25, 30 - feet off dock
**AFTER DRILLING** ---

| ELEVATION (ft) | DEPTH (ft) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE NUMBER | RECOVERY % (RQD) | BLOW COUNTS (N VALUE) | POCKET PENETROMETER (tsf) | DRY UNIT WT. (pcf) |
|---|---|---|---|---|---|---|---|---|
| 600 | 0 | | Water. | | | | | |
| | 5 | | | | | | | |
| 595 | | | | | | | | |
| | 10 | | | | | | | |
| 590 | | | | | | | | |
| | 15 | | POORLY GRADED GRAVEL (Brick) w/ SILTY CLAY and SAND and Organic Fines (GP-GC) Black to brown, water bearing. | SS 1 | 40 | | | |
| 585 | | | | SS 2 | 100 | | | |
| | 20 | | SILTY SAND (SM) with Organic Fines (SM) Brown to black, wet, little gravel, trace clay. | SS 3 | 100 | | | |
| 580 | | | | SS 4 | 100 | | | |
| | | | | SS 5 | 100 | | | |
| | 25 | | | SS 6 | 100 | | | |
| 575 | | | SILTY CLAYEY SAND with Organic Fines (SC-SM) Brown, water bearing, trace gravel and clay. | SS 7 | 70 | | | |
| | 30 | | | SS 8 | 70 | | | |
| 570 | | | Bottom of hole at 31.0 feet. | | | | | |

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

1.2
32.7
15.0

GEOTECH BH PLOTS 13M0837 LHB D DOCK.GPJ GINT US LAB.GDT 10/17/13

**EPC Engineering & Testing**
**Geotechnical • Environmental • Materials Engineering**
539 Garfield Avenue
Duluth, Minnesota 55802

# BORING NUMBER SB-13-06



**CLIENT** LHB
**PROJECT NAME** D Dock
**PROJECT NUMBER** 13M0937
**PROJECT LOCATION** St. Louis Bay
**DATE STARTED** 9/30/13 **COMPLETED** 9/30/13
**GROUND ELEVATION** 601 ft **HOLE SIZE** 7-Inch
**DRILLING CONTRACTOR** EPC Engineering & Testing
**GROUND WATER LEVELS:**
**DRILLING METHOD** CME 55 Truck Rig with HSA Cal. to N68
**AT TIME OF DRILLING** 0.0 ft / Elev 601.0 ft
**LOGGED BY** BEM **CHECKED BY** GH
**AT END OF DRILLING** ---
**NOTES** Station 14+30, 30 - feet off dock
**AFTER DRILLING** —

| ELEVATION (ft) | DEPTH (ft) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE NUMBER | RECOVERY % (RQD) | BLOW COUNTS (N VALUE) | POCKET PENETROMETER (tsf) | DRY UNIT WT. (pcf) | ▲ SPT N VALUE ▲ 20 40 60 80 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80 |
|---|---|---|---|---|---|---|---|---|---|
| 600 | 0 | | Water. | | | | | | |
| | 5 | | | | | | | | |
| 595 | | | POORLY GRADED GRAVEL (Brick) w/SAND (GP) Black to brown, water bearing, trace shells. | SS 1 | 40 | | | | |
| | 10 | | | SS 2 | 40 | | | | 3.4 |
| 590 | | | POORLY GRADED SAND w/SILTY CLAY and Organic Fines (SP-SC) Black to brown, trace gravel. | SS 3 | 100 | | | | |
| | 15 | | | SS 4 | 50 | | | | 10.4 |
| 585 | | | SILTY SAND with Organic Fines (SM) Brown, water bearing, trace clay. | SS 5 | 100 | | | | |
| | 20 | | | SS 6 | 100 | | | | |
| 580 | | | | SS 7 | 100 | | | | 33.1 |
| | 25 | | POORLY GRADED SAND (SP) Brown, fine grained, water bearing, trace organics. | SS 8 | 100 | | | | |
| 575 | | | | | | | | | 2.5 |
| | 30 | | | SS 9 | 100 | | | | |
| | | | Bottom of hole at 30.5 feet. | | | | | | |

GEOTECH BH PLOTS 13M0837 LHB D DOCK.GPJ GINT US LAB.GDT 10/17/13

**EPC Engineering & Testing**
**Geotechnical • Environmental • Materials Engineering**
539 Garfield Avenue
Duluth, Minnesota 55802

# BORING NUMBER SB-13-07



**CLIENT** LHB
**PROJECT NAME** D Dock
**PROJECT NUMBER** 13M0937
**PROJECT LOCATION** St. Louis Bay
**DATE STARTED** 10/1/13 **COMPLETED** 10/1/13
**GROUND ELEVATION** 601 ft **HOLE SIZE** 7-Inch
**DRILLING CONTRACTOR** EPC Engineering & Testing
**GROUND WATER LEVELS:**
**DRILLING METHOD** CME 55 Truck Rig with HSA Cal. to N68
▽ **AT TIME OF DRILLING** 0.0 ft / Elev 601.0 ft
**LOGGED BY** BEM **CHECKED BY** GH
**AT END OF DRILLING** ---
**NOTES** 10-feet off dock.
**AFTER DRILLING** ---

| ELEVATION (ft) | DEPTH (ft) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE NUMBER | RECOVERY % (RQD) | BLOW COUNTS (N VALUE) | POCKET PENETROMETER (tsf) | DRY UNIT WT. (pcf) | ▲ SPT N VALUE ▲ 20 40 60 80 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80 |
|---|---|---|---|---|---|---|---|---|---|
| 600 | 0 | ▽ | Water. | | | | | | |
| | 5 | | | | | | | | |
| 595 | | | | | | | | | |
| | 10 | | | | | | | | |
| 590 | | | | | | | | | |
| | 15 | | | | | | | | |
| 585 | | | | | | | | | |
| | 20 | | SILTY CLAYEY SAND w/Organic Fines (SC-SM) Brown, fine grained, trace to little shells, trace clay, water bearing. | SS 1 | 100 | | | | 12.4 |
| 580 | | | POORLY GRADED SAND (SP) Brown, fine grained, water bearing, trace shells and gravel. | SS 2 | 100 | | | | |
| | 25 | | | SS 3 | 100 | | | | |
| 575 | | | | SS 4 | 100 | | | | 3.3 |
| | 30 | | | SS 5 | 100 | | | | |
| 570 | | | Bottom of hole at 31.5 feet. | | | | | | |

GEOTECH BH PLOTS 13M0837 LHB D DOCK.GPJ GINT US LAB.GDT 10/17/13

**EPC Engineering & Testing**
**Geotechnical • Environmental • Materials Engineering**
539 Garfield Avenue
Duluth, Minnesota 55802

# BORING NUMBER SB-13-08



**CLIENT** LHB
**PROJECT NAME** D Dock
**PROJECT NUMBER** 13M0937
**PROJECT LOCATION** St. Louis Bay
**DATE STARTED** 10/1/13 **COMPLETED** 10/1/13
**GROUND ELEVATION** 601 ft **HOLE SIZE** 7-Inch
**DRILLING CONTRACTOR** EPC Engineering & Testing
**GROUND WATER LEVELS:**
**DRILLING METHOD** CME 55 Truck Rig with HSA Cal. to N68
▽ **AT TIME OF DRILLING** 0.0 ft / Elev 601.0 ft
**LOGGED BY** BEM **CHECKED BY** GH
**AT END OF DRILLING** ---
**NOTES** 8-feet off dock wall.
**AFTER DRILLING** ---

| ELEVATION (ft) | DEPTH (ft) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE NUMBER | RECOVERY % (RQD) | BLOW COUNTS (N VALUE) | POCKET PENETROMETER (tsf) | DRY UNIT WT. (pcf) |
|---|---|---|---|---|---|---|---|---|
| 600 | 0 | | Water. | | | | | |
| | 5 | | | | | | | |
| 595 | | | | | | | | |
| | 10 | | | | | | | |
| 590 | | | | | | | | |
| | 15 | | POORLY GRADED SAND w/SILTY CLAY and Organic Fines (SP-SC) Brown, fine to medium grained, water bearing, trace gravel. | SS 1 | 100 | | | |
| 585 | | | POORLY GRADED SAND (SP) Brown, fine grained, water bearing. | SS 2 | 100 | | | |
| | 20 | | | SS 3 | 100 | | | |
| 580 | | | | SS 4 | 100 | | | |
| | 25 | | Trace organics at 24-feet. | SS 5 | 100 | | | |
| 575 | | | | SS 6 | 100 | | | |
| | 30 | | | SS 7 | 100 | | | |
| 570 | | | Bottom of hole at 32.0 feet. | | | | | |

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

9.5
2.7

GEOTECH BH PLOTS 13M0837 LHB D DOCK.GPJ GINT US LAB.GDT 10/17/13

# ATTACHMENT 3
## ANALYTICAL LABORATORY REPORTS

Pace Analytical®
www.pacelabs.com

**Pace Analytical Services, Inc.**
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

October 17, 2013

Brian McVean
ENGINEERING PARTNERS CO.
539 Garfield Avenue
Duluth, MN 55802

RE: Project: D DOCK
Pace Project No.: 4086098

Dear Brian McVean:
Enclosed are the analytical results for sample(s) received by the laboratory on October 04, 2013. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Brian Basten for
Steven Mleczko
steve.mleczko@pacelabs.com
Project Manager

Enclosures

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

## CERTIFICATIONS

Project: D DOCK
Pace Project No.: 4086098

**Green Bay Certification IDs**
1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 11888
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
US Dept of Agriculture #: S-76505
Wisconsin Certification #: 405132750

## REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

## SAMPLE SUMMARY

Project: D DOCK
Pace Project No.: 4086098

| Lab ID | Sample ID | Matrix | Date Collected | Date Received |
|---|---|---|---|---|
| 4086098001 | SB-5-13 (13.5-18) | Solid | 10/01/13 00:00 | 10/04/13 09:10 |
| 4086098002 | SB-5-13 (18-26) | Solid | 10/01/13 00:00 | 10/04/13 09:10 |
| 4086098003 | SB-5-13 (26-31) | Solid | 10/01/13 00:00 | 10/04/13 09:10 |
| 4086098004 | SB-6-13 (7-12.5) | Solid | 09/30/13 00:00 | 10/04/13 09:10 |
| 4086098005 | SB-6-13 (12.5-17.5) | Solid | 09/30/13 00:00 | 10/04/13 09:10 |
| 4086098006 | SB-6-13 (17.5-22.5) | Solid | 09/30/13 00:00 | 10/04/13 09:10 |
| 4086098007 | SB-6-13 (24-30.5) | Solid | 09/30/13 00:00 | 10/04/13 09:10 |
| 4086098008 | SB-7-13 (19-21.5) | Solid | 10/02/13 00:00 | 10/04/13 09:10 |
| 4086098009 | SB-7-13 (21.5-31.5) | Solid | 10/02/13 00:00 | 10/04/13 09:10 |
| 4086098010 | SB-8-13 (14.5-17) | Solid | 10/02/13 00:00 | 10/04/13 09:10 |
| 4086098011 | SB-8-13 (17-32) | Solid | 10/02/13 00:00 | 10/04/13 09:10 |

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## SAMPLE ANALYTE COUNT

Project: D DOCK
Pace Project No.: 4086098

| Lab ID | Sample ID | Method | Analysts | Analytes Reported | Laboratory |
|---|---|---|---|---|---|
| 4086098001 | SB-5-13 (13.5-18) | EPA 8082 | BDS | 10 | PASI-G |
| | | EPA 6010 | DLB | 8 | PASI-G |
| | | EPA 7471 | CMS | 1 | PASI-G |
| | | EPA 8270 by SIM | ARO | 18 | PASI-G |
| | | ASTM D2974-87 | SKW | 1 | PASI-G |
| | | EPA 300.0 | JCJ | 3 | PASI-G |
| | | EPA 350.1 | HMB | 1 | PASI-G |
| | | EPA 351.2 | HMB | 1 | PASI-G |
| | | EPA 365.4 | DAW | 1 | PASI-G |
| | | EPA 9060 Modified | TJJ | 4 | PASI-G |
| 4086098002 | SB-5-13 (18-26) | EPA 8082 | BDS | 10 | PASI-G |
| | | EPA 6010 | DLB | 8 | PASI-G |
| | | EPA 7471 | CMS | 1 | PASI-G |
| | | EPA 8270 by SIM | ARO | 18 | PASI-G |
| | | ASTM D2974-87 | SKW | 1 | PASI-G |
| | | EPA 300.0 | JCJ | 3 | PASI-G |
| | | EPA 350.1 | HMB | 1 | PASI-G |
| | | EPA 351.2 | HMB | 1 | PASI-G |
| | | EPA 365.4 | DAW | 1 | PASI-G |
| | | EPA 9060 Modified | TJJ | 4 | PASI-G |
| 4086098003 | SB-5-13 (26-31) | EPA 8082 | BDS | 10 | PASI-G |
| | | EPA 6010 | DLB | 8 | PASI-G |
| | | EPA 7471 | CMS | 1 | PASI-G |
| | | EPA 8270 by SIM | ARO | 18 | PASI-G |
| | | ASTM D2974-87 | SKW | 1 | PASI-G |
| | | EPA 300.0 | JCJ | 3 | PASI-G |
| | | EPA 350.1 | HMB | 1 | PASI-G |
| | | EPA 351.2 | HMB | 1 | PASI-G |
| | | EPA 365.4 | DAW | 1 | PASI-G |
| | | EPA 9060 Modified | TJJ | 4 | PASI-G |
| 4086098004 | SB-6-13 (7-12.5) | EPA 8082 | BDS | 10 | PASI-G |
| | | EPA 6010 | DLB | 8 | PASI-G |
| | | EPA 7471 | CMS | 1 | PASI-G |
| | | EPA 8270 by SIM | ARO | 18 | PASI-G |
| | | ASTM D2974-87 | SKW | 1 | PASI-G |
| | | EPA 300.0 | JCJ | 3 | PASI-G |
| | | EPA 350.1 | HMB | 1 | PASI-G |

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## SAMPLE ANALYTE COUNT

Project: D DOCK
Pace Project No.: 4086098

| Lab ID | Sample ID | Method | Analysts | Analytes Reported | Laboratory |
|---|---|---|---|---|---|
| | | EPA 351.2 | HMB | 1 | PASI-G |
| | | EPA 365.4 | DAW | 1 | PASI-G |
| | | EPA 9060 Modified | TJJ | 4 | PASI-G |
| **4086098005** | **SB-6-13 (12.5-17.5)** | EPA 8082 | BDS | 10 | PASI-G |
| | | EPA 6010 | DLB | 8 | PASI-G |
| | | EPA 7471 | CMS | 1 | PASI-G |
| | | EPA 8270 by SIM | ARO | 18 | PASI-G |
| | | ASTM D2974-87 | SKW | 1 | PASI-G |
| | | EPA 300.0 | JCJ | 3 | PASI-G |
| | | EPA 350.1 | HMB | 1 | PASI-G |
| | | EPA 351.2 | HMB | 1 | PASI-G |
| | | EPA 365.4 | DAW | 1 | PASI-G |
| | | EPA 9060 Modified | TJJ | 4 | PASI-G |
| **4086098006** | **SB-6-13 (17.5-22.5)** | EPA 8082 | BDS | 10 | PASI-G |
| | | EPA 6010 | DLB | 8 | PASI-G |
| | | EPA 7471 | CMS | 1 | PASI-G |
| | | EPA 8270 by SIM | ARO | 18 | PASI-G |
| | | ASTM D2974-87 | SKW | 1 | PASI-G |
| | | EPA 300.0 | JCJ | 3 | PASI-G |
| | | EPA 350.1 | HMB | 1 | PASI-G |
| | | EPA 351.2 | HMB | 1 | PASI-G |
| | | EPA 365.4 | DAW | 1 | PASI-G |
| | | EPA 9060 Modified | TJJ | 4 | PASI-G |
| **4086098007** | **SB-6-13 (24-30.5)** | ASTM D2974-87 | SKW | 1 | PASI-G |
| **4086098008** | **SB-7-13 (19-21.5)** | EPA 8082 | BDS | 10 | PASI-G |
| | | EPA 6010 | DLB | 8 | PASI-G |
| | | EPA 7471 | CMS | 1 | PASI-G |
| | | EPA 8270 by SIM | ARO | 18 | PASI-G |
| | | ASTM D2974-87 | SKW | 1 | PASI-G |
| | | EPA 300.0 | JCJ | 3 | PASI-G |
| | | EPA 350.1 | HMB | 1 | PASI-G |
| | | EPA 351.2 | HMB | 1 | PASI-G |
| | | EPA 365.4 | DAW | 1 | PASI-G |
| | | EPA 9060 Modified | TJJ | 4 | PASI-G |
| **4086098009** | **SB-7-13 (21.5-31.5)** | ASTM D2974-87 | SKW | 1 | PASI-G |
| **4086098010** | **SB-8-13 (14.5-17)** | EPA 8082 | BDS | 10 | PASI-G |
| | | EPA 6010 | DLB | 8 | PASI-G |

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(920)469-2436

## SAMPLE ANALYTE COUNT

Project: D DOCK
Pace Project No.: 4086098

| Lab ID | Sample ID | Method | Analysts | Analytes Reported | Laboratory |
|---|---|---|---|---|---|
| | | EPA 7471 | CMS | 1 | PASI-G |
| | | EPA 8270 by SIM | ARO | 18 | PASI-G |
| | | ASTM D2974-87 | SKW | 1 | PASI-G |
| | | EPA 300.0 | JCJ | 3 | PASI-G |
| | | EPA 350.1 | HMB | 1 | PASI-G |
| | | EPA 351.2 | HMB | 1 | PASI-G |
| | | EPA 365.4 | DAW | 1 | PASI-G |
| | | EPA 9060 Modified | TJJ | 4 | PASI-G |
| 4086098011 | SB-8-13 (17-32) | ASTM D2974-87 | SKW | 1 | PASI-G |

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## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4086098

**Sample: SB-5-13 (13.5-18)** **Lab ID: 4086098001** Collected: 10/01/13 00:00 Received: 10/04/13 09:10 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **8082 GCS PCB** | Analytical Method: EPA 8082 Preparation Method: EPA 3541 | | | | | | | |
| PCB-1016 (Aroclor 1016) | ND | ug/kg | 70.7 | 1 | 10/08/13 11:25 | 10/09/13 17:35 | 12674-11-2 | |
| PCB-1221 (Aroclor 1221) | ND | ug/kg | 70.7 | 1 | 10/08/13 11:25 | 10/09/13 17:35 | 11104-28-2 | |
| PCB-1232 (Aroclor 1232) | ND | ug/kg | 70.7 | 1 | 10/08/13 11:25 | 10/09/13 17:35 | 11141-16-5 | |
| PCB-1242 (Aroclor 1242) | ND | ug/kg | 70.7 | 1 | 10/08/13 11:25 | 10/09/13 17:35 | 53469-21-9 | |
| PCB-1248 (Aroclor 1248) | ND | ug/kg | 70.7 | 1 | 10/08/13 11:25 | 10/09/13 17:35 | 12672-29-6 | |
| PCB-1254 (Aroclor 1254) | ND | ug/kg | 70.7 | 1 | 10/08/13 11:25 | 10/09/13 17:35 | 11097-69-1 | |
| PCB-1260 (Aroclor 1260) | ND | ug/kg | 70.7 | 1 | 10/08/13 11:25 | 10/09/13 17:35 | 11096-82-5 | |
| PCB, Total | ND | ug/kg | 70.7 | 1 | 10/08/13 11:25 | 10/09/13 17:35 | 1336-36-3 | |
| ***Surrogates*** | | | | | | | | |
| Tetrachloro-m-xylene (S) | 80 | % | 40-130 | 1 | 10/08/13 11:25 | 10/09/13 17:35 | 877-09-8 | |
| Decachlorobiphenyl (S) | 77 | % | 48-130 | 1 | 10/08/13 11:25 | 10/09/13 17:35 | 2051-24-3 | |
| **6010 MET ICP** | Analytical Method: EPA 6010 Preparation Method: EPA 3050 | | | | | | | |
| Arsenic | **7.2** | mg/kg | 2.6 | 1 | 10/08/13 14:06 | 10/09/13 20:21 | 7440-38-2 | |
| Cadmium | **0.84** | mg/kg | 0.64 | 1 | 10/08/13 14:06 | 10/09/13 20:21 | 7440-43-9 | |
| Chromium | **16.9** | mg/kg | 0.64 | 1 | 10/08/13 14:06 | 10/09/13 20:21 | 7440-47-3 | |
| Copper | **28.8** | mg/kg | 1.3 | 1 | 10/08/13 14:06 | 10/09/13 20:21 | 7440-50-8 | |
| Lead | **92.4** | mg/kg | 1.3 | 1 | 10/08/13 14:06 | 10/09/13 20:21 | 7439-92-1 | |
| Nickel | **15.2** | mg/kg | 1.3 | 1 | 10/08/13 14:06 | 10/09/13 20:21 | 7440-02-0 | |
| Selenium | ND | mg/kg | 2.6 | 1 | 10/08/13 14:06 | 10/09/13 20:21 | 7782-49-2 | |
| Zinc | **266** | mg/kg | 5.2 | 1 | 10/08/13 14:06 | 10/09/13 20:21 | 7440-66-6 | |
| **7471 Mercury** | Analytical Method: EPA 7471 Preparation Method: EPA 7471 | | | | | | | |
| Mercury | **0.093** | mg/kg | 0.0085 | 1 | 10/08/13 14:28 | 10/08/13 18:35 | 7439-97-6 | |
| **8270 MSSV PAH by SIM** | Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546 | | | | | | | |
| Acenaphthene | **433** | ug/kg | 188 | 8 | 10/12/13 12:00 | 10/16/13 12:48 | 83-32-9 | |
| Acenaphthylene | ND | ug/kg | 188 | 8 | 10/12/13 12:00 | 10/16/13 12:48 | 208-96-8 | |
| Anthracene | **535** | ug/kg | 188 | 8 | 10/12/13 12:00 | 10/16/13 12:48 | 120-12-7 | |
| Benzo(a)anthracene | **641** | ug/kg | 188 | 8 | 10/12/13 12:00 | 10/16/13 12:48 | 56-55-3 | |
| Benzo(a)pyrene | **692** | ug/kg | 188 | 8 | 10/12/13 12:00 | 10/16/13 12:48 | 50-32-8 | |
| Benzo(b)fluoranthene | **575** | ug/kg | 188 | 8 | 10/12/13 12:00 | 10/16/13 12:48 | 205-99-2 | 1q |
| Benzo(g,h,i)perylene | **394** | ug/kg | 188 | 8 | 10/12/13 12:00 | 10/16/13 12:48 | 191-24-2 | |
| Benzo(k)fluoranthene | **629** | ug/kg | 188 | 8 | 10/12/13 12:00 | 10/16/13 12:48 | 207-08-9 | 1q |
| Chrysene | **789** | ug/kg | 188 | 8 | 10/12/13 12:00 | 10/16/13 12:48 | 218-01-9 | |
| Dibenz(a,h)anthracene | ND | ug/kg | 188 | 8 | 10/12/13 12:00 | 10/16/13 12:48 | 53-70-3 | |
| Fluoranthene | **1610** | ug/kg | 188 | 8 | 10/12/13 12:00 | 10/16/13 12:48 | 206-44-0 | |
| Fluorene | **313** | ug/kg | 188 | 8 | 10/12/13 12:00 | 10/16/13 12:48 | 86-73-7 | |
| Indeno(1,2,3-cd)pyrene | **339** | ug/kg | 188 | 8 | 10/12/13 12:00 | 10/16/13 12:48 | 193-39-5 | |
| Naphthalene | **256** | ug/kg | 188 | 8 | 10/12/13 12:00 | 10/16/13 12:48 | 91-20-3 | |
| Phenanthrene | **1780** | ug/kg | 188 | 8 | 10/12/13 12:00 | 10/16/13 12:48 | 85-01-8 | |
| Pyrene | **1320** | ug/kg | 188 | 8 | 10/12/13 12:00 | 10/16/13 12:48 | 129-00-0 | |
| ***Surrogates*** | | | | | | | | |
| 2-Fluorobiphenyl (S) | 73 | % | 40-130 | 8 | 10/12/13 12:00 | 10/16/13 12:48 | 321-60-8 | |
| Terphenyl-d14 (S) | 69 | % | 40-130 | 8 | 10/12/13 12:00 | 10/16/13 12:48 | 1718-51-0 | |

## REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4086098

**Sample: SB-5-13 (13.5-18)** **Lab ID: 4086098001** Collected: 10/01/13 00:00 Received: 10/04/13 09:10 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **Percent Moisture** | Analytical Method: ASTM D2974-87 | | | | | | | |
| Percent Moisture | **29.2** | % | 0.10 | 1 | | 10/14/13 16:18 | | |
| **300.0 IC Anions** | Analytical Method: EPA 300.0 Preparation Method: EPA 300.0 | | | | | | | |
| Nitrate as N | ND | mg/kg | 21.3 | 5 | 10/07/13 14:22 | 10/08/13 20:57 | 14797-55-8 | D3 |
| Nitrite as N | ND | mg/kg | 14.2 | 5 | 10/07/13 14:22 | 10/08/13 20:57 | 14797-65-0 | D3 |
| Nitrogen, NO2 plus NO3 | ND | mg/kg | 21.3 | 5 | 10/07/13 14:22 | 10/08/13 20:57 | | |
| **350.1 Ammonia** | Analytical Method: EPA 350.1 Preparation Method: EPA 350.1 | | | | | | | |
| Nitrogen, Ammonia | **46.5** | mg/kg | 18.4 | 1 | 10/11/13 18:50 | 10/11/13 20:30 | 7664-41-7 | |
| **351.2 Total Kjeldahl Nitrogen** | Analytical Method: EPA 351.2 Preparation Method: EPA 351.2 | | | | | | | |
| Nitrogen, Kjeldahl, Total | **702** | mg/kg | 118 | 1 | 10/07/13 15:05 | 10/07/13 22:25 | 7727-37-9 | |
| **365.4 Total Phosphorus** | Analytical Method: EPA 365.4 Preparation Method: EPA 365.4 | | | | | | | |
| Phosphorus | **412** | mg/kg | 33.2 | 1 | 10/17/13 09:00 | 10/17/13 12:24 | 7723-14-0 | |
| **Total Organic Carbon** | Analytical Method: EPA 9060 Modified | | | | | | | |
| ***Surrogates*** | | | | | | | | |
| RPD% | **31.6** | % | | 1 | | 10/11/13 09:01 | | |
| Total Organic Carbon | **14200** | mg/kg | 1210 | 1 | | 10/11/13 08:54 | 7440-44-0 | |
| Total Organic Carbon | **19500** | mg/kg | 1220 | 1 | | 10/11/13 09:01 | 7440-44-0 | |
| Mean Total Organic Carbon | **16900** | mg/kg | 1220 | 1 | | 10/11/13 09:01 | 7440-44-0 | |

## REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4086098

**Sample: SB-5-13 (18-26)** **Lab ID: 4086098002** Collected: 10/01/13 00:00 Received: 10/04/13 09:10 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **8082 GCS PCB** | Analytical Method: EPA 8082 Preparation Method: EPA 3541 | | | | | | | |
| PCB-1016 (Aroclor 1016) | ND | ug/kg | 62.8 | 1 | 10/08/13 11:25 | 10/09/13 17:53 | 12674-11-2 | |
| PCB-1221 (Aroclor 1221) | ND | ug/kg | 62.8 | 1 | 10/08/13 11:25 | 10/09/13 17:53 | 11104-28-2 | |
| PCB-1232 (Aroclor 1232) | ND | ug/kg | 62.8 | 1 | 10/08/13 11:25 | 10/09/13 17:53 | 11141-16-5 | |
| PCB-1242 (Aroclor 1242) | ND | ug/kg | 62.8 | 1 | 10/08/13 11:25 | 10/09/13 17:53 | 53469-21-9 | |
| PCB-1248 (Aroclor 1248) | ND | ug/kg | 62.8 | 1 | 10/08/13 11:25 | 10/09/13 17:53 | 12672-29-6 | |
| PCB-1254 (Aroclor 1254) | ND | ug/kg | 62.8 | 1 | 10/08/13 11:25 | 10/09/13 17:53 | 11097-69-1 | |
| PCB-1260 (Aroclor 1260) | ND | ug/kg | 62.8 | 1 | 10/08/13 11:25 | 10/09/13 17:53 | 11096-82-5 | |
| PCB, Total | ND | ug/kg | 62.8 | 1 | 10/08/13 11:25 | 10/09/13 17:53 | 1336-36-3 | |
| ***Surrogates*** | | | | | | | | |
| Tetrachloro-m-xylene (S) | 70 | % | 40-130 | 1 | 10/08/13 11:25 | 10/09/13 17:53 | 877-09-8 | |
| Decachlorobiphenyl (S) | 71 | % | 48-130 | 1 | 10/08/13 11:25 | 10/09/13 17:53 | 2051-24-3 | |
| **6010 MET ICP** | Analytical Method: EPA 6010 Preparation Method: EPA 3050 | | | | | | | |
| Arsenic | ND | mg/kg | 2.5 | 1 | 10/08/13 14:06 | 10/09/13 20:24 | 7440-38-2 | |
| Cadmium | ND | mg/kg | 0.62 | 1 | 10/08/13 14:06 | 10/09/13 20:24 | 7440-43-9 | |
| Chromium | **11.6** | mg/kg | 0.62 | 1 | 10/08/13 14:06 | 10/09/13 20:24 | 7440-47-3 | |
| Copper | **11.3** | mg/kg | 1.2 | 1 | 10/08/13 14:06 | 10/09/13 20:24 | 7440-50-8 | |
| Lead | **14.3** | mg/kg | 1.2 | 1 | 10/08/13 14:06 | 10/09/13 20:24 | 7439-92-1 | |
| Nickel | **9.6** | mg/kg | 1.2 | 1 | 10/08/13 14:06 | 10/09/13 20:24 | 7440-02-0 | |
| Selenium | ND | mg/kg | 2.5 | 1 | 10/08/13 14:06 | 10/09/13 20:24 | 7782-49-2 | |
| Zinc | **39.0** | mg/kg | 5.0 | 1 | 10/08/13 14:06 | 10/09/13 20:24 | 7440-66-6 | |
| **7471 Mercury** | Analytical Method: EPA 7471 Preparation Method: EPA 7471 | | | | | | | |
| Mercury | **0.047** | mg/kg | 0.0073 | 1 | 10/08/13 14:28 | 10/08/13 18:37 | 7439-97-6 | |
| **8270 MSSV PAH by SIM** | Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546 | | | | | | | |
| Acenaphthene | **357** | ug/kg | 209 | 10 | 10/12/13 12:00 | 10/16/13 17:28 | 83-32-9 | |
| Acenaphthylene | ND | ug/kg | 209 | 10 | 10/12/13 12:00 | 10/16/13 17:28 | 208-96-8 | |
| Anthracene | **630** | ug/kg | 209 | 10 | 10/12/13 12:00 | 10/16/13 17:28 | 120-12-7 | |
| Benzo(a)anthracene | **723** | ug/kg | 209 | 10 | 10/12/13 12:00 | 10/16/13 17:28 | 56-55-3 | |
| Benzo(a)pyrene | **884** | ug/kg | 209 | 10 | 10/12/13 12:00 | 10/16/13 17:28 | 50-32-8 | |
| Benzo(b)fluoranthene | **648** | ug/kg | 209 | 10 | 10/12/13 12:00 | 10/16/13 17:28 | 205-99-2 | 1q |
| Benzo(g,h,i)perylene | **538** | ug/kg | 209 | 10 | 10/12/13 12:00 | 10/16/13 17:28 | 191-24-2 | |
| Benzo(k)fluoranthene | **705** | ug/kg | 209 | 10 | 10/12/13 12:00 | 10/16/13 17:28 | 207-08-9 | 1q |
| Chrysene | **810** | ug/kg | 209 | 10 | 10/12/13 12:00 | 10/16/13 17:28 | 218-01-9 | |
| Dibenz(a,h)anthracene | ND | ug/kg | 209 | 10 | 10/12/13 12:00 | 10/16/13 17:28 | 53-70-3 | |
| Fluoranthene | **1970** | ug/kg | 209 | 10 | 10/12/13 12:00 | 10/16/13 17:28 | 206-44-0 | |
| Fluorene | **370** | ug/kg | 209 | 10 | 10/12/13 12:00 | 10/16/13 17:28 | 86-73-7 | |
| Indeno(1,2,3-cd)pyrene | **435** | ug/kg | 209 | 10 | 10/12/13 12:00 | 10/16/13 17:28 | 193-39-5 | |
| Naphthalene | **411** | ug/kg | 209 | 10 | 10/12/13 12:00 | 10/16/13 17:28 | 91-20-3 | |
| Phenanthrene | **2500** | ug/kg | 209 | 10 | 10/12/13 12:00 | 10/16/13 17:28 | 85-01-8 | |
| Pyrene | **1800** | ug/kg | 209 | 10 | 10/12/13 12:00 | 10/16/13 17:28 | 129-00-0 | |
| ***Surrogates*** | | | | | | | | |
| 2-Fluorobiphenyl (S) | 73 | % | 40-130 | 10 | 10/12/13 12:00 | 10/16/13 17:28 | 321-60-8 | |
| Terphenyl-d14 (S) | 63 | % | 40-130 | 10 | 10/12/13 12:00 | 10/16/13 17:28 | 1718-51-0 | |

## REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4086098

**Sample: SB-5-13 (18-26)** **Lab ID: 4086098002** Collected: 10/01/13 00:00 Received: 10/04/13 09:10 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **Percent Moisture** | Analytical Method: ASTM D2974-87 | | | | | | | |
| Percent Moisture | **20.3** | % | 0.10 | 1 | | 10/14/13 16:18 | | |
| **300.0 IC Anions** | Analytical Method: EPA 300.0 Preparation Method: EPA 300.0 | | | | | | | |
| Nitrate as N | ND | mg/kg | 3.8 | 1 | 10/07/13 14:22 | 10/08/13 21:22 | 14797-55-8 | |
| Nitrite as N | ND | mg/kg | 2.6 | 1 | 10/07/13 14:22 | 10/08/13 21:22 | 14797-65-0 | |
| Nitrogen, NO2 plus NO3 | ND | mg/kg | 3.8 | 1 | 10/07/13 14:22 | 10/08/13 21:22 | | |
| **350.1 Ammonia** | Analytical Method: EPA 350.1 Preparation Method: EPA 350.1 | | | | | | | |
| Nitrogen, Ammonia | **53.3** | mg/kg | 16.4 | 1 | 10/11/13 18:50 | 10/11/13 20:31 | 7664-41-7 | |
| **351.2 Total Kjeldahl Nitrogen** | Analytical Method: EPA 351.2 Preparation Method: EPA 351.2 | | | | | | | |
| Nitrogen, Kjeldahl, Total | **329** | mg/kg | 71.7 | 1 | 10/07/13 15:05 | 10/07/13 22:26 | 7727-37-9 | |
| **365.4 Total Phosphorus** | Analytical Method: EPA 365.4 Preparation Method: EPA 365.4 | | | | | | | |
| Phosphorus | **351** | mg/kg | 52.9 | 1 | 10/17/13 09:00 | 10/17/13 12:24 | 7723-14-0 | |
| **Total Organic Carbon** | Analytical Method: EPA 9060 Modified | | | | | | | |
| ***Surrogates*** | | | | | | | | |
| RPD% | **3.1** | % | | 1 | | 10/11/13 09:14 | | |
| Total Organic Carbon | **9640** | mg/kg | 1490 | 1 | | 10/11/13 09:07 | 7440-44-0 | |
| Total Organic Carbon | **9940** | mg/kg | 1480 | 1 | | 10/11/13 09:14 | 7440-44-0 | |
| Mean Total Organic Carbon | **9790** | mg/kg | 1480 | 1 | | 10/11/13 09:14 | 7440-44-0 | |

## REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4086098

**Sample: SB-5-13 (26-31)** **Lab ID: 4086098003** Collected: 10/01/13 00:00 Received: 10/04/13 09:10 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **8082 GCS PCB** | Analytical Method: EPA 8082 Preparation Method: EPA 3541 | | | | | | | |
| PCB-1016 (Aroclor 1016) | ND | ug/kg | 64.7 | 1 | 10/08/13 11:25 | 10/09/13 18:11 | 12674-11-2 | |
| PCB-1221 (Aroclor 1221) | ND | ug/kg | 64.7 | 1 | 10/08/13 11:25 | 10/09/13 18:11 | 11104-28-2 | |
| PCB-1232 (Aroclor 1232) | ND | ug/kg | 64.7 | 1 | 10/08/13 11:25 | 10/09/13 18:11 | 11141-16-5 | |
| PCB-1242 (Aroclor 1242) | ND | ug/kg | 64.7 | 1 | 10/08/13 11:25 | 10/09/13 18:11 | 53469-21-9 | |
| PCB-1248 (Aroclor 1248) | ND | ug/kg | 64.7 | 1 | 10/08/13 11:25 | 10/09/13 18:11 | 12672-29-6 | |
| PCB-1254 (Aroclor 1254) | ND | ug/kg | 64.7 | 1 | 10/08/13 11:25 | 10/09/13 18:11 | 11097-69-1 | |
| PCB-1260 (Aroclor 1260) | ND | ug/kg | 64.7 | 1 | 10/08/13 11:25 | 10/09/13 18:11 | 11096-82-5 | |
| PCB, Total | ND | ug/kg | 64.7 | 1 | 10/08/13 11:25 | 10/09/13 18:11 | 1336-36-3 | |
| ***Surrogates*** | | | | | | | | |
| Tetrachloro-m-xylene (S) | 78 | % | 40-130 | 1 | 10/08/13 11:25 | 10/09/13 18:11 | 877-09-8 | |
| Decachlorobiphenyl (S) | 79 | % | 48-130 | 1 | 10/08/13 11:25 | 10/09/13 18:11 | 2051-24-3 | |
| **6010 MET ICP** | Analytical Method: EPA 6010 Preparation Method: EPA 3050 | | | | | | | |
| Arsenic | ND | mg/kg | 2.2 | 1 | 10/08/13 14:06 | 10/09/13 20:26 | 7440-38-2 | |
| Cadmium | ND | mg/kg | 0.56 | 1 | 10/08/13 14:06 | 10/09/13 20:26 | 7440-43-9 | |
| Chromium | **8.3** | mg/kg | 0.56 | 1 | 10/08/13 14:06 | 10/09/13 20:26 | 7440-47-3 | |
| Copper | **9.3** | mg/kg | 1.1 | 1 | 10/08/13 14:06 | 10/09/13 20:26 | 7440-50-8 | |
| Lead | **9.9** | mg/kg | 1.1 | 1 | 10/08/13 14:06 | 10/09/13 20:26 | 7439-92-1 | |
| Nickel | **6.0** | mg/kg | 1.1 | 1 | 10/08/13 14:06 | 10/09/13 20:26 | 7440-02-0 | |
| Selenium | ND | mg/kg | 2.2 | 1 | 10/08/13 14:06 | 10/09/13 20:26 | 7782-49-2 | |
| Zinc | **28.2** | mg/kg | 4.5 | 1 | 10/08/13 14:06 | 10/09/13 20:26 | 7440-66-6 | |
| **7471 Mercury** | Analytical Method: EPA 7471 Preparation Method: EPA 7471 | | | | | | | |
| Mercury | **0.040** | mg/kg | 0.0069 | 1 | 10/08/13 14:28 | 10/08/13 18:40 | 7439-97-6 | |
| **8270 MSSV PAH by SIM** | Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546 | | | | | | | |
| Acenaphthene | **823** | ug/kg | 431 | 20 | 10/12/13 12:00 | 10/15/13 18:39 | 83-32-9 | |
| Acenaphthylene | ND | ug/kg | 431 | 20 | 10/12/13 12:00 | 10/15/13 18:39 | 208-96-8 | |
| Anthracene | **2210** | ug/kg | 431 | 20 | 10/12/13 12:00 | 10/15/13 18:39 | 120-12-7 | |
| Benzo(a)anthracene | **1870** | ug/kg | 431 | 20 | 10/12/13 12:00 | 10/15/13 18:39 | 56-55-3 | |
| Benzo(a)pyrene | **1740** | ug/kg | 431 | 20 | 10/12/13 12:00 | 10/15/13 18:39 | 50-32-8 | |
| Benzo(b)fluoranthene | **1320** | ug/kg | 431 | 20 | 10/12/13 12:00 | 10/15/13 18:39 | 205-99-2 | 1q |
| Benzo(g,h,i)perylene | **816** | ug/kg | 431 | 20 | 10/12/13 12:00 | 10/15/13 18:39 | 191-24-2 | |
| Benzo(k)fluoranthene | **1410** | ug/kg | 431 | 20 | 10/12/13 12:00 | 10/15/13 18:39 | 207-08-9 | 1q |
| Chrysene | **1940** | ug/kg | 431 | 20 | 10/12/13 12:00 | 10/15/13 18:39 | 218-01-9 | |
| Dibenz(a,h)anthracene | ND | ug/kg | 431 | 20 | 10/12/13 12:00 | 10/15/13 18:39 | 53-70-3 | |
| Fluoranthene | **4740** | ug/kg | 431 | 20 | 10/12/13 12:00 | 10/15/13 18:39 | 206-44-0 | |
| Fluorene | **1160** | ug/kg | 431 | 20 | 10/12/13 12:00 | 10/15/13 18:39 | 86-73-7 | |
| Indeno(1,2,3-cd)pyrene | **712** | ug/kg | 431 | 20 | 10/12/13 12:00 | 10/15/13 18:39 | 193-39-5 | |
| Naphthalene | **1100** | ug/kg | 431 | 20 | 10/12/13 12:00 | 10/15/13 18:39 | 91-20-3 | |
| Phenanthrene | **6150** | ug/kg | 431 | 20 | 10/12/13 12:00 | 10/15/13 18:39 | 85-01-8 | |
| Pyrene | **3880** | ug/kg | 431 | 20 | 10/12/13 12:00 | 10/15/13 18:39 | 129-00-0 | |
| ***Surrogates*** | | | | | | | | |
| 2-Fluorobiphenyl (S) | 63 | % | 40-130 | 20 | 10/12/13 12:00 | 10/15/13 18:39 | 321-60-8 | |
| Terphenyl-d14 (S) | 58 | % | 40-130 | 20 | 10/12/13 12:00 | 10/15/13 18:39 | 1718-51-0 | |

## REPORT OF LABORATORY ANALYSIS

Pace Analytical®
www.pacelabs.com

**Pace Analytical Services, Inc.**
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4086098

**Sample: SB-5-13 (26-31)** **Lab ID: 4086098003** Collected: 10/01/13 00:00 Received: 10/04/13 09:10 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **Percent Moisture** | Analytical Method: ASTM D2974-87 | | | | | | | |
| Percent Moisture | **22.7** | % | 0.10 | 1 | | 10/14/13 16:18 | | |
| **300.0 IC Anions** | Analytical Method: EPA 300.0 Preparation Method: EPA 300.0 | | | | | | | |
| Nitrate as N | ND | mg/kg | 3.9 | 1 | 10/07/13 14:22 | 10/08/13 21:46 | 14797-55-8 | |
| Nitrite as N | ND | mg/kg | 2.6 | 1 | 10/07/13 14:22 | 10/08/13 21:46 | 14797-65-0 | |
| Nitrogen, NO2 plus NO3 | ND | mg/kg | 3.9 | 1 | 10/07/13 14:22 | 10/08/13 21:46 | | |
| **350.1 Ammonia** | Analytical Method: EPA 350.1 Preparation Method: EPA 350.1 | | | | | | | |
| Nitrogen, Ammonia | **46.3** | mg/kg | 16.9 | 1 | 10/11/13 18:50 | 10/11/13 20:34 | 7664-41-7 | |
| **351.2 Total Kjeldahl Nitrogen** | Analytical Method: EPA 351.2 Preparation Method: EPA 351.2 | | | | | | | |
| Nitrogen, Kjeldahl, Total | **536** | mg/kg | 61.6 | 1 | 10/07/13 15:05 | 10/07/13 22:27 | 7727-37-9 | |
| **365.4 Total Phosphorus** | Analytical Method: EPA 365.4 Preparation Method: EPA 365.4 | | | | | | | |
| Phosphorus | **269** | mg/kg | 24.6 | 1 | 10/17/13 09:00 | 10/17/13 12:25 | 7723-14-0 | |
| **Total Organic Carbon** | Analytical Method: EPA 9060 Modified | | | | | | | |
| ***Surrogates*** | | | | | | | | |
| RPD% | **8.9** | % | | 1 | | 10/11/13 09:54 | | |
| Total Organic Carbon | **16300** | mg/kg | 1170 | 1 | | 10/11/13 09:47 | 7440-44-0 | |
| Total Organic Carbon | **14900** | mg/kg | 1180 | 1 | | 10/11/13 09:54 | 7440-44-0 | |
| Mean Total Organic Carbon | **15600** | mg/kg | 1170 | 1 | | 10/11/13 09:54 | 7440-44-0 | |

## REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4086098

**Sample: SB-6-13 (7-12.5)** **Lab ID: 4086098004** Collected: 09/30/13 00:00 Received: 10/04/13 09:10 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **8082 GCS PCB** | Analytical Method: EPA 8082 Preparation Method: EPA 3541 | | | | | | | |
| PCB-1016 (Aroclor 1016) | ND | ug/kg | 65.7 | 1 | 10/08/13 11:25 | 10/09/13 18:29 | 12674-11-2 | |
| PCB-1221 (Aroclor 1221) | ND | ug/kg | 65.7 | 1 | 10/08/13 11:25 | 10/09/13 18:29 | 11104-28-2 | |
| PCB-1232 (Aroclor 1232) | ND | ug/kg | 65.7 | 1 | 10/08/13 11:25 | 10/09/13 18:29 | 11141-16-5 | |
| PCB-1242 (Aroclor 1242) | ND | ug/kg | 65.7 | 1 | 10/08/13 11:25 | 10/09/13 18:29 | 53469-21-9 | |
| PCB-1248 (Aroclor 1248) | ND | ug/kg | 65.7 | 1 | 10/08/13 11:25 | 10/09/13 18:29 | 12672-29-6 | |
| PCB-1254 (Aroclor 1254) | ND | ug/kg | 65.7 | 1 | 10/08/13 11:25 | 10/09/13 18:29 | 11097-69-1 | |
| PCB-1260 (Aroclor 1260) | ND | ug/kg | 65.7 | 1 | 10/08/13 11:25 | 10/09/13 18:29 | 11096-82-5 | |
| PCB, Total | ND | ug/kg | 65.7 | 1 | 10/08/13 11:25 | 10/09/13 18:29 | 1336-36-3 | |
| ***Surrogates*** | | | | | | | | |
| Tetrachloro-m-xylene (S) | 73 | % | 40-130 | 1 | 10/08/13 11:25 | 10/09/13 18:29 | 877-09-8 | |
| Decachlorobiphenyl (S) | 73 | % | 48-130 | 1 | 10/08/13 11:25 | 10/09/13 18:29 | 2051-24-3 | |
| **6010 MET ICP** | Analytical Method: EPA 6010 Preparation Method: EPA 3050 | | | | | | | |
| Arsenic | **3.2** | mg/kg | 2.6 | 1 | 10/08/13 14:06 | 10/09/13 20:28 | 7440-38-2 | |
| Cadmium | ND | mg/kg | 0.65 | 1 | 10/08/13 14:06 | 10/09/13 20:28 | 7440-43-9 | |
| Chromium | **43.8** | mg/kg | 0.65 | 1 | 10/08/13 14:06 | 10/09/13 20:28 | 7440-47-3 | |
| Copper | **17.7** | mg/kg | 1.3 | 1 | 10/08/13 14:06 | 10/09/13 20:28 | 7440-50-8 | |
| Lead | **34.0** | mg/kg | 1.3 | 1 | 10/08/13 14:06 | 10/09/13 20:28 | 7439-92-1 | |
| Nickel | **19.5** | mg/kg | 1.3 | 1 | 10/08/13 14:06 | 10/09/13 20:28 | 7440-02-0 | |
| Selenium | ND | mg/kg | 2.6 | 1 | 10/08/13 14:06 | 10/09/13 20:28 | 7782-49-2 | |
| Zinc | **51.3** | mg/kg | 5.2 | 1 | 10/08/13 14:06 | 10/09/13 20:28 | 7440-66-6 | |
| **7471 Mercury** | Analytical Method: EPA 7471 Preparation Method: EPA 7471 | | | | | | | |
| Mercury | **0.31** | mg/kg | 0.0076 | 1 | 10/08/13 14:28 | 10/08/13 18:42 | 7439-97-6 | |
| **8270 MSSV PAH by SIM** | Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546 | | | | | | | |
| Acenaphthene | **1810** | ug/kg | 175 | 4 | 10/11/13 20:31 | 10/16/13 05:56 | 83-32-9 | |
| Acenaphthylene | ND | ug/kg | 175 | 4 | 10/11/13 20:31 | 10/16/13 05:56 | 208-96-8 | |
| Anthracene | **878** | ug/kg | 175 | 4 | 10/11/13 20:31 | 10/16/13 05:56 | 120-12-7 | |
| Benzo(a)anthracene | **613** | ug/kg | 175 | 4 | 10/11/13 20:31 | 10/16/13 05:56 | 56-55-3 | |
| Benzo(a)pyrene | **590** | ug/kg | 175 | 4 | 10/11/13 20:31 | 10/16/13 05:56 | 50-32-8 | |
| Benzo(b)fluoranthene | **506** | ug/kg | 175 | 4 | 10/11/13 20:31 | 10/16/13 05:56 | 205-99-2 | 1q |
| Benzo(g,h,i)perylene | ND | ug/kg | 175 | 4 | 10/11/13 20:31 | 10/16/13 05:56 | 191-24-2 | |
| Benzo(k)fluoranthene | **461** | ug/kg | 175 | 4 | 10/11/13 20:31 | 10/16/13 05:56 | 207-08-9 | 1q |
| Chrysene | **644** | ug/kg | 175 | 4 | 10/11/13 20:31 | 10/16/13 05:56 | 218-01-9 | |
| Dibenz(a,h)anthracene | ND | ug/kg | 175 | 4 | 10/11/13 20:31 | 10/16/13 05:56 | 53-70-3 | |
| Fluoranthene | **1350** | ug/kg | 175 | 4 | 10/11/13 20:31 | 10/16/13 05:56 | 206-44-0 | |
| Fluorene | **673** | ug/kg | 175 | 4 | 10/11/13 20:31 | 10/16/13 05:56 | 86-73-7 | |
| Indeno(1,2,3-cd)pyrene | ND | ug/kg | 175 | 4 | 10/11/13 20:31 | 10/16/13 05:56 | 193-39-5 | |
| Naphthalene | **1930** | ug/kg | 175 | 4 | 10/11/13 20:31 | 10/16/13 05:56 | 91-20-3 | |
| Phenanthrene | **2500** | ug/kg | 175 | 4 | 10/11/13 20:31 | 10/16/13 05:56 | 85-01-8 | |
| Pyrene | **1510** | ug/kg | 175 | 4 | 10/11/13 20:31 | 10/16/13 05:56 | 129-00-0 | |
| ***Surrogates*** | | | | | | | | |
| 2-Fluorobiphenyl (S) | 92 | % | 40-130 | 4 | 10/11/13 20:31 | 10/16/13 05:56 | 321-60-8 | |
| Terphenyl-d14 (S) | 81 | % | 40-130 | 4 | 10/11/13 20:31 | 10/16/13 05:56 | 1718-51-0 | |

## REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4086098

**Sample: SB-6-13 (7-12.5)** **Lab ID: 4086098004** Collected: 09/30/13 00:00 Received: 10/04/13 09:10 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **Percent Moisture** | Analytical Method: ASTM D2974-87 | | | | | | | |
| Percent Moisture | **23.9** | % | 0.10 | 1 | | 10/14/13 16:18 | | |
| **300.0 IC Anions** | Analytical Method: EPA 300.0 Preparation Method: EPA 300.0 | | | | | | | |
| Nitrate as N | ND | mg/kg | 4.0 | 1 | 10/07/13 14:22 | 10/08/13 21:55 | 14797-55-8 | |
| Nitrite as N | ND | mg/kg | 2.6 | 1 | 10/07/13 14:22 | 10/08/13 21:55 | 14797-65-0 | |
| Nitrogen, NO2 plus NO3 | ND | mg/kg | 4.0 | 1 | 10/07/13 14:22 | 10/08/13 21:55 | | |
| **350.1 Ammonia** | Analytical Method: EPA 350.1 Preparation Method: EPA 350.1 | | | | | | | |
| Nitrogen, Ammonia | **29.7** | mg/kg | 14.6 | 1 | 10/11/13 18:50 | 10/11/13 20:35 | 7664-41-7 | |
| **351.2 Total Kjeldahl Nitrogen** | Analytical Method: EPA 351.2 Preparation Method: EPA 351.2 | | | | | | | |
| Nitrogen, Kjeldahl, Total | **592** | mg/kg | 97.4 | 1 | 10/07/13 15:05 | 10/07/13 22:28 | 7727-37-9 | |
| **365.4 Total Phosphorus** | Analytical Method: EPA 365.4 Preparation Method: EPA 365.4 | | | | | | | |
| Phosphorus | **393** | mg/kg | 40.4 | 1 | 10/17/13 09:00 | 10/17/13 12:25 | 7723-14-0 | |
| **Total Organic Carbon** | Analytical Method: EPA 9060 Modified | | | | | | | |
| ***Surrogates*** | | | | | | | | |
| RPD% | **42.5** | % | | 1 | | 10/11/13 10:48 | | |
| Total Organic Carbon | **56100** | mg/kg | 1490 | 1 | | 10/11/13 10:41 | 7440-44-0 | |
| Total Organic Carbon | **36500** | mg/kg | 1490 | 1 | | 10/11/13 10:48 | 7440-44-0 | |
| Mean Total Organic Carbon | **46300** | mg/kg | 1490 | 1 | | 10/11/13 10:48 | 7440-44-0 | 2q |

## REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4086098

**Sample: SB-6-13 (12.5-17.5)** **Lab ID: 4086098005** Collected: 09/30/13 00:00 Received: 10/04/13 09:10 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **8082 GCS PCB** | Analytical Method: EPA 8082 Preparation Method: EPA 3541 | | | | | | | |
| PCB-1016 (Aroclor 1016) | ND | ug/kg | 78.5 | 1 | 10/08/13 11:25 | 10/09/13 18:47 | 12674-11-2 | |
| PCB-1221 (Aroclor 1221) | ND | ug/kg | 78.5 | 1 | 10/08/13 11:25 | 10/09/13 18:47 | 11104-28-2 | |
| PCB-1232 (Aroclor 1232) | ND | ug/kg | 78.5 | 1 | 10/08/13 11:25 | 10/09/13 18:47 | 11141-16-5 | |
| PCB-1242 (Aroclor 1242) | ND | ug/kg | 78.5 | 1 | 10/08/13 11:25 | 10/09/13 18:47 | 53469-21-9 | |
| PCB-1248 (Aroclor 1248) | ND | ug/kg | 78.5 | 1 | 10/08/13 11:25 | 10/09/13 18:47 | 12672-29-6 | |
| PCB-1254 (Aroclor 1254) | ND | ug/kg | 78.5 | 1 | 10/08/13 11:25 | 10/09/13 18:47 | 11097-69-1 | |
| PCB-1260 (Aroclor 1260) | ND | ug/kg | 78.5 | 1 | 10/08/13 11:25 | 10/09/13 18:47 | 11096-82-5 | |
| PCB, Total | ND | ug/kg | 78.5 | 1 | 10/08/13 11:25 | 10/09/13 18:47 | 1336-36-3 | |
| ***Surrogates*** | | | | | | | | |
| Tetrachloro-m-xylene (S) | 67 | % | 40-130 | 1 | 10/08/13 11:25 | 10/09/13 18:47 | 877-09-8 | |
| Decachlorobiphenyl (S) | 69 | % | 48-130 | 1 | 10/08/13 11:25 | 10/09/13 18:47 | 2051-24-3 | |
| **6010 MET ICP** | Analytical Method: EPA 6010 Preparation Method: EPA 3050 | | | | | | | |
| Arsenic | ND | mg/kg | 3.1 | 1 | 10/08/13 14:06 | 10/09/13 20:30 | 7440-38-2 | |
| Cadmium | ND | mg/kg | 0.77 | 1 | 10/08/13 14:06 | 10/09/13 20:30 | 7440-43-9 | |
| Chromium | **11.7** | mg/kg | 0.77 | 1 | 10/08/13 14:06 | 10/09/13 20:30 | 7440-47-3 | |
| Copper | **15.5** | mg/kg | 1.5 | 1 | 10/08/13 14:06 | 10/09/13 20:30 | 7440-50-8 | |
| Lead | **25.9** | mg/kg | 1.5 | 1 | 10/08/13 14:06 | 10/09/13 20:30 | 7439-92-1 | |
| Nickel | **7.9** | mg/kg | 1.5 | 1 | 10/08/13 14:06 | 10/09/13 20:30 | 7440-02-0 | |
| Selenium | ND | mg/kg | 3.1 | 1 | 10/08/13 14:06 | 10/09/13 20:30 | 7782-49-2 | |
| Zinc | **48.8** | mg/kg | 6.1 | 1 | 10/08/13 14:06 | 10/09/13 20:30 | 7440-66-6 | |
| **7471 Mercury** | Analytical Method: EPA 7471 Preparation Method: EPA 7471 | | | | | | | |
| Mercury | **0.074** | mg/kg | 0.0089 | 1 | 10/08/13 14:28 | 10/08/13 18:44 | 7439-97-6 | |
| **8270 MSSV PAH by SIM** | Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546 | | | | | | | |
| Acenaphthene | **2490** | ug/kg | 523 | 20 | 10/11/13 20:31 | 10/15/13 19:14 | 83-32-9 | |
| Acenaphthylene | ND | ug/kg | 523 | 20 | 10/11/13 20:31 | 10/15/13 19:14 | 208-96-8 | |
| Anthracene | **1480** | ug/kg | 523 | 20 | 10/11/13 20:31 | 10/15/13 19:14 | 120-12-7 | |
| Benzo(a)anthracene | **668** | ug/kg | 523 | 20 | 10/11/13 20:31 | 10/15/13 19:14 | 56-55-3 | |
| Benzo(a)pyrene | **598** | ug/kg | 523 | 20 | 10/11/13 20:31 | 10/15/13 19:14 | 50-32-8 | |
| Benzo(b)fluoranthene | ND | ug/kg | 523 | 20 | 10/11/13 20:31 | 10/15/13 19:14 | 205-99-2 | 1q |
| Benzo(g,h,i)perylene | ND | ug/kg | 523 | 20 | 10/11/13 20:31 | 10/15/13 19:14 | 191-24-2 | |
| Benzo(k)fluoranthene | **558** | ug/kg | 523 | 20 | 10/11/13 20:31 | 10/15/13 19:14 | 207-08-9 | 1q |
| Chrysene | **702** | ug/kg | 523 | 20 | 10/11/13 20:31 | 10/15/13 19:14 | 218-01-9 | |
| Dibenz(a,h)anthracene | ND | ug/kg | 523 | 20 | 10/11/13 20:31 | 10/15/13 19:14 | 53-70-3 | |
| Fluoranthene | **1650** | ug/kg | 523 | 20 | 10/11/13 20:31 | 10/15/13 19:14 | 206-44-0 | |
| Fluorene | **1170** | ug/kg | 523 | 20 | 10/11/13 20:31 | 10/15/13 19:14 | 86-73-7 | |
| Indeno(1,2,3-cd)pyrene | ND | ug/kg | 523 | 20 | 10/11/13 20:31 | 10/15/13 19:14 | 193-39-5 | |
| Naphthalene | **4520** | ug/kg | 523 | 20 | 10/11/13 20:31 | 10/15/13 19:14 | 91-20-3 | |
| Phenanthrene | **3790** | ug/kg | 523 | 20 | 10/11/13 20:31 | 10/15/13 19:14 | 85-01-8 | |
| Pyrene | **1860** | ug/kg | 523 | 20 | 10/11/13 20:31 | 10/15/13 19:14 | 129-00-0 | |
| ***Surrogates*** | | | | | | | | |
| 2-Fluorobiphenyl (S) | 72 | % | 40-130 | 20 | 10/11/13 20:31 | 10/15/13 19:14 | 321-60-8 | |
| Terphenyl-d14 (S) | 62 | % | 40-130 | 20 | 10/11/13 20:31 | 10/15/13 19:14 | 1718-51-0 | |

## REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
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(920)469-2436

## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4086098

**Sample: SB-6-13 (12.5-17.5)** **Lab ID: 4086098005** Collected: 09/30/13 00:00 Received: 10/04/13 09:10 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **Percent Moisture** | Analytical Method: ASTM D2974-87 | | | | | | | |
| Percent Moisture | **36.3** | % | 0.10 | 1 | | 10/14/13 16:18 | | |
| **300.0 IC Anions** | Analytical Method: EPA 300.0 Preparation Method: EPA 300.0 | | | | | | | |
| Nitrate as N | ND | mg/kg | 4.7 | 1 | 10/07/13 14:22 | 10/08/13 22:03 | 14797-55-8 | |
| Nitrite as N | ND | mg/kg | 3.1 | 1 | 10/07/13 14:22 | 10/08/13 22:03 | 14797-65-0 | |
| Nitrogen, NO2 plus NO3 | ND | mg/kg | 4.7 | 1 | 10/07/13 14:22 | 10/08/13 22:03 | | |
| **350.1 Ammonia** | Analytical Method: EPA 350.1 Preparation Method: EPA 350.1 | | | | | | | |
| Nitrogen, Ammonia | **79.3** | mg/kg | 22.4 | 1 | 10/11/13 18:50 | 10/11/13 20:36 | 7664-41-7 | |
| **351.2 Total Kjeldahl Nitrogen** | Analytical Method: EPA 351.2 Preparation Method: EPA 351.2 | | | | | | | |
| Nitrogen, Kjeldahl, Total | **1080** | mg/kg | 143 | 1 | 10/07/13 15:05 | 10/07/13 22:28 | 7727-37-9 | |
| **365.4 Total Phosphorus** | Analytical Method: EPA 365.4 Preparation Method: EPA 365.4 | | | | | | | |
| Phosphorus | **368** | mg/kg | 50.2 | 1 | 10/17/13 09:00 | 10/17/13 12:26 | 7723-14-0 | |
| **Total Organic Carbon** | Analytical Method: EPA 9060 Modified | | | | | | | |
| ***Surrogates*** | | | | | | | | |
| RPD% | **18.9** | % | | 1 | | 10/11/13 11:01 | | |
| Total Organic Carbon | **44000** | mg/kg | 1850 | 1 | | 10/11/13 10:55 | 7440-44-0 | |
| Total Organic Carbon | **53200** | mg/kg | 1830 | 1 | | 10/11/13 11:01 | 7440-44-0 | |
| Mean Total Organic Carbon | **48600** | mg/kg | 1840 | 1 | | 10/11/13 11:01 | 7440-44-0 | |

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4086098

**Sample: SB-6-13 (17.5-22.5)** **Lab ID: 4086098006** Collected: 09/30/13 00:00 Received: 10/04/13 09:10 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **8082 GCS PCB** | Analytical Method: EPA 8082 Preparation Method: EPA 3541 | | | | | | | |
| PCB-1016 (Aroclor 1016) | ND | ug/kg | 89.0 | 1 | 10/08/13 11:25 | 10/09/13 19:05 | 12674-11-2 | |
| PCB-1221 (Aroclor 1221) | ND | ug/kg | 89.0 | 1 | 10/08/13 11:25 | 10/09/13 19:05 | 11104-28-2 | |
| PCB-1232 (Aroclor 1232) | ND | ug/kg | 89.0 | 1 | 10/08/13 11:25 | 10/09/13 19:05 | 11141-16-5 | |
| PCB-1242 (Aroclor 1242) | ND | ug/kg | 89.0 | 1 | 10/08/13 11:25 | 10/09/13 19:05 | 53469-21-9 | |
| PCB-1248 (Aroclor 1248) | ND | ug/kg | 89.0 | 1 | 10/08/13 11:25 | 10/09/13 19:05 | 12672-29-6 | |
| PCB-1254 (Aroclor 1254) | ND | ug/kg | 89.0 | 1 | 10/08/13 11:25 | 10/09/13 19:05 | 11097-69-1 | |
| PCB-1260 (Aroclor 1260) | ND | ug/kg | 89.0 | 1 | 10/08/13 11:25 | 10/09/13 19:05 | 11096-82-5 | |
| PCB, Total | ND | ug/kg | 89.0 | 1 | 10/08/13 11:25 | 10/09/13 19:05 | 1336-36-3 | |
| ***Surrogates*** | | | | | | | | |
| Tetrachloro-m-xylene (S) | 75 | % | 40-130 | 1 | 10/08/13 11:25 | 10/09/13 19:05 | 877-09-8 | |
| Decachlorobiphenyl (S) | 73 | % | 48-130 | 1 | 10/08/13 11:25 | 10/09/13 19:05 | 2051-24-3 | |
| **6010 MET ICP** | Analytical Method: EPA 6010 Preparation Method: EPA 3050 | | | | | | | |
| Arsenic | **3.8** | mg/kg | 3.0 | 1 | 10/08/13 14:06 | 10/09/13 20:36 | 7440-38-2 | |
| Cadmium | ND | mg/kg | 0.76 | 1 | 10/08/13 14:06 | 10/09/13 20:36 | 7440-43-9 | |
| Chromium | **18.7** | mg/kg | 0.76 | 1 | 10/08/13 14:06 | 10/09/13 20:36 | 7440-47-3 | |
| Copper | **17.3** | mg/kg | 1.5 | 1 | 10/08/13 14:06 | 10/09/13 20:36 | 7440-50-8 | |
| Lead | **24.5** | mg/kg | 1.5 | 1 | 10/08/13 14:06 | 10/09/13 20:36 | 7439-92-1 | |
| Nickel | **13.5** | mg/kg | 1.5 | 1 | 10/08/13 14:06 | 10/09/13 20:36 | 7440-02-0 | |
| Selenium | ND | mg/kg | 3.0 | 1 | 10/08/13 14:06 | 10/09/13 20:36 | 7782-49-2 | |
| Zinc | **58.7** | mg/kg | 6.1 | 1 | 10/08/13 14:06 | 10/09/13 20:36 | 7440-66-6 | |
| **7471 Mercury** | Analytical Method: EPA 7471 Preparation Method: EPA 7471 | | | | | | | |
| Mercury | **0.12** | mg/kg | 0.011 | 1 | 10/08/13 14:28 | 10/08/13 18:50 | 7439-97-6 | |
| **8270 MSSV PAH by SIM** | Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546 | | | | | | | |
| Acenaphthene | **60.1** | ug/kg | 29.7 | 1 | 10/12/13 12:00 | 10/15/13 06:16 | 83-32-9 | |
| Acenaphthylene | ND | ug/kg | 29.7 | 1 | 10/12/13 12:00 | 10/15/13 06:16 | 208-96-8 | |
| Anthracene | **59.6** | ug/kg | 29.7 | 1 | 10/12/13 12:00 | 10/15/13 06:16 | 120-12-7 | |
| Benzo(a)anthracene | **79.1** | ug/kg | 29.7 | 1 | 10/12/13 12:00 | 10/15/13 06:16 | 56-55-3 | |
| Benzo(a)pyrene | **95.0** | ug/kg | 29.7 | 1 | 10/12/13 12:00 | 10/15/13 06:16 | 50-32-8 | |
| Benzo(b)fluoranthene | **80.8** | ug/kg | 29.7 | 1 | 10/12/13 12:00 | 10/15/13 06:16 | 205-99-2 | 1q |
| Benzo(g,h,i)perylene | **42.9** | ug/kg | 29.7 | 1 | 10/12/13 12:00 | 10/15/13 06:16 | 191-24-2 | |
| Benzo(k)fluoranthene | **63.6** | ug/kg | 29.7 | 1 | 10/12/13 12:00 | 10/15/13 06:16 | 207-08-9 | 1q |
| Chrysene | **91.8** | ug/kg | 29.7 | 1 | 10/12/13 12:00 | 10/15/13 06:16 | 218-01-9 | |
| Dibenz(a,h)anthracene | ND | ug/kg | 29.7 | 1 | 10/12/13 12:00 | 10/15/13 06:16 | 53-70-3 | |
| Fluoranthene | **187** | ug/kg | 29.7 | 1 | 10/12/13 12:00 | 10/15/13 06:16 | 206-44-0 | |
| Fluorene | **40.3** | ug/kg | 29.7 | 1 | 10/12/13 12:00 | 10/15/13 06:16 | 86-73-7 | |
| Indeno(1,2,3-cd)pyrene | **37.3** | ug/kg | 29.7 | 1 | 10/12/13 12:00 | 10/15/13 06:16 | 193-39-5 | |
| Naphthalene | **190** | ug/kg | 29.7 | 1 | 10/12/13 12:00 | 10/15/13 06:16 | 91-20-3 | |
| Phenanthrene | **222** | ug/kg | 29.7 | 1 | 10/12/13 12:00 | 10/15/13 06:16 | 85-01-8 | |
| Pyrene | **195** | ug/kg | 29.7 | 1 | 10/12/13 12:00 | 10/15/13 06:16 | 129-00-0 | |
| ***Surrogates*** | | | | | | | | |
| 2-Fluorobiphenyl (S) | 91 | % | 40-130 | 1 | 10/12/13 12:00 | 10/15/13 06:16 | 321-60-8 | |
| Terphenyl-d14 (S) | 79 | % | 40-130 | 1 | 10/12/13 12:00 | 10/15/13 06:16 | 1718-51-0 | |

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4086098

**Sample: SB-6-13 (17.5-22.5)** **Lab ID: 4086098006** Collected: 09/30/13 00:00 Received: 10/04/13 09:10 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **Percent Moisture** | Analytical Method: ASTM D2974-87 | | | | | | | |
| Percent Moisture | **43.8** | % | 0.10 | 1 | | 10/14/13 16:19 | | |
| **300.0 IC Anions** | Analytical Method: EPA 300.0 Preparation Method: EPA 300.0 | | | | | | | |
| Nitrate as N | ND | mg/kg | 5.4 | 1 | 10/07/13 14:22 | 10/08/13 22:11 | 14797-55-8 | |
| Nitrite as N | ND | mg/kg | 3.6 | 1 | 10/07/13 14:22 | 10/08/13 22:11 | 14797-65-0 | |
| Nitrogen, NO2 plus NO3 | ND | mg/kg | 5.4 | 1 | 10/07/13 14:22 | 10/08/13 22:11 | | |
| **350.1 Ammonia** | Analytical Method: EPA 350.1 Preparation Method: EPA 350.1 | | | | | | | |
| Nitrogen, Ammonia | **157** | mg/kg | 21.4 | 1 | 10/11/13 18:50 | 10/11/13 20:37 | 7664-41-7 | |
| **351.2 Total Kjeldahl Nitrogen** | Analytical Method: EPA 351.2 Preparation Method: EPA 351.2 | | | | | | | |
| Nitrogen, Kjeldahl, Total | **1850** | mg/kg | 137 | 1 | 10/07/13 15:05 | 10/07/13 22:29 | 7727-37-9 | |
| **365.4 Total Phosphorus** | Analytical Method: EPA 365.4 Preparation Method: EPA 365.4 | | | | | | | |
| Phosphorus | **431** | mg/kg | 64.7 | 1 | 10/17/13 09:00 | 10/17/13 12:28 | 7723-14-0 | |
| **Total Organic Carbon** | Analytical Method: EPA 9060 Modified | | | | | | | |
| ***Surrogates*** | | | | | | | | |
| RPD% | **11.3** | % | | 1 | | 10/11/13 11:14 | | |
| Total Organic Carbon | **49600** | mg/kg | 2580 | 1 | | 10/11/13 11:08 | 7440-44-0 | |
| Total Organic Carbon | **44300** | mg/kg | 2570 | 1 | | 10/11/13 11:14 | 7440-44-0 | |
| Mean Total Organic Carbon | **47000** | mg/kg | 2580 | 1 | | 10/11/13 11:14 | 7440-44-0 | |

## REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4086098

**Sample: SB-6-13 (24-30.5)** **Lab ID: 4086098007** Collected: 09/30/13 00:00 Received: 10/04/13 09:10 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **Percent Moisture** | Analytical Method: ASTM D2974-87 | | | | | | | |
| Percent Moisture | **20.5** | % | 0.10 | 1 | | 10/14/13 16:19 | | |

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4086098

**Sample: SB-7-13 (19-21.5)** **Lab ID: 4086098008** Collected: 10/02/13 00:00 Received: 10/04/13 09:10 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **8082 GCS PCB** | Analytical Method: EPA 8082 Preparation Method: EPA 3541 | | | | | | | |
| PCB-1016 (Aroclor 1016) | ND | ug/kg | 67.5 | 1 | 10/08/13 11:25 | 10/09/13 19:22 | 12674-11-2 | |
| PCB-1221 (Aroclor 1221) | ND | ug/kg | 67.5 | 1 | 10/08/13 11:25 | 10/09/13 19:22 | 11104-28-2 | |
| PCB-1232 (Aroclor 1232) | ND | ug/kg | 67.5 | 1 | 10/08/13 11:25 | 10/09/13 19:22 | 11141-16-5 | |
| PCB-1242 (Aroclor 1242) | ND | ug/kg | 67.5 | 1 | 10/08/13 11:25 | 10/09/13 19:22 | 53469-21-9 | |
| PCB-1248 (Aroclor 1248) | ND | ug/kg | 67.5 | 1 | 10/08/13 11:25 | 10/09/13 19:22 | 12672-29-6 | |
| PCB-1254 (Aroclor 1254) | ND | ug/kg | 67.5 | 1 | 10/08/13 11:25 | 10/09/13 19:22 | 11097-69-1 | |
| PCB-1260 (Aroclor 1260) | ND | ug/kg | 67.5 | 1 | 10/08/13 11:25 | 10/09/13 19:22 | 11096-82-5 | |
| PCB, Total | ND | ug/kg | 67.5 | 1 | 10/08/13 11:25 | 10/09/13 19:22 | 1336-36-3 | |
| ***Surrogates*** | | | | | | | | |
| Tetrachloro-m-xylene (S) | 88 | % | 40-130 | 1 | 10/08/13 11:25 | 10/09/13 19:22 | 877-09-8 | |
| Decachlorobiphenyl (S) | 87 | % | 48-130 | 1 | 10/08/13 11:25 | 10/09/13 19:22 | 2051-24-3 | |
| **6010 MET ICP** | Analytical Method: EPA 6010 Preparation Method: EPA 3050 | | | | | | | |
| Arsenic | ND | mg/kg | 2.5 | 1 | 10/08/13 14:06 | 10/09/13 20:39 | 7440-38-2 | |
| Cadmium | ND | mg/kg | 0.61 | 1 | 10/08/13 14:06 | 10/09/13 20:39 | 7440-43-9 | |
| Chromium | **11.6** | mg/kg | 0.61 | 1 | 10/08/13 14:06 | 10/09/13 20:39 | 7440-47-3 | |
| Copper | **9.4** | mg/kg | 1.2 | 1 | 10/08/13 14:06 | 10/09/13 20:39 | 7440-50-8 | |
| Lead | **8.2** | mg/kg | 1.2 | 1 | 10/08/13 14:06 | 10/09/13 20:39 | 7439-92-1 | |
| Nickel | **8.6** | mg/kg | 1.2 | 1 | 10/08/13 14:06 | 10/09/13 20:39 | 7440-02-0 | |
| Selenium | ND | mg/kg | 2.5 | 1 | 10/08/13 14:06 | 10/09/13 20:39 | 7782-49-2 | |
| Zinc | **33.8** | mg/kg | 4.9 | 1 | 10/08/13 14:06 | 10/09/13 20:39 | 7440-66-6 | |
| **7471 Mercury** | Analytical Method: EPA 7471 Preparation Method: EPA 7471 | | | | | | | |
| Mercury | **0.019** | mg/kg | 0.0082 | 1 | 10/08/13 14:28 | 10/08/13 18:52 | 7439-97-6 | |
| **8270 MSSV PAH by SIM** | Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546 | | | | | | | |
| Acenaphthene | ND | ug/kg | 45.0 | 1 | 10/14/13 11:30 | 10/15/13 16:20 | 83-32-9 | |
| Acenaphthylene | ND | ug/kg | 45.0 | 1 | 10/14/13 11:30 | 10/15/13 16:20 | 208-96-8 | |
| Anthracene | ND | ug/kg | 45.0 | 1 | 10/14/13 11:30 | 10/15/13 16:20 | 120-12-7 | |
| Benzo(a)anthracene | ND | ug/kg | 45.0 | 1 | 10/14/13 11:30 | 10/15/13 16:20 | 56-55-3 | |
| Benzo(a)pyrene | ND | ug/kg | 45.0 | 1 | 10/14/13 11:30 | 10/15/13 16:20 | 50-32-8 | |
| Benzo(b)fluoranthene | ND | ug/kg | 45.0 | 1 | 10/14/13 11:30 | 10/15/13 16:20 | 205-99-2 | 1q |
| Benzo(g,h,i)perylene | ND | ug/kg | 45.0 | 1 | 10/14/13 11:30 | 10/15/13 16:20 | 191-24-2 | |
| Benzo(k)fluoranthene | ND | ug/kg | 45.0 | 1 | 10/14/13 11:30 | 10/15/13 16:20 | 207-08-9 | 1q |
| Chrysene | ND | ug/kg | 45.0 | 1 | 10/14/13 11:30 | 10/15/13 16:20 | 218-01-9 | |
| Dibenz(a,h)anthracene | ND | ug/kg | 45.0 | 1 | 10/14/13 11:30 | 10/15/13 16:20 | 53-70-3 | |
| Fluoranthene | **65.0** | ug/kg | 45.0 | 1 | 10/14/13 11:30 | 10/15/13 16:20 | 206-44-0 | |
| Fluorene | ND | ug/kg | 45.0 | 1 | 10/14/13 11:30 | 10/15/13 16:20 | 86-73-7 | |
| Indeno(1,2,3-cd)pyrene | ND | ug/kg | 45.0 | 1 | 10/14/13 11:30 | 10/15/13 16:20 | 193-39-5 | |
| Naphthalene | ND | ug/kg | 45.0 | 1 | 10/14/13 11:30 | 10/15/13 16:20 | 91-20-3 | |
| Phenanthrene | **45.6** | ug/kg | 45.0 | 1 | 10/14/13 11:30 | 10/15/13 16:20 | 85-01-8 | |
| Pyrene | **55.6** | ug/kg | 45.0 | 1 | 10/14/13 11:30 | 10/15/13 16:20 | 129-00-0 | |
| ***Surrogates*** | | | | | | | | |
| 2-Fluorobiphenyl (S) | 54 | % | 40-130 | 1 | 10/14/13 11:30 | 10/15/13 16:20 | 321-60-8 | |
| Terphenyl-d14 (S) | 45 | % | 40-130 | 1 | 10/14/13 11:30 | 10/15/13 16:20 | 1718-51-0 | |

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4086098

**Sample: SB-7-13 (19-21.5)** **Lab ID: 4086098008** Collected: 10/02/13 00:00 Received: 10/04/13 09:10 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **Percent Moisture** | Analytical Method: ASTM D2974-87 | | | | | | | |
| Percent Moisture | **26.0** | % | 0.10 | 1 | | 10/14/13 16:19 | | |
| **300.0 IC Anions** | Analytical Method: EPA 300.0 Preparation Method: EPA 300.0 | | | | | | | |
| Nitrate as N | ND | mg/kg | 4.0 | 1 | 10/07/13 14:22 | 10/08/13 22:19 | 14797-55-8 | |
| Nitrite as N | ND | mg/kg | 2.7 | 1 | 10/07/13 14:22 | 10/08/13 22:19 | 14797-65-0 | |
| Nitrogen, NO2 plus NO3 | ND | mg/kg | 4.0 | 1 | 10/07/13 14:22 | 10/08/13 22:19 | | |
| **350.1 Ammonia** | Analytical Method: EPA 350.1 Preparation Method: EPA 350.1 | | | | | | | |
| Nitrogen, Ammonia | **52.0** | mg/kg | 17.6 | 1 | 10/11/13 18:50 | 10/11/13 20:38 | 7664-41-7 | |
| **351.2 Total Kjeldahl Nitrogen** | Analytical Method: EPA 351.2 Preparation Method: EPA 351.2 | | | | | | | |
| Nitrogen, Kjeldahl, Total | **655** | mg/kg | 100 | 1 | 10/07/13 15:05 | 10/07/13 22:30 | 7727-37-9 | |
| **365.4 Total Phosphorus** | Analytical Method: EPA 365.4 Preparation Method: EPA 365.4 | | | | | | | |
| Phosphorus | **345** | mg/kg | 31.8 | 1 | 10/17/13 09:00 | 10/17/13 12:29 | 7723-14-0 | |
| **Total Organic Carbon** | Analytical Method: EPA 9060 Modified | | | | | | | |
| ***Surrogates*** | | | | | | | | |
| RPD% | **5.3** | % | | 1 | | 10/11/13 11:26 | | |
| Total Organic Carbon | **6450** | mg/kg | 1240 | 1 | | 10/11/13 11:21 | 7440-44-0 | |
| Total Organic Carbon | **6110** | mg/kg | 1240 | 1 | | 10/11/13 11:26 | 7440-44-0 | |
| Mean Total Organic Carbon | **6280** | mg/kg | 1240 | 1 | | 10/11/13 11:26 | 7440-44-0 | |

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4086098

**Sample: SB-7-13 (21.5-31.5)** **Lab ID: 4086098009** Collected: 10/02/13 00:00 Received: 10/04/13 09:10 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **Percent Moisture** | Analytical Method: ASTM D2974-87 | | | | | | | |
| Percent Moisture | **20.0** | % | 0.10 | 1 | | 10/14/13 16:19 | | |

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4086098

**Sample: SB-8-13 (14.5-17)** **Lab ID: 4086098010** Collected: 10/02/13 00:00 Received: 10/04/13 09:10 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **8082 GCS PCB** | Analytical Method: EPA 8082 Preparation Method: EPA 3541 | | | | | | | |
| PCB-1016 (Aroclor 1016) | ND | ug/kg | 64.7 | 1 | 10/08/13 11:25 | 10/09/13 19:40 | 12674-11-2 | |
| PCB-1221 (Aroclor 1221) | ND | ug/kg | 64.7 | 1 | 10/08/13 11:25 | 10/09/13 19:40 | 11104-28-2 | |
| PCB-1232 (Aroclor 1232) | ND | ug/kg | 64.7 | 1 | 10/08/13 11:25 | 10/09/13 19:40 | 11141-16-5 | |
| PCB-1242 (Aroclor 1242) | ND | ug/kg | 64.7 | 1 | 10/08/13 11:25 | 10/09/13 19:40 | 53469-21-9 | |
| PCB-1248 (Aroclor 1248) | ND | ug/kg | 64.7 | 1 | 10/08/13 11:25 | 10/09/13 19:40 | 12672-29-6 | |
| PCB-1254 (Aroclor 1254) | ND | ug/kg | 64.7 | 1 | 10/08/13 11:25 | 10/09/13 19:40 | 11097-69-1 | |
| PCB-1260 (Aroclor 1260) | ND | ug/kg | 64.7 | 1 | 10/08/13 11:25 | 10/09/13 19:40 | 11096-82-5 | |
| PCB, Total | ND | ug/kg | 64.7 | 1 | 10/08/13 11:25 | 10/09/13 19:40 | 1336-36-3 | |
| ***Surrogates*** | | | | | | | | |
| Tetrachloro-m-xylene (S) | 74 | % | 40-130 | 1 | 10/08/13 11:25 | 10/09/13 19:40 | 877-09-8 | |
| Decachlorobiphenyl (S) | 75 | % | 48-130 | 1 | 10/08/13 11:25 | 10/09/13 19:40 | 2051-24-3 | |
| **6010 MET ICP** | Analytical Method: EPA 6010 Preparation Method: EPA 3050 | | | | | | | |
| Arsenic | ND | mg/kg | 2.6 | 1 | 10/08/13 14:06 | 10/09/13 20:41 | 7440-38-2 | |
| Cadmium | ND | mg/kg | 0.64 | 1 | 10/08/13 14:06 | 10/09/13 20:41 | 7440-43-9 | |
| Chromium | **7.9** | mg/kg | 0.64 | 1 | 10/08/13 14:06 | 10/09/13 20:41 | 7440-47-3 | |
| Copper | **6.8** | mg/kg | 1.3 | 1 | 10/08/13 14:06 | 10/09/13 20:41 | 7440-50-8 | |
| Lead | **6.2** | mg/kg | 1.3 | 1 | 10/08/13 14:06 | 10/09/13 20:41 | 7439-92-1 | |
| Nickel | **6.0** | mg/kg | 1.3 | 1 | 10/08/13 14:06 | 10/09/13 20:41 | 7440-02-0 | |
| Selenium | ND | mg/kg | 2.6 | 1 | 10/08/13 14:06 | 10/09/13 20:41 | 7782-49-2 | |
| Zinc | **23.6** | mg/kg | 5.1 | 1 | 10/08/13 14:06 | 10/09/13 20:41 | 7440-66-6 | |
| **7471 Mercury** | Analytical Method: EPA 7471 Preparation Method: EPA 7471 | | | | | | | |
| Mercury | **0.013** | mg/kg | 0.0073 | 1 | 10/08/13 14:28 | 10/08/13 18:54 | 7439-97-6 | |
| **8270 MSSV PAH by SIM** | Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546 | | | | | | | |
| Acenaphthene | **75.4** | ug/kg | 21.6 | 1 | 10/14/13 11:30 | 10/15/13 17:47 | 83-32-9 | |
| Acenaphthylene | ND | ug/kg | 21.6 | 1 | 10/14/13 11:30 | 10/15/13 17:47 | 208-96-8 | |
| Anthracene | **183** | ug/kg | 21.6 | 1 | 10/14/13 11:30 | 10/15/13 17:47 | 120-12-7 | |
| Benzo(a)anthracene | **161** | ug/kg | 21.6 | 1 | 10/14/13 11:30 | 10/15/13 17:47 | 56-55-3 | |
| Benzo(a)pyrene | **141** | ug/kg | 21.6 | 1 | 10/14/13 11:30 | 10/15/13 17:47 | 50-32-8 | |
| Benzo(b)fluoranthene | **135** | ug/kg | 21.6 | 1 | 10/14/13 11:30 | 10/15/13 17:47 | 205-99-2 | 1q |
| Benzo(g,h,i)perylene | **67.8** | ug/kg | 21.6 | 1 | 10/14/13 11:30 | 10/15/13 17:47 | 191-24-2 | |
| Benzo(k)fluoranthene | **117** | ug/kg | 21.6 | 1 | 10/14/13 11:30 | 10/15/13 17:47 | 207-08-9 | 1q |
| Chrysene | **166** | ug/kg | 21.6 | 1 | 10/14/13 11:30 | 10/15/13 17:47 | 218-01-9 | |
| Dibenz(a,h)anthracene | **27.5** | ug/kg | 21.6 | 1 | 10/14/13 11:30 | 10/15/13 17:47 | 53-70-3 | |
| Fluoranthene | **387** | ug/kg | 21.6 | 1 | 10/14/13 11:30 | 10/15/13 17:47 | 206-44-0 | |
| Fluorene | **119** | ug/kg | 21.6 | 1 | 10/14/13 11:30 | 10/15/13 17:47 | 86-73-7 | |
| Indeno(1,2,3-cd)pyrene | **62.8** | ug/kg | 21.6 | 1 | 10/14/13 11:30 | 10/15/13 17:47 | 193-39-5 | |
| Naphthalene | **117** | ug/kg | 21.6 | 1 | 10/14/13 11:30 | 10/15/13 17:47 | 91-20-3 | |
| Phenanthrene | **522** | ug/kg | 21.6 | 1 | 10/14/13 11:30 | 10/15/13 17:47 | 85-01-8 | |
| Pyrene | **297** | ug/kg | 21.6 | 1 | 10/14/13 11:30 | 10/15/13 17:47 | 129-00-0 | |
| ***Surrogates*** | | | | | | | | |
| 2-Fluorobiphenyl (S) | 77 | % | 40-130 | 1 | 10/14/13 11:30 | 10/15/13 17:47 | 321-60-8 | |
| Terphenyl-d14 (S) | 55 | % | 40-130 | 1 | 10/14/13 11:30 | 10/15/13 17:47 | 1718-51-0 | |

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4086098

**Sample: SB-8-13 (14.5-17)** **Lab ID: 4086098010** Collected: 10/02/13 00:00 Received: 10/04/13 09:10 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **Percent Moisture** | Analytical Method: ASTM D2974-87 | | | | | | | |
| Percent Moisture | **22.7** | % | 0.10 | 1 | | 10/14/13 16:19 | | |
| **300.0 IC Anions** | Analytical Method: EPA 300.0 Preparation Method: EPA 300.0 | | | | | | | |
| Nitrate as N | ND | mg/kg | 3.9 | 1 | 10/07/13 14:22 | 10/08/13 22:27 | 14797-55-8 | |
| Nitrite as N | ND | mg/kg | 2.6 | 1 | 10/07/13 14:22 | 10/08/13 22:27 | 14797-65-0 | |
| Nitrogen, NO2 plus NO3 | ND | mg/kg | 3.9 | 1 | 10/07/13 14:22 | 10/08/13 22:27 | | |
| **350.1 Ammonia** | Analytical Method: EPA 350.1 Preparation Method: EPA 350.1 | | | | | | | |
| Nitrogen, Ammonia | **31.5** | mg/kg | 19.4 | 1 | 10/11/13 18:50 | 10/11/13 20:39 | 7664-41-7 | |
| **351.2 Total Kjeldahl Nitrogen** | Analytical Method: EPA 351.2 Preparation Method: EPA 351.2 | | | | | | | |
| Nitrogen, Kjeldahl, Total | **247** | mg/kg | 112 | 1 | 10/07/13 15:05 | 10/07/13 22:31 | 7727-37-9 | |
| **365.4 Total Phosphorus** | Analytical Method: EPA 365.4 Preparation Method: EPA 365.4 | | | | | | | |
| Phosphorus | **246** | mg/kg | 29.6 | 1 | 10/17/13 09:00 | 10/17/13 12:29 | 7723-14-0 | |
| **Total Organic Carbon** | Analytical Method: EPA 9060 Modified | | | | | | | |
| ***Surrogates*** | | | | | | | | |
| RPD% | **12.3** | % | | 1 | | 10/11/13 11:38 | | |
| Total Organic Carbon | **4220** | mg/kg | 891 | 1 | | 10/11/13 11:32 | 7440-44-0 | |
| Total Organic Carbon | **3730** | mg/kg | 882 | 1 | | 10/11/13 11:38 | 7440-44-0 | |
| Mean Total Organic Carbon | **3980** | mg/kg | 886 | 1 | | 10/11/13 11:38 | 7440-44-0 | |

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: D DOCK
Pace Project No.: 4086098

**Sample: SB-8-13 (17-32)** **Lab ID: 4086098011** Collected: 10/02/13 00:00 Received: 10/04/13 09:10 Matrix: Solid

***Results reported on a "dry-weight" basis***

| Parameters | Results | Units | Report Limit | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **Percent Moisture** | Analytical Method: ASTM D2974-87 | | | | | | | |
| Percent Moisture | **20.7** | % | 0.10 | 1 | | 10/14/13 16:19 | | |

## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4086098

QC Batch: MERP/3901 Analysis Method: EPA 7471
QC Batch Method: EPA 7471 Analysis Description: 7471 Mercury
Associated Lab Samples: 4086098001, 4086098002, 4086098003, 4086098004, 4086098005, 4086098006, 4086098008, 4086098010

METHOD BLANK: 870960 Matrix: Solid
Associated Lab Samples: 4086098001, 4086098002, 4086098003, 4086098004, 4086098005, 4086098006, 4086098008, 4086098010

| Parameter | Units | Blank Result | Reporting Limit | Analyzed | Qualifiers |
|---|---|---|---|---|---|
| Mercury | mg/kg | ND | 0.0067 | 10/08/13 18:09 | |

LABORATORY CONTROL SAMPLE: 870961

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Mercury | mg/kg | .17 | 0.17 | 102 | 85-115 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 870962 870963

| Parameter | Units | 4085983021 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mercury | mg/kg | 0.065 | .21 | .21 | 0.25 | 0.30 | 92 | 114 | 85-115 | 16 | 20 | |

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## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4086098

QC Batch: MPRP/9280 Analysis Method: EPA 6010
QC Batch Method: EPA 3050 Analysis Description: 6010 MET
Associated Lab Samples: 4086098001, 4086098002, 4086098003, 4086098004, 4086098005, 4086098006, 4086098008, 4086098010

METHOD BLANK: 870934 Matrix: Solid
Associated Lab Samples: 4086098001, 4086098002, 4086098003, 4086098004, 4086098005, 4086098006, 4086098008, 4086098010

| Parameter | Units | Blank Result | Reporting Limit | Analyzed | Qualifiers |
|---|---|---|---|---|---|
| Arsenic | mg/kg | ND | 2.0 | 10/09/13 19:48 | |
| Cadmium | mg/kg | ND | 0.50 | 10/09/13 19:48 | |
| Chromium | mg/kg | ND | 0.50 | 10/09/13 19:48 | |
| Copper | mg/kg | ND | 1.0 | 10/09/13 19:48 | |
| Lead | mg/kg | ND | 1.0 | 10/09/13 19:48 | |
| Nickel | mg/kg | ND | 1.0 | 10/09/13 19:48 | |
| Selenium | mg/kg | ND | 2.0 | 10/09/13 19:48 | |
| Zinc | mg/kg | ND | 4.0 | 10/09/13 19:48 | |

LABORATORY CONTROL SAMPLE: 870935

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Arsenic | mg/kg | 50 | 43.4 | 87 | 80-120 | |
| Cadmium | mg/kg | 50 | 44.6 | 89 | 80-120 | |
| Chromium | mg/kg | 50 | 42.7 | 85 | 80-120 | |
| Copper | mg/kg | 50 | 44.6 | 89 | 80-120 | |
| Lead | mg/kg | 50 | 45.4 | 91 | 80-120 | |
| Nickel | mg/kg | 50 | 42.1 | 84 | 80-120 | |
| Selenium | mg/kg | 50 | 43.8 | 88 | 80-120 | |
| Zinc | mg/kg | 50 | 43.7 | 87 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 870936 870937

| Parameter | Units | 4086076001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | mg/kg | 3.5 | 58 | 57.6 | 51.0 | 52.0 | 82 | 84 | 75-125 | 2 | 20 | |
| Cadmium | mg/kg | 0.21J | 58 | 57.6 | 49.8 | 50.7 | 86 | 88 | 75-125 | 2 | 20 | |
| Chromium | mg/kg | 17.7 | 58 | 57.6 | 56.8 | 57.8 | 68 | 70 | 75-125 | 2 | 20 | M0 |
| Copper | mg/kg | 11.5 | 58 | 57.6 | 58.6 | 59.8 | 81 | 84 | 75-125 | 2 | 20 | |
| Lead | mg/kg | 4.4 | 58 | 57.6 | 49.3 | 51.3 | 78 | 81 | 75-125 | 4 | 20 | |
| Nickel | mg/kg | 8.0 | 58 | 57.6 | 50.1 | 50.6 | 73 | 74 | 75-125 | 1 | 20 | M0 |
| Selenium | mg/kg | <0.69 | 58 | 57.6 | 46.8 | 48.6 | 81 | 84 | 75-125 | 4 | 20 | |
| Zinc | mg/kg | 21.6 | 58 | 57.6 | 63.5 | 64.6 | 72 | 75 | 75-125 | 2 | 20 | M0 |

## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4086098

QC Batch: OEXT/20147 Analysis Method: EPA 8082
QC Batch Method: EPA 3541 Analysis Description: 8082 GCS PCB
Associated Lab Samples: 4086098001, 4086098002, 4086098003, 4086098004, 4086098005, 4086098006, 4086098008, 4086098010

METHOD BLANK: 870999 Matrix: Solid
Associated Lab Samples: 4086098001, 4086098002, 4086098003, 4086098004, 4086098005, 4086098006, 4086098008, 4086098010

| Parameter | Units | Blank Result | Reporting Limit | Analyzed | Qualifiers |
|---|---|---|---|---|---|
| PCB-1016 (Aroclor 1016) | ug/kg | ND | 50.0 | 10/09/13 13:04 | |
| PCB-1221 (Aroclor 1221) | ug/kg | ND | 50.0 | 10/09/13 13:04 | |
| PCB-1232 (Aroclor 1232) | ug/kg | ND | 50.0 | 10/09/13 13:04 | |
| PCB-1242 (Aroclor 1242) | ug/kg | ND | 50.0 | 10/09/13 13:04 | |
| PCB-1248 (Aroclor 1248) | ug/kg | ND | 50.0 | 10/09/13 13:04 | |
| PCB-1254 (Aroclor 1254) | ug/kg | ND | 50.0 | 10/09/13 13:04 | |
| PCB-1260 (Aroclor 1260) | ug/kg | ND | 50.0 | 10/09/13 13:04 | |
| Decachlorobiphenyl (S) | % | 95 | 48-130 | 10/09/13 13:04 | |
| Tetrachloro-m-xylene (S) | % | 91 | 40-130 | 10/09/13 13:04 | |

LABORATORY CONTROL SAMPLE: 871000

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| PCB-1016 (Aroclor 1016) | ug/kg | | ND | | | |
| PCB-1221 (Aroclor 1221) | ug/kg | | ND | | | |
| PCB-1232 (Aroclor 1232) | ug/kg | | ND | | | |
| PCB-1242 (Aroclor 1242) | ug/kg | | ND | | | |
| PCB-1248 (Aroclor 1248) | ug/kg | | ND | | | |
| PCB-1254 (Aroclor 1254) | ug/kg | | ND | | | |
| PCB-1260 (Aroclor 1260) | ug/kg | 500 | 467 | 93 | 70-130 | |
| Decachlorobiphenyl (S) | % | | | 90 | 48-130 | |
| Tetrachloro-m-xylene (S) | % | | | 86 | 40-130 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 871001 871002

| Parameter | Units | 4086154005 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1016 (Aroclor 1016) | ug/kg | <29.5 | | | ND | ND | | | | | 31 | |
| PCB-1221 (Aroclor 1221) | ug/kg | <29.5 | | | ND | ND | | | | | 31 | |
| PCB-1232 (Aroclor 1232) | ug/kg | <29.5 | | | ND | ND | | | | | 31 | |
| PCB-1242 (Aroclor 1242) | ug/kg | <29.5 | | | ND | ND | | | | | 31 | |
| PCB-1248 (Aroclor 1248) | ug/kg | 30.7J | | | 37.6J | 52.1J | | | | | 31 | |
| PCB-1254 (Aroclor 1254) | ug/kg | <29.5 | | | ND | ND | | | | | 31 | |
| PCB-1260 (Aroclor 1260) | ug/kg | <29.5 | 590 | 590 | 508 | 499 | 86 | 85 | 40-149 | 2 | 31 | |
| Decachlorobiphenyl (S) | % | | | | | | 83 | 83 | 48-130 | | | |
| Tetrachloro-m-xylene (S) | % | | | | | | 78 | 77 | 40-130 | | | |

## REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4086098

QC Batch: OEXT/20192
QC Batch Method: EPA 3546
Analysis Method: EPA 8270 by SIM
Analysis Description: 8270/3546 MSSV PAH by SIM
Associated Lab Samples: 4086098004, 4086098005

METHOD BLANK: 874241
Matrix: Solid
Associated Lab Samples: 4086098004, 4086098005

| Parameter | Units | Blank Result | Reporting Limit | Analyzed | Qualifiers |
|---|---|---|---|---|---|
| Acenaphthene | ug/kg | ND | 16.7 | 10/14/13 09:25 | |
| Acenaphthylene | ug/kg | ND | 16.7 | 10/14/13 09:25 | |
| Anthracene | ug/kg | ND | 16.7 | 10/14/13 09:25 | |
| Benzo(a)anthracene | ug/kg | ND | 16.7 | 10/14/13 09:25 | |
| Benzo(a)pyrene | ug/kg | ND | 16.7 | 10/14/13 09:25 | |
| Benzo(b)fluoranthene | ug/kg | ND | 16.7 | 10/14/13 09:25 | |
| Benzo(g,h,i)perylene | ug/kg | ND | 16.7 | 10/14/13 09:25 | |
| Benzo(k)fluoranthene | ug/kg | ND | 16.7 | 10/14/13 09:25 | |
| Chrysene | ug/kg | ND | 16.7 | 10/14/13 09:25 | |
| Dibenz(a,h)anthracene | ug/kg | ND | 16.7 | 10/14/13 09:25 | |
| Fluoranthene | ug/kg | ND | 16.7 | 10/14/13 09:25 | |
| Fluorene | ug/kg | ND | 16.7 | 10/14/13 09:25 | |
| Indeno(1,2,3-cd)pyrene | ug/kg | ND | 16.7 | 10/14/13 09:25 | |
| Naphthalene | ug/kg | ND | 16.7 | 10/14/13 09:25 | |
| Phenanthrene | ug/kg | ND | 16.7 | 10/14/13 09:25 | |
| Pyrene | ug/kg | ND | 16.7 | 10/14/13 09:25 | |
| 2-Fluorobiphenyl (S) | % | 98 | 40-130 | 10/14/13 09:25 | |
| Terphenyl-d14 (S) | % | 89 | 40-130 | 10/14/13 09:25 | |

LABORATORY CONTROL SAMPLE: 874242

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Acenaphthene | ug/kg | 333 | 319 | 96 | 55-130 | |
| Acenaphthylene | ug/kg | 333 | 307 | 92 | 55-130 | |
| Anthracene | ug/kg | 333 | 337 | 101 | 66-130 | |
| Benzo(a)anthracene | ug/kg | 333 | 304 | 91 | 55-130 | |
| Benzo(a)pyrene | ug/kg | 333 | 311 | 93 | 56-130 | |
| Benzo(b)fluoranthene | ug/kg | 333 | 346 | 104 | 53-130 | |
| Benzo(g,h,i)perylene | ug/kg | 333 | 314 | 94 | 51-130 | |
| Benzo(k)fluoranthene | ug/kg | 333 | 321 | 96 | 52-130 | |
| Chrysene | ug/kg | 333 | 331 | 99 | 58-130 | |
| Dibenz(a,h)anthracene | ug/kg | 333 | 313 | 94 | 55-130 | |
| Fluoranthene | ug/kg | 333 | 318 | 95 | 62-130 | |
| Fluorene | ug/kg | 333 | 324 | 97 | 58-130 | |
| Indeno(1,2,3-cd)pyrene | ug/kg | 333 | 307 | 92 | 54-130 | |
| Naphthalene | ug/kg | 333 | 264 | 79 | 41-130 | |
| Phenanthrene | ug/kg | 333 | 317 | 95 | 60-130 | |
| Pyrene | ug/kg | 333 | 322 | 97 | 51-130 | |
| 2-Fluorobiphenyl (S) | % | | | 100 | 40-130 | |
| Terphenyl-d14 (S) | % | | | 94 | 40-130 | |

## REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
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(920)469-2436

## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4086098

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 874243 874244

| Parameter | Units | 4086118003 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | ug/kg | <9.6 | 384 | 384 | 353 | 349 | 92 | 91 | 31-130 | 1 | 35 | |
| Acenaphthylene | ug/kg | <9.6 | 384 | 384 | 339 | 341 | 88 | 88 | 32-130 | 1 | 25 | |
| Anthracene | ug/kg | <9.6 | 384 | 384 | 362 | 361 | 94 | 94 | 39-131 | 0 | 38 | |
| Benzo(a)anthracene | ug/kg | <9.6 | 384 | 384 | 342 | 338 | 89 | 88 | 29-130 | 1 | 30 | |
| Benzo(a)pyrene | ug/kg | <3.4 | 384 | 384 | 396 | 394 | 103 | 102 | 35-130 | 0 | 33 | |
| Benzo(b)fluoranthene | ug/kg | <9.6 | 384 | 384 | 452 | 444 | 117 | 115 | 21-142 | 2 | 44 | |
| Benzo(g,h,i)perylene | ug/kg | <9.6 | 384 | 384 | 298 | 290 | 77 | 75 | 12-134 | 3 | 33 | |
| Benzo(k)fluoranthene | ug/kg | <3.4 | 384 | 384 | 328 | 329 | 85 | 86 | 35-130 | 0 | 37 | |
| Chrysene | ug/kg | <9.6 | 384 | 384 | 351 | 345 | 91 | 89 | 37-130 | 2 | 38 | |
| Dibenz(a,h)anthracene | ug/kg | <9.6 | 384 | 384 | 328 | 329 | 85 | 86 | 23-130 | 0 | 27 | |
| Fluoranthene | ug/kg | <9.6 | 384 | 384 | 355 | 351 | 92 | 91 | 29-137 | 1 | 50 | |
| Fluorene | ug/kg | <9.6 | 384 | 384 | 359 | 358 | 93 | 93 | 32-130 | 0 | 32 | |
| Indeno(1,2,3-cd)pyrene | ug/kg | <9.6 | 384 | 384 | 315 | 314 | 82 | 82 | 17-134 | 0 | 28 | |
| Naphthalene | ug/kg | <9.6 | 384 | 384 | 312 | 294 | 81 | 77 | 24-130 | 6 | 40 | |
| Phenanthrene | ug/kg | <9.6 | 384 | 384 | 360 | 359 | 93 | 93 | 27-135 | 0 | 46 | |
| Pyrene | ug/kg | <9.6 | 384 | 384 | 355 | 353 | 91 | 90 | 24-130 | 0 | 49 | |
| 2-Fluorobiphenyl (S) | % | | | | | | 97 | 95 | 40-130 | | | |
| Terphenyl-d14 (S) | % | | | | | | 87 | 87 | 40-130 | | | |

## REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
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(920)469-2436

## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4086098

QC Batch: OEXT/20193 Analysis Method: EPA 8270 by SIM
QC Batch Method: EPA 3546 Analysis Description: 8270/3546 MSSV PAH by SIM
Associated Lab Samples: 4086098001, 4086098002, 4086098003, 4086098006

METHOD BLANK: 874765 Matrix: Solid
Associated Lab Samples: 4086098001, 4086098002, 4086098003, 4086098006

| Parameter | Units | Blank Result | Reporting Limit | Analyzed | Qualifiers |
|---|---|---|---|---|---|
| Acenaphthene | ug/kg | ND | 16.7 | 10/14/13 11:10 | |
| Acenaphthylene | ug/kg | ND | 16.7 | 10/14/13 11:10 | |
| Anthracene | ug/kg | ND | 16.7 | 10/14/13 11:10 | |
| Benzo(a)anthracene | ug/kg | ND | 16.7 | 10/14/13 11:10 | |
| Benzo(a)pyrene | ug/kg | ND | 16.7 | 10/14/13 11:10 | |
| Benzo(b)fluoranthene | ug/kg | ND | 16.7 | 10/14/13 11:10 | |
| Benzo(g,h,i)perylene | ug/kg | ND | 16.7 | 10/14/13 11:10 | |
| Benzo(k)fluoranthene | ug/kg | ND | 16.7 | 10/14/13 11:10 | |
| Chrysene | ug/kg | ND | 16.7 | 10/14/13 11:10 | |
| Dibenz(a,h)anthracene | ug/kg | ND | 16.7 | 10/14/13 11:10 | |
| Fluoranthene | ug/kg | ND | 16.7 | 10/14/13 11:10 | |
| Fluorene | ug/kg | ND | 16.7 | 10/14/13 11:10 | |
| Indeno(1,2,3-cd)pyrene | ug/kg | ND | 16.7 | 10/14/13 11:10 | |
| Naphthalene | ug/kg | ND | 16.7 | 10/14/13 11:10 | |
| Phenanthrene | ug/kg | ND | 16.7 | 10/14/13 11:10 | |
| Pyrene | ug/kg | ND | 16.7 | 10/14/13 11:10 | |
| 2-Fluorobiphenyl (S) | % | 92 | 40-130 | 10/14/13 11:10 | |
| Terphenyl-d14 (S) | % | 82 | 40-130 | 10/14/13 11:10 | |

LABORATORY CONTROL SAMPLE: 874766

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Acenaphthene | ug/kg | 333 | 295 | 88 | 55-130 | |
| Acenaphthylene | ug/kg | 333 | 288 | 86 | 55-130 | |
| Anthracene | ug/kg | 333 | 333 | 100 | 66-130 | |
| Benzo(a)anthracene | ug/kg | 333 | 280 | 84 | 55-130 | |
| Benzo(a)pyrene | ug/kg | 333 | 289 | 87 | 56-130 | |
| Benzo(b)fluoranthene | ug/kg | 333 | 323 | 97 | 53-130 | |
| Benzo(g,h,i)perylene | ug/kg | 333 | 296 | 89 | 51-130 | |
| Benzo(k)fluoranthene | ug/kg | 333 | 294 | 88 | 52-130 | |
| Chrysene | ug/kg | 333 | 298 | 89 | 58-130 | |
| Dibenz(a,h)anthracene | ug/kg | 333 | 296 | 89 | 55-130 | |
| Fluoranthene | ug/kg | 333 | 309 | 93 | 62-130 | |
| Fluorene | ug/kg | 333 | 301 | 90 | 58-130 | |
| Indeno(1,2,3-cd)pyrene | ug/kg | 333 | 293 | 88 | 54-130 | |
| Naphthalene | ug/kg | 333 | 234 | 70 | 41-130 | |
| Phenanthrene | ug/kg | 333 | 310 | 93 | 60-130 | |
| Pyrene | ug/kg | 333 | 294 | 88 | 51-130 | |
| 2-Fluorobiphenyl (S) | % | | | 97 | 40-130 | |
| Terphenyl-d14 (S) | % | | | 89 | 40-130 | |

## REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4086098

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 874767 874768

| Parameter | Units | 4085823002 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | ug/kg | <9.9 | 396 | 396 | 372 | 353 | 92 | 87 | 31-130 | 5 | 35 | |
| Acenaphthylene | ug/kg | 32.6 | 396 | 396 | 366 | 359 | 84 | 82 | 32-130 | 2 | 25 | |
| Anthracene | ug/kg | 29.7 | 396 | 396 | 377 | 371 | 87 | 86 | 39-131 | 2 | 38 | |
| Benzo(a)anthracene | ug/kg | 93.6 | 396 | 396 | 386 | 387 | 74 | 74 | 29-130 | 0 | 30 | |
| Benzo(a)pyrene | ug/kg | 119 | 396 | 396 | 438 | 450 | 80 | 83 | 35-130 | 3 | 33 | |
| Benzo(b)fluoranthene | ug/kg | 122 | 396 | 396 | 425 | 537 | 76 | 104 | 21-142 | 23 | 44 | |
| Benzo(g,h,i)perylene | ug/kg | 71.0 | 396 | 396 | 310 | 305 | 60 | 59 | 12-134 | 1 | 33 | |
| Benzo(k)fluoranthene | ug/kg | 119 | 396 | 396 | 430 | 371 | 78 | 64 | 35-130 | 15 | 37 | |
| Chrysene | ug/kg | 140 | 396 | 396 | 412 | 423 | 68 | 71 | 37-130 | 3 | 38 | |
| Dibenz(a,h)anthracene | ug/kg | 26.8 | 396 | 396 | 333 | 334 | 77 | 78 | 23-130 | 0 | 27 | |
| Fluoranthene | ug/kg | 168 | 396 | 396 | 445 | 448 | 70 | 71 | 29-137 | 1 | 50 | |
| Fluorene | ug/kg | <9.9 | 396 | 396 | 367 | 358 | 91 | 89 | 32-130 | 2 | 32 | |
| Indeno(1,2,3-cd)pyrene | ug/kg | 63.0 | 396 | 396 | 326 | 327 | 66 | 66 | 17-134 | 0 | 28 | |
| Naphthalene | ug/kg | 411 | 396 | 396 | 570 | 645 | 40 | 59 | 24-130 | 12 | 40 | |
| Phenanthrene | ug/kg | 105 | 396 | 396 | 428 | 433 | 81 | 83 | 27-135 | 1 | 46 | |
| Pyrene | ug/kg | 159 | 396 | 396 | 449 | 453 | 73 | 74 | 24-130 | 1 | 49 | |
| 2-Fluorobiphenyl (S) | % | | | | | | 92 | 92 | 40-130 | | | |
| Terphenyl-d14 (S) | % | | | | | | 83 | 84 | 40-130 | | | |

## REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
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(920)469-2436

## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4086098

QC Batch: OEXT/20205
QC Batch Method: EPA 3546
Analysis Method: EPA 8270 by SIM
Analysis Description: 8270/3546 MSSV PAH by SIM
Associated Lab Samples: 4086098008, 4086098010

METHOD BLANK: 874967
Matrix: Solid
Associated Lab Samples: 4086098008, 4086098010

| Parameter | Units | Blank Result | Reporting Limit | Analyzed | Qualifiers |
|---|---|---|---|---|---|
| Acenaphthene | ug/kg | ND | 16.7 | 10/14/13 16:04 | |
| Acenaphthylene | ug/kg | ND | 16.7 | 10/14/13 16:04 | |
| Anthracene | ug/kg | ND | 16.7 | 10/14/13 16:04 | |
| Benzo(a)anthracene | ug/kg | ND | 16.7 | 10/14/13 16:04 | |
| Benzo(a)pyrene | ug/kg | ND | 16.7 | 10/14/13 16:04 | |
| Benzo(b)fluoranthene | ug/kg | ND | 16.7 | 10/14/13 16:04 | |
| Benzo(g,h,i)perylene | ug/kg | ND | 16.7 | 10/14/13 16:04 | |
| Benzo(k)fluoranthene | ug/kg | ND | 16.7 | 10/14/13 16:04 | |
| Chrysene | ug/kg | ND | 16.7 | 10/14/13 16:04 | |
| Dibenz(a,h)anthracene | ug/kg | ND | 16.7 | 10/14/13 16:04 | |
| Fluoranthene | ug/kg | ND | 16.7 | 10/14/13 16:04 | |
| Fluorene | ug/kg | ND | 16.7 | 10/14/13 16:04 | |
| Indeno(1,2,3-cd)pyrene | ug/kg | ND | 16.7 | 10/14/13 16:04 | |
| Naphthalene | ug/kg | ND | 16.7 | 10/14/13 16:04 | |
| Phenanthrene | ug/kg | ND | 16.7 | 10/14/13 16:04 | |
| Pyrene | ug/kg | ND | 16.7 | 10/14/13 16:04 | |
| 2-Fluorobiphenyl (S) | % | 80 | 40-130 | 10/14/13 16:04 | |
| Terphenyl-d14 (S) | % | 76 | 40-130 | 10/14/13 16:04 | |

LABORATORY CONTROL SAMPLE: 874968

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Acenaphthene | ug/kg | 333 | 251 | 75 | 55-130 | |
| Acenaphthylene | ug/kg | 333 | 246 | 74 | 55-130 | |
| Anthracene | ug/kg | 333 | 267 | 80 | 66-130 | |
| Benzo(a)anthracene | ug/kg | 333 | 238 | 71 | 55-130 | |
| Benzo(a)pyrene | ug/kg | 333 | 242 | 73 | 56-130 | |
| Benzo(b)fluoranthene | ug/kg | 333 | 272 | 82 | 53-130 | |
| Benzo(g,h,i)perylene | ug/kg | 333 | 249 | 75 | 51-130 | |
| Benzo(k)fluoranthene | ug/kg | 333 | 248 | 74 | 52-130 | |
| Chrysene | ug/kg | 333 | 259 | 78 | 58-130 | |
| Dibenz(a,h)anthracene | ug/kg | 333 | 244 | 73 | 55-130 | |
| Fluoranthene | ug/kg | 333 | 251 | 75 | 62-130 | |
| Fluorene | ug/kg | 333 | 256 | 77 | 58-130 | |
| Indeno(1,2,3-cd)pyrene | ug/kg | 333 | 241 | 72 | 54-130 | |
| Naphthalene | ug/kg | 333 | 210 | 63 | 41-130 | |
| Phenanthrene | ug/kg | 333 | 250 | 75 | 60-130 | |
| Pyrene | ug/kg | 333 | 254 | 76 | 51-130 | |
| 2-Fluorobiphenyl (S) | % | | | 78 | 40-130 | |
| Terphenyl-d14 (S) | % | | | 74 | 40-130 | |

## REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
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(920)469-2436

## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4086098

QC Batch: PMST/9000 Analysis Method: ASTM D2974-87
QC Batch Method: ASTM D2974-87 Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 4086098001, 4086098002, 4086098003, 4086098004, 4086098005, 4086098006, 4086098007, 4086098008, 4086098009, 4086098010, 4086098011

SAMPLE DUPLICATE: 875184

| Parameter | Units | 4086572002 Result | Dup Result | RPD | Max RPD | Qualifiers |
|---|---|---|---|---|---|---|
| Percent Moisture | % | 20.5 | 20.0 | 2 | 10 | |

## REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
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(920)469-2436

## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4086098

QC Batch: WETA/19880 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 4086098001, 4086098002, 4086098003, 4086098004, 4086098005, 4086098006, 4086098008, 4086098010

METHOD BLANK: 870425 Matrix: Solid
Associated Lab Samples: 4086098001, 4086098002, 4086098003, 4086098004, 4086098005, 4086098006, 4086098008, 4086098010

| Parameter | Units | Blank Result | Reporting Limit | Analyzed | Qualifiers |
|---|---|---|---|---|---|
| Nitrate as N | mg/kg | ND | 3.0 | 10/09/13 10:24 | |
| Nitrite as N | mg/kg | ND | 2.0 | 10/09/13 10:24 | |
| Nitrogen, NO2 plus NO3 | mg/kg | ND | 3.0 | 10/09/13 10:24 | |

LABORATORY CONTROL SAMPLE: 870426

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Nitrate as N | mg/kg | 20 | 19.2 | 96 | 80-120 | |
| Nitrite as N | mg/kg | 10 | 10.9 | 109 | 80-120 | |
| Nitrogen, NO2 plus NO3 | mg/kg | 30 | 30.1 | 100 | | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 870427 870428

| Parameter | Units | 4086098001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nitrate as N | mg/kg | ND | 141 | 141 | 140 | 140 | 98 | 98 | 80-120 | 0 | 20 | |
| Nitrite as N | mg/kg | ND | 70.9 | 70.9 | 76.6 | 77.3 | 108 | 109 | 80-120 | 1 | 20 | |
| Nitrogen, NO2 plus NO3 | mg/kg | ND | 213 | 213 | 216 | 217 | 102 | 102 | | 0 | | |

## REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
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(920)469-2436

## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4086098

QC Batch: WETA/19986 Analysis Method: EPA 350.1
QC Batch Method: EPA 350.1 Analysis Description: 350.1 Ammonia
Associated Lab Samples: 4086098001, 4086098002, 4086098003, 4086098004, 4086098005, 4086098006, 4086098008, 4086098010

METHOD BLANK: 873143 Matrix: Solid
Associated Lab Samples: 4086098001, 4086098002, 4086098003, 4086098004, 4086098005, 4086098006, 4086098008, 4086098010

| Parameter | Units | Blank Result | Reporting Limit | Analyzed | Qualifiers |
|---|---|---|---|---|---|
| Nitrogen, Ammonia | mg/kg | ND | 15.0 | 10/11/13 20:22 | |

LABORATORY CONTROL SAMPLE: 873144

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Nitrogen, Ammonia | mg/kg | 300 | 291 | 97 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 873145 873146

| Parameter | Units | 4085716001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nitrogen, Ammonia | mg/kg | <52.8 | 2210 | 2210 | 2420 | 2320 | 107 | 103 | 80-120 | 4 | 20 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 873147 873148

| Parameter | Units | 4086324002 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nitrogen, Ammonia | mg/kg | <51.1 | 2040 | 1950 | 2180 | 2130 | 106 | 108 | 80-120 | 3 | 20 | |

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(920)469-2436

## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4086098

QC Batch: WETA/19883 Analysis Method: EPA 351.2
QC Batch Method: EPA 351.2 Analysis Description: 351.2 TKN
Associated Lab Samples: 4086098001, 4086098002, 4086098003, 4086098004, 4086098005, 4086098006, 4086098008, 4086098010

METHOD BLANK: 870479 Matrix: Solid
Associated Lab Samples: 4086098001, 4086098002, 4086098003, 4086098004, 4086098005, 4086098006, 4086098008, 4086098010

| Parameter | Units | Blank Result | Reporting Limit | Analyzed | Qualifiers |
|---|---|---|---|---|---|
| Nitrogen, Kjeldahl, Total | mg/kg | ND | 100 | 10/07/13 22:08 | |

LABORATORY CONTROL SAMPLE: 870480

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Nitrogen, Kjeldahl, Total | mg/kg | 500 | 450 | 90 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 870481 870482

| Parameter | Units | 4085496003 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nitrogen, Kjeldahl, Total | mg/kg | 36200 | 5440 | 5440 | 34800 | 49000 | -26 | 235 | 80-120 | 34 | 20 | P6,R1 |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 870483 870484

| Parameter | Units | 4086098010 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nitrogen, Kjeldahl, Total | mg/kg | 247 | 562 | 562 | 727 | 698 | 85 | 80 | 80-120 | 4 | 20 | |

## REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4086098

QC Batch: WETA/20092 Analysis Method: EPA 365.4
QC Batch Method: EPA 365.4 Analysis Description: 365.4 Total Phosphorus
Associated Lab Samples: 4086098001, 4086098002, 4086098003, 4086098004, 4086098005, 4086098006, 4086098008, 4086098010

METHOD BLANK: 876897 Matrix: Solid
Associated Lab Samples: 4086098001, 4086098002, 4086098003, 4086098004, 4086098005, 4086098006, 4086098008, 4086098010

| Parameter | Units | Blank Result | Reporting Limit | Analyzed | Qualifiers |
|---|---|---|---|---|---|
| Phosphorus | mg/kg | ND | 40.0 | 10/17/13 12:23 | |

LABORATORY CONTROL SAMPLE: 876898

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Phosphorus | mg/kg | 500 | 509 | 102 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 876899 876900

| Parameter | Units | 10245808002 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phosphorus | mg/kg | 427 | 294 | 294 | 670 | 668 | 83 | 82 | 80-120 | 0 | 20 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 876901 876902

| Parameter | Units | 10245808010 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phosphorus | mg/kg | 325 | 400 | 400 | 679 | 632 | 88 | 77 | 80-120 | 7 | 20 | M0 |

## REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

## QUALITY CONTROL DATA

Project: D DOCK
Pace Project No.: 4086098

QC Batch: WETA/19969 Analysis Method: EPA 9060 Modified
QC Batch Method: EPA 9060 Modified Analysis Description: 9060 TOC Average
Associated Lab Samples: 4086098001, 4086098002, 4086098003, 4086098004, 4086098005, 4086098006, 4086098008, 4086098010

METHOD BLANK: 872253 Matrix: Solid
Associated Lab Samples: 4086098001, 4086098002, 4086098003, 4086098004, 4086098005, 4086098006, 4086098008, 4086098010

| Parameter | Units | Blank Result | Reporting Limit | Analyzed | Qualifiers |
|---|---|---|---|---|---|
| Mean Total Organic Carbon | mg/kg | ND | 600 | 10/11/13 08:09 | |

LABORATORY CONTROL SAMPLE: 872254

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Mean Total Organic Carbon | mg/kg | 120000 | 125000 | 104 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 872255 872256

| Parameter | Units | 4086098003 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mean Total Organic Carbon | mg/kg | 15600 | 11700 | 11700 | 27700 | 26600 | 104 | 94 | 50-150 | 4 | 30 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 872257 872258

| Parameter | Units | 4086098002 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mean Total Organic Carbon | mg/kg | 9790 | 14800 | 14900 | 27600 | 26300 | 120 | 110 | 50-150 | 5 | 30 | |

**REPORT OF LABORATORY ANALYSIS**

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1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

# QUALIFIERS

Project: D DOCK
Pace Project No.: 4086098

## DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

## LABORATORIES

| | |
|---|---|
| PASI-G | Pace Analytical Services - Green Bay |

## ANALYTE QUALIFIERS

| | |
|---|---|
| 1q | Benzo(b)fluoranthene and benzo(k)fluoranthene were in the check standard but did not meet the resolution criteria in SW846 Method 8270C. Whereas sample results included are reported as individual isomers, the lab and the customer must recognize them as an isomeric pair. |
| 2q | Two additional repetitions were analyzed as a result of an RPD >/=40%. The results from the additional repetitions are 41,800 mg/Kg and 40,700 mg/Kg, adjusted for % moisture. |
| D3 | Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference. |
| M0 | Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits. |
| P6 | Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level. |
| R1 | RPD value was outside control limits. |

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## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: D DOCK
Pace Project No.: 4086098

| Lab ID | Sample ID | QC Batch Method | QC Batch | Analytical Method | Analytical Batch |
|---|---|---|---|---|---|
| 4086098001 | SB-5-13 (13.5-18) | EPA 3541 | OEXT/20147 | EPA 8082 | GCSV/10323 |
| 4086098002 | SB-5-13 (18-26) | EPA 3541 | OEXT/20147 | EPA 8082 | GCSV/10323 |
| 4086098003 | SB-5-13 (26-31) | EPA 3541 | OEXT/20147 | EPA 8082 | GCSV/10323 |
| 4086098004 | SB-6-13 (7-12.5) | EPA 3541 | OEXT/20147 | EPA 8082 | GCSV/10323 |
| 4086098005 | SB-6-13 (12.5-17.5) | EPA 3541 | OEXT/20147 | EPA 8082 | GCSV/10323 |
| 4086098006 | SB-6-13 (17.5-22.5) | EPA 3541 | OEXT/20147 | EPA 8082 | GCSV/10323 |
| 4086098008 | SB-7-13 (19-21.5) | EPA 3541 | OEXT/20147 | EPA 8082 | GCSV/10323 |
| 4086098010 | SB-8-13 (14.5-17) | EPA 3541 | OEXT/20147 | EPA 8082 | GCSV/10323 |
| 4086098001 | SB-5-13 (13.5-18) | EPA 3050 | MPRP/9280 | EPA 6010 | ICP/8174 |
| 4086098002 | SB-5-13 (18-26) | EPA 3050 | MPRP/9280 | EPA 6010 | ICP/8174 |
| 4086098003 | SB-5-13 (26-31) | EPA 3050 | MPRP/9280 | EPA 6010 | ICP/8174 |
| 4086098004 | SB-6-13 (7-12.5) | EPA 3050 | MPRP/9280 | EPA 6010 | ICP/8174 |
| 4086098005 | SB-6-13 (12.5-17.5) | EPA 3050 | MPRP/9280 | EPA 6010 | ICP/8174 |
| 4086098006 | SB-6-13 (17.5-22.5) | EPA 3050 | MPRP/9280 | EPA 6010 | ICP/8174 |
| 4086098008 | SB-7-13 (19-21.5) | EPA 3050 | MPRP/9280 | EPA 6010 | ICP/8174 |
| 4086098010 | SB-8-13 (14.5-17) | EPA 3050 | MPRP/9280 | EPA 6010 | ICP/8174 |
| 4086098001 | SB-5-13 (13.5-18) | EPA 7471 | MERP/3901 | EPA 7471 | MERC/4972 |
| 4086098002 | SB-5-13 (18-26) | EPA 7471 | MERP/3901 | EPA 7471 | MERC/4972 |
| 4086098003 | SB-5-13 (26-31) | EPA 7471 | MERP/3901 | EPA 7471 | MERC/4972 |
| 4086098004 | SB-6-13 (7-12.5) | EPA 7471 | MERP/3901 | EPA 7471 | MERC/4972 |
| 4086098005 | SB-6-13 (12.5-17.5) | EPA 7471 | MERP/3901 | EPA 7471 | MERC/4972 |
| 4086098006 | SB-6-13 (17.5-22.5) | EPA 7471 | MERP/3901 | EPA 7471 | MERC/4972 |
| 4086098008 | SB-7-13 (19-21.5) | EPA 7471 | MERP/3901 | EPA 7471 | MERC/4972 |
| 4086098010 | SB-8-13 (14.5-17) | EPA 7471 | MERP/3901 | EPA 7471 | MERC/4972 |
| 4086098001 | SB-5-13 (13.5-18) | EPA 3546 | OEXT/20193 | EPA 8270 by SIM | MSSV/6099 |
| 4086098002 | SB-5-13 (18-26) | EPA 3546 | OEXT/20193 | EPA 8270 by SIM | MSSV/6099 |
| 4086098003 | SB-5-13 (26-31) | EPA 3546 | OEXT/20193 | EPA 8270 by SIM | MSSV/6099 |
| 4086098004 | SB-6-13 (7-12.5) | EPA 3546 | OEXT/20192 | EPA 8270 by SIM | MSSV/6098 |
| 4086098005 | SB-6-13 (12.5-17.5) | EPA 3546 | OEXT/20192 | EPA 8270 by SIM | MSSV/6098 |
| 4086098006 | SB-6-13 (17.5-22.5) | EPA 3546 | OEXT/20193 | EPA 8270 by SIM | MSSV/6099 |
| 4086098008 | SB-7-13 (19-21.5) | EPA 3546 | OEXT/20205 | EPA 8270 by SIM | MSSV/6102 |
| 4086098010 | SB-8-13 (14.5-17) | EPA 3546 | OEXT/20205 | EPA 8270 by SIM | MSSV/6102 |
| 4086098001 | SB-5-13 (13.5-18) | ASTM D2974-87 | PMST/9000 | | |
| 4086098002 | SB-5-13 (18-26) | ASTM D2974-87 | PMST/9000 | | |
| 4086098003 | SB-5-13 (26-31) | ASTM D2974-87 | PMST/9000 | | |
| 4086098004 | SB-6-13 (7-12.5) | ASTM D2974-87 | PMST/9000 | | |
| 4086098005 | SB-6-13 (12.5-17.5) | ASTM D2974-87 | PMST/9000 | | |
| 4086098006 | SB-6-13 (17.5-22.5) | ASTM D2974-87 | PMST/9000 | | |
| 4086098007 | SB-6-13 (24-30.5) | ASTM D2974-87 | PMST/9000 | | |
| 4086098008 | SB-7-13 (19-21.5) | ASTM D2974-87 | PMST/9000 | | |
| 4086098009 | SB-7-13 (21.5-31.5) | ASTM D2974-87 | PMST/9000 | | |
| 4086098010 | SB-8-13 (14.5-17) | ASTM D2974-87 | PMST/9000 | | |
| 4086098011 | SB-8-13 (17-32) | ASTM D2974-87 | PMST/9000 | | |
| 4086098001 | SB-5-13 (13.5-18) | EPA 300.0 | WETA/19880 | EPA 300.0 | WETA/19891 |
| 4086098002 | SB-5-13 (18-26) | EPA 300.0 | WETA/19880 | EPA 300.0 | WETA/19891 |

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## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: D DOCK
Pace Project No.: 4086098

| Lab ID | Sample ID | QC Batch Method | QC Batch | Analytical Method | Analytical Batch |
|---|---|---|---|---|---|
| 4086098003 | SB-5-13 (26-31) | EPA 300.0 | WETA/19880 | EPA 300.0 | WETA/19891 |
| 4086098004 | SB-6-13 (7-12.5) | EPA 300.0 | WETA/19880 | EPA 300.0 | WETA/19891 |
| 4086098005 | SB-6-13 (12.5-17.5) | EPA 300.0 | WETA/19880 | EPA 300.0 | WETA/19891 |
| 4086098006 | SB-6-13 (17.5-22.5) | EPA 300.0 | WETA/19880 | EPA 300.0 | WETA/19891 |
| 4086098008 | SB-7-13 (19-21.5) | EPA 300.0 | WETA/19880 | EPA 300.0 | WETA/19891 |
| 4086098010 | SB-8-13 (14.5-17) | EPA 300.0 | WETA/19880 | EPA 300.0 | WETA/19891 |
| 4086098001 | SB-5-13 (13.5-18) | EPA 350.1 | WETA/19986 | EPA 350.1 | WETA/19998 |
| 4086098002 | SB-5-13 (18-26) | EPA 350.1 | WETA/19986 | EPA 350.1 | WETA/19998 |
| 4086098003 | SB-5-13 (26-31) | EPA 350.1 | WETA/19986 | EPA 350.1 | WETA/19998 |
| 4086098004 | SB-6-13 (7-12.5) | EPA 350.1 | WETA/19986 | EPA 350.1 | WETA/19998 |
| 4086098005 | SB-6-13 (12.5-17.5) | EPA 350.1 | WETA/19986 | EPA 350.1 | WETA/19998 |
| 4086098006 | SB-6-13 (17.5-22.5) | EPA 350.1 | WETA/19986 | EPA 350.1 | WETA/19998 |
| 4086098008 | SB-7-13 (19-21.5) | EPA 350.1 | WETA/19986 | EPA 350.1 | WETA/19998 |
| 4086098010 | SB-8-13 (14.5-17) | EPA 350.1 | WETA/19986 | EPA 350.1 | WETA/19998 |
| 4086098001 | SB-5-13 (13.5-18) | EPA 351.2 | WETA/19883 | EPA 351.2 | WETA/19899 |
| 4086098002 | SB-5-13 (18-26) | EPA 351.2 | WETA/19883 | EPA 351.2 | WETA/19899 |
| 4086098003 | SB-5-13 (26-31) | EPA 351.2 | WETA/19883 | EPA 351.2 | WETA/19899 |
| 4086098004 | SB-6-13 (7-12.5) | EPA 351.2 | WETA/19883 | EPA 351.2 | WETA/19899 |
| 4086098005 | SB-6-13 (12.5-17.5) | EPA 351.2 | WETA/19883 | EPA 351.2 | WETA/19899 |
| 4086098006 | SB-6-13 (17.5-22.5) | EPA 351.2 | WETA/19883 | EPA 351.2 | WETA/19899 |
| 4086098008 | SB-7-13 (19-21.5) | EPA 351.2 | WETA/19883 | EPA 351.2 | WETA/19899 |
| 4086098010 | SB-8-13 (14.5-17) | EPA 351.2 | WETA/19883 | EPA 351.2 | WETA/19899 |
| 4086098001 | SB-5-13 (13.5-18) | EPA 365.4 | WETA/20092 | EPA 365.4 | WETA/20096 |
| 4086098002 | SB-5-13 (18-26) | EPA 365.4 | WETA/20092 | EPA 365.4 | WETA/20096 |
| 4086098003 | SB-5-13 (26-31) | EPA 365.4 | WETA/20092 | EPA 365.4 | WETA/20096 |
| 4086098004 | SB-6-13 (7-12.5) | EPA 365.4 | WETA/20092 | EPA 365.4 | WETA/20096 |
| 4086098005 | SB-6-13 (12.5-17.5) | EPA 365.4 | WETA/20092 | EPA 365.4 | WETA/20096 |
| 4086098006 | SB-6-13 (17.5-22.5) | EPA 365.4 | WETA/20092 | EPA 365.4 | WETA/20096 |
| 4086098008 | SB-7-13 (19-21.5) | EPA 365.4 | WETA/20092 | EPA 365.4 | WETA/20096 |
| 4086098010 | SB-8-13 (14.5-17) | EPA 365.4 | WETA/20092 | EPA 365.4 | WETA/20096 |
| 4086098001 | SB-5-13 (13.5-18) | EPA 9060 Modified | WETA/19969 | | |
| 4086098001 | SB-5-13 (13.5-18) | EPA 9060 Modified | WETA/19970 | | |
| 4086098002 | SB-5-13 (18-26) | EPA 9060 Modified | WETA/19969 | | |
| 4086098002 | SB-5-13 (18-26) | EPA 9060 Modified | WETA/19970 | | |
| 4086098003 | SB-5-13 (26-31) | EPA 9060 Modified | WETA/19969 | | |
| 4086098003 | SB-5-13 (26-31) | EPA 9060 Modified | WETA/19970 | | |
| 4086098004 | SB-6-13 (7-12.5) | EPA 9060 Modified | WETA/19969 | | |
| 4086098004 | SB-6-13 (7-12.5) | EPA 9060 Modified | WETA/19970 | | |
| 4086098005 | SB-6-13 (12.5-17.5) | EPA 9060 Modified | WETA/19969 | | |
| 4086098005 | SB-6-13 (12.5-17.5) | EPA 9060 Modified | WETA/19970 | | |
| 4086098006 | SB-6-13 (17.5-22.5) | EPA 9060 Modified | WETA/19969 | | |

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(920)469-2436

## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: D DOCK
Pace Project No.: 4086098

| Lab ID | Sample ID | QC Batch Method | QC Batch | Analytical Method | Analytical Batch |
|---|---|---|---|---|---|
| **4086098006** | **SB-6-13 (17.5-22.5)** | EPA 9060 Modified | WETA/19970 | | |
| **4086098008** | **SB-7-13 (19-21.5)** | EPA 9060 Modified | WETA/19969 | | |
| **4086098008** | **SB-7-13 (19-21.5)** | EPA 9060 Modified | WETA/19970 | | |
| **4086098010** | **SB-8-13 (14.5-17)** | EPA 9060 Modified | WETA/19969 | | |
| **4086098010** | **SB-8-13 (14.5-17)** | EPA 9060 Modified | WETA/19970 | | |

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# CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

40860098

Page: of 1504650



| Section A Required Client Information: | Section B Required Project Information: | Section C Invoice Information: |
|---|---|---|
| Company: EPC | Report To: BMcVean@epcduluth.com | Attention: BRIAN |
| Address: 339 GARFIELD | Copy To: | Company Name: EPC |
| DULUTH MN 55802 | | Address: |
| Email To: BMcVean@epcduluth.com | Purchase Order No.: | Pace Quote Reference: |
| Phone: (218) 727-1239 Fax: | Project Name: D DOCK | Pace Project Manager: |
| Requested Due Date/TAT: | Project Number: | Pace Profile #: |

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: MN

Section D Required Client Information

**SAMPLE ID** (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes — MATRIX / CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

Requested Analysis Filtered (Y/N)

| ITEM # | SAMPLE ID | MATRIX CODE (see valid codes to left) | SAMPLE TYPE (G=GRAB C=COMP) | COLLECTED: COMPOSITE START DATE | COMPOSITE START TIME | COMPOSITE END/GRAB DATE | COMPOSITE END/GRAB TIME | SAMPLE TEMP AT COLLECTION | # OF CONTAINERS | Preservatives: Unpreserved | $H_2SO_4$ | $HNO_3$ | HCl | NaOH | $Na_2S_2O_3$ | Methanol | Other | Analysis Test ↓ Y/N | PAHs | LL Metals | Phosphorus | Nitrate-Nitrite | Ammonia N Ltd | Total Kjeldahl | PCBs | Total Org Carbon | Residual Chlorine (Y/N) | Pace Project No./ Lab I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | SB-5-13 (13.5-18) | SL | C | 10/1/13 | | | | | 3 | X | | | | | | | | | X | X | X | X | X | X | X | | | 34020A |
| 2 | SB-5-13 (18-26) | SL | C | ↓ | | | | | 3 | X | | | | | | | | | X | X | X | X | X | X | X | | | |
| 3 | SB-5-13 (26-31) | SL | C | | | | | | 3 | X | | | | | | | | | X | X | X | X | X | X | X | | | |
| 4 | SB-6-13 (7-12.5) | SL | C | 9/30/13 | | | | | 3 | X | | | | | | | | | X | X | X | X | X | X | X | | | |
| 5 | SB-6-13 (12.5-17.5) | SL | C | | | | | | 3 | X | | | | | | | | | X | X | X | X | X | X | X | | | |
| 6 | SB-6-13 (17.5-22.5) | SL | C | ↓ | | | | | 3 | X | | | | | | | | | X | X | X | X | X | X | X | | | |
| 7 | SB-6-13 (24-30.5) | SL | C | 9/30/13 | | | | | 3 | X | | | | | | | | | X | X | X | X | X | X | X | | | |
| 8 | SB-7-13 (19-21.5) | SL | G | 10/1/13 | | | | | 3 | X | | | | | | | | | X | X | X | X | X | X | X | | | |
| 9 | SB-7-13 (21.5-31.5) | SL | C | ↓ | | | | | 3 | X | | | | | | | | | X | X | X | X | X | X | X | | | |
| 10 | SB-8-13 (14.5-17) | SL | G | | | | | | 3 | X | | | | | | | | | X | X | X | X | X | X | X | | | |
| 11 | SB-8-13 (17-32) | SL | C | ↓ | | | | | 3 | X | | | | | | | | | X | X | X | X | X | X | X | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| ADDITIONAL COMMENTS | RELINQUISHED BY / AFFILIATION | DATE | TIME | ACCEPTED BY / AFFILIATION | DATE | TIME | SAMPLE CONDITIONS |
|---|---|---|---|---|---|---|---|
| | | 10/3/13 | 11:37A | | 10/3/13 | 1137 | |
| | | 10/3/13 | 1500 | | | | |
| | Fed Ex | 10/5/13 | 0910 | Juan Ulfe Pace | 10/5/13 | 0910 | 3.5 Y Y Y |

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: BRIAN MCVEAN

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 10-3-13

| Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N) |
|---|---|---|---|
| | | | |

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

## Steve Mleczko - Re: D Dock Samples

4086098

**From:** <bmcvean@epcduluth.com>
**To:** "Steve Mleczko" <Steve.Mleczko@pacelabs.com>
**Date:** 10/4/2013 10:19 AM
**Subject:** Re: D Dock Samples

I need to take one more sample off the list, please hold off on sample SB-6-13 (24-30.5), thanks So the total change to the COC will be a minus 3 samples leaving eight (8) to run for the full suite of parameters. Thanks, of course call with any and all questions, Brian

Brian E. McVean, PE
EPC Engineering & Testing
539 Garfield Avenue
Duluth, MN 55802
(218) 727-1239 o (218) 727-1248 f
(218) 343-2677 c

On Fri 10/04/13 8:42 AM , "Steve Mleczko" <Steve.Mleczko@pacelabs.com> wrote:

> Thanks!
> Steve
>
> Steve Mleczko
> Project Manager
> Pace Analytical Services, Inc.
> Green Bay Laboratory
> (920) 321-9440 Direct Dial
> (920) 469-2436 Ext. 440
> Steve.Mleczko@pacelabs.com
>
> >>> <bmcvean@epcduluth.com> 10/4/2013 8:31 AM >>>
>
> Hi Steve, the two samples I wish to hold off on are: SB-8-13 (17-32), SB-7-13 (21.5-31.5), thanks
>
> Brian E. McVean, PE
> EPC Engineering & Testing
> 539 Garfield Avenue
> Duluth, MN 55802
> (218) 727-1239 o (218) 727-1248 f
> (218) 343-2677 c
>
> 

Pace Analytical Services,
1241 Bellevue Street, Su
Green Bay, WI 54

Pace Analytical™

# Sample Condition Upon Receipt

Client Name: EPC Project # 4086098

Courier: [X] Fed Ex [ ] UPS [ ] USPS [ ] Client [ ] Commercial [ ] Pace Other ____

Tracking #: 7968 3369 3600

Custody Seal on Cooler/Box Present: [X] yes [ ] no Seals intact: [X] yes [ ] no

Custody Seal on Samples Present: [ ] yes [X] no Seals intact: [ ] yes [ ] no

Packing Material: [X] Bubble Wrap [X] Bubble Bags [ ] None [ ] Other ____

Thermometer Used: SR43 Type of Ice: (Wet) Blue Dry None [X] Samples on ice, cooling process has begun

Cooler Temperature: Uncorr: 3 /Corr: 3.5 Biological Tissue is Frozen: [ ] yes [ ] no

Temp Blank Present: [X] yes [ ] no

Person examining contents: Date: 10-4-13 Initials: SW

Temp should be above freezing to 6°C for all sample except Biota.
Frozen Biota Samples should be received ≤ 0°C.

| | | Comments: |
|---|---|---|
| Chain of Custody Present: | [X]Yes [ ]No [ ]N/A | 1. |
| Chain of Custody Filled Out: | [X]Yes [ ]No [ ]N/A | 2. |
| Chain of Custody Relinquished: | [X]Yes [ ]No [ ]N/A | 3. |
| Sampler Name & Signature on COC: | [X]Yes [ ]No [ ]N/A | 4. |
| Samples Arrived within Hold Time: | [X]Yes [ ]No [ ]N/A | 5. |
| - VOA Samples frozen upon receipt | [ ]Yes [ ]No | Date/Time: |
| **Short Hold Time Analysis (<72hr):** | [ ]Yes [X]No [ ]N/A | 6. |
| **Rush Turn Around Time Requested:** | [ ]Yes [X]No [ ]N/A | 7. |
| Sufficient Volume: | [X]Yes [ ]No [ ]N/A | 8. |
| Correct Containers Used: | [X]Yes [ ]No [ ]N/A | 9. |
| -Pace Containers Used: | [X]Yes [ ]No [ ]N/A | |
| -Pace IR Containers Used: | [ ]Yes [ ]No [X]N/A | |
| Containers Intact: | [X]Yes [ ]No [ ]N/A | 10. |
| Filtered volume received for Dissolved tests | [ ]Yes [ ]No [X]N/A | 11. |
| Sample Labels match COC: -Includes date/time/ID/Analysis Matrix: S | [ ]Yes [X]No [ ]N/A | 12. 004 - ID depth reads (7.5-12.5) 10/4 SW<br>005 - ID depth reads (12-17.5)<br>ALL SAMPLES MATCHED ID ONLY. |
| All containers needing preservation have been checked. (Non-Compliance noted in 13.) | [ ]Yes [ ]No [X]N/A | 13. [ ] HNO3 [ ] H2SO4 [ ] NaOH [ ] NaOH +ZnAct |
| All containers needing preservation are found to be in compliance with EPA recommendation. (HNO3, H2SO4 ≤2; NaOH+ZnAct ≥9, NaOH ≥12) | [ ]Yes [ ]No [X]N/A | |
| exceptions: VOA, coliform, TOC, TOX, TOH, O&G, WIDROW, Phenolics, OTHER: | [ ]Yes [X]No | Initial when completed / Lab Std #ID of preservative / Date/ Time: |
| Headspace in VOA Vials ( >6mm): | [ ]Yes [ ]No [X]N/A | 14. |
| Trip Blank Present: | [ ]Yes [ ]No [X]N/A | 15. |
| Trip Blank Custody Seals Present | [ ]Yes [ ]No [X]N/A | |
| Pace Trip Blank Lot # (if purchased): | | |

**Client Notification/ Resolution:** If checked, see attached form for additional comments

Person Contacted: ____ Date/Time: ____

Comments/ Resolution: ____

Project Manager Review: ____ Date: 10/7/13

# ATTACHMENT 4
## PHYSICAL LABORATORY REPORTS

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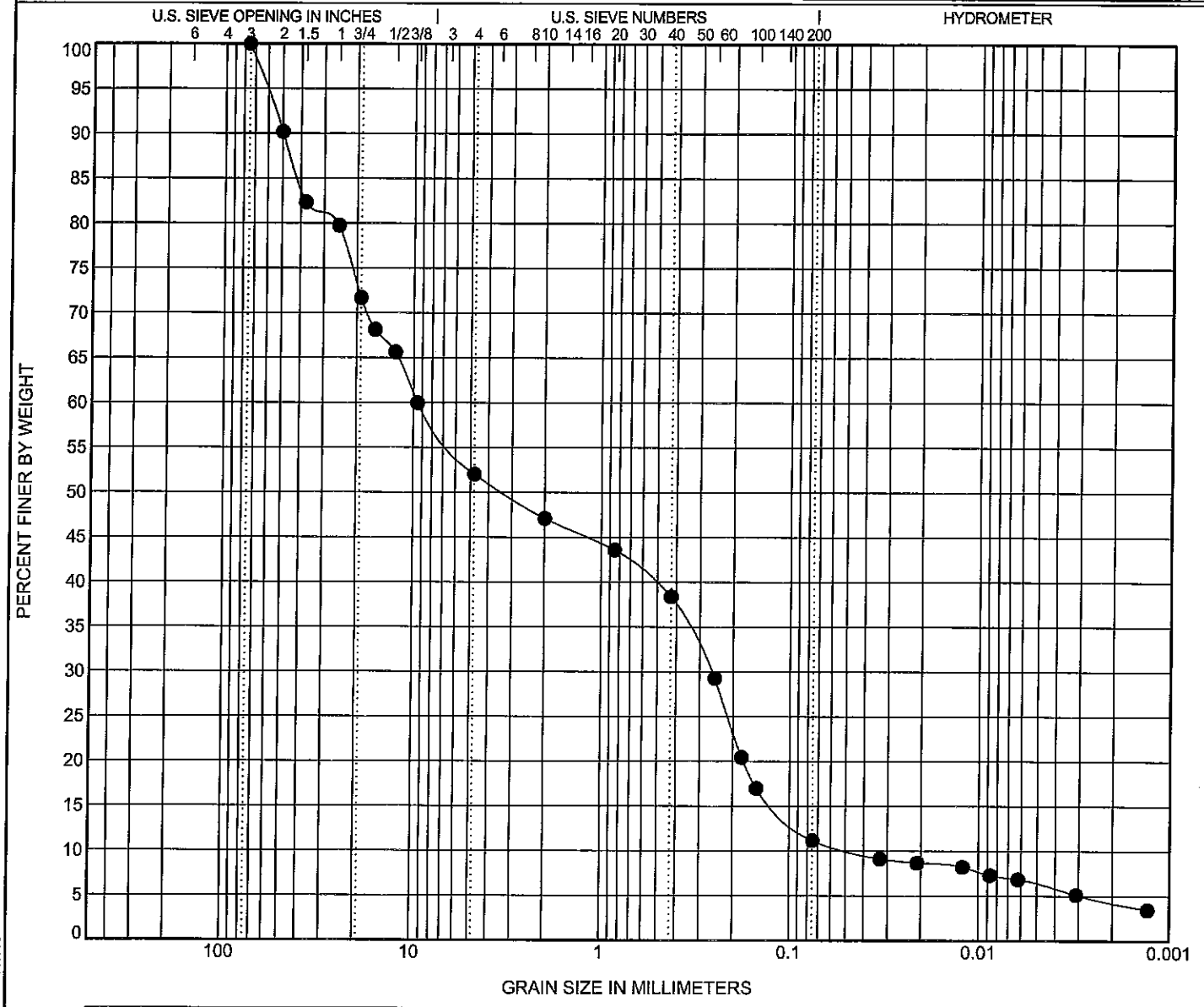
# GRAIN SIZE DISTRIBUTION

**CLIENT** LHB Corporation **PROJECT NAME** D Dock

**PROJECT NUMBER** 13E0837 **PROJECT LOCATION** Duluth, MN




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| Specimen Identification | Classification | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|
| ● Lab Sample # 217 | POORLY GRADED GRAVEL with SILTY CLAY and SAND(GP-GC) | | | | 0.15 | 204.63 |

| D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|
| 75 | 9.505 | 0.261 | 0.046 | 48.0 | 40.9 | 4.9 | 6.3 |

| SIEVE | % PASS | SPEC | SIEVE | % PASS | SPEC | NOTES |
|---|---|---|---|---|---|---|
| 3" | 100 | | #10 | 47 | | Sample obtained from |
| 2" | 90 | | #16 | | | SB-5 (13.5' - 18') |
| 1.5" | 82 | | #20 | 44 | | |
| 1" | 80 | | #30 | | | |
| 3/4" | 72 | | #40 | 38 | | |
| 5/8" | 68 | | #50 | | | |
| 1/2" | 66 | | #60 | 29 | | |
| 3/8" | 60 | | #80 | 20 | | |
| #4 | 52 | | #100 | 17 | | |
| #8 | | | #200 | 11.2 | | |

GRAIN SIZE WITH SPEC BANDS 13E0837 D DOCK.GPJ GINT US LAB.GDT 10/17/13

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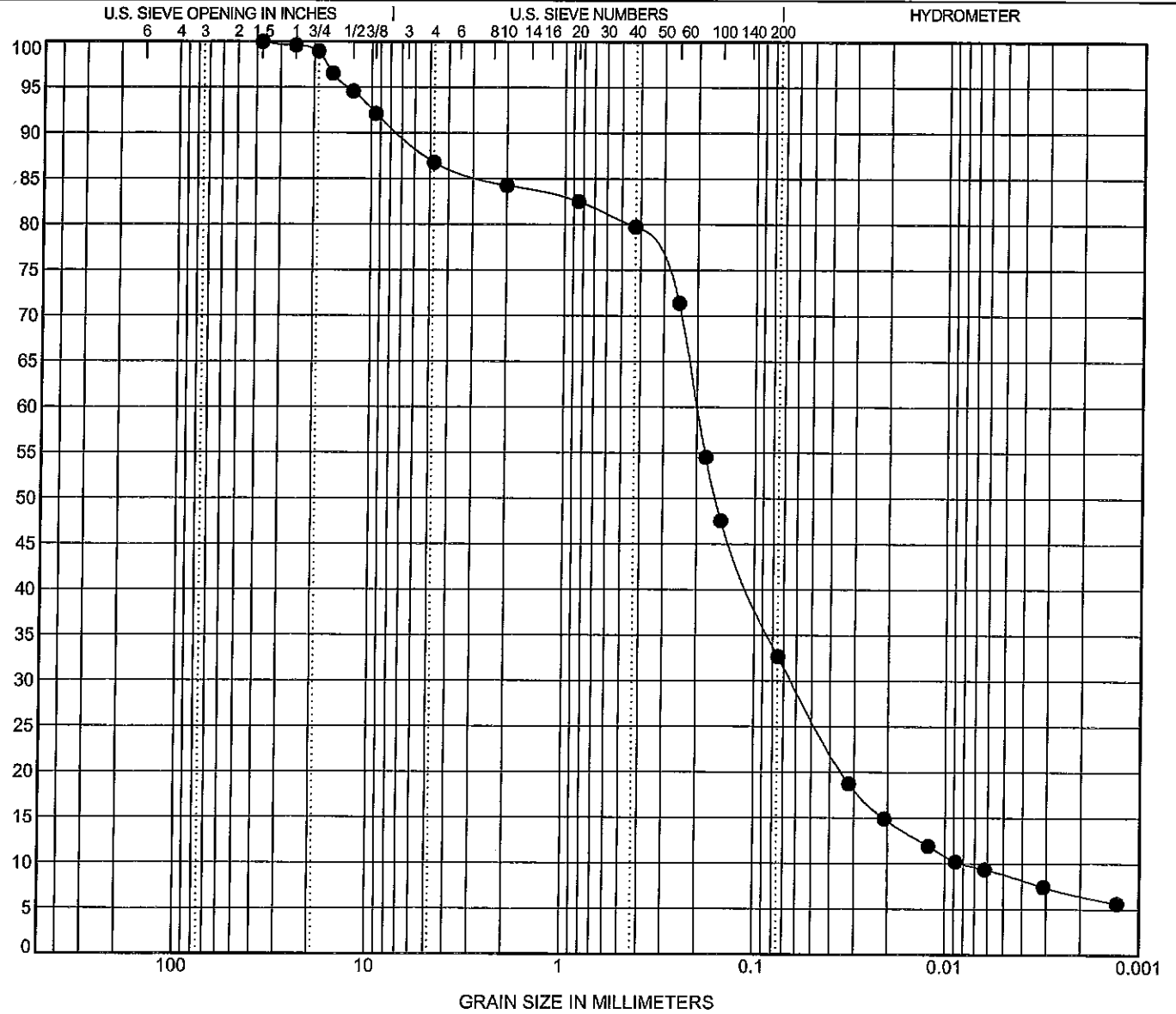
# GRAIN SIZE DISTRIBUTION

**CLIENT** LHB Corporation **PROJECT NAME** D Dock

**PROJECT NUMBER** 13E0837 **PROJECT LOCATION** Duluth, MN




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| Specimen Identification | Classification | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|
| ● **Lab Sample # 218** | **SILTY SAND(SM)** | | | | **2.52** | **25.01** |

| D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|
| **37.5** | **0.2** | **0.064** | **0.008** | **13.2** | **54.1** | **23.9** | **8.8** |

| SIEVE | % PASS | SPEC | SIEVE | % PASS | SPEC | NOTES |
|---|---|---|---|---|---|---|
| 3" | | | #10 | 84 | | Sample obtained from |
| 2" | | | #16 | | | SB-5 (18' - 26') |
| 1.5" | 100 | | #20 | 83 | | |
| 1" | 100 | | #30 | | | |
| 3/4" | 99 | | #40 | 80 | | |
| 5/8" | 97 | | #50 | | | |
| 1/2" | 95 | | #60 | 71 | | |
| 3/8" | 92 | | #80 | 55 | | |
| #4 | 87 | | #100 | 48 | | |
| #8 | | | #200 | 32.7 | | |

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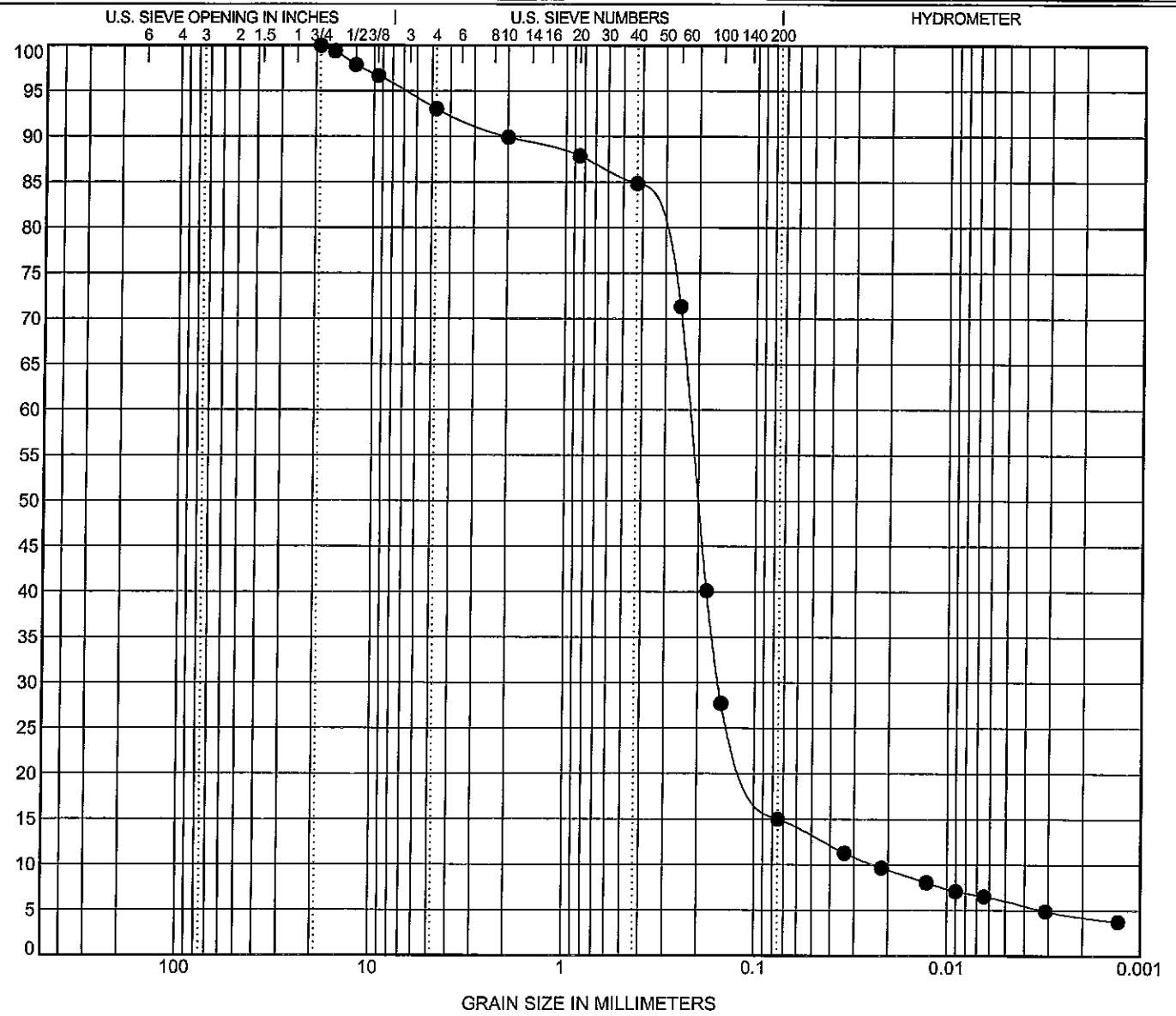
**CLIENT** LHB Corporation **PROJECT NAME** D Dock

**PROJECT NUMBER** 13E0837 **PROJECT LOCATION** Duluth, MN




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| Specimen Identification | Classification | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|
| ● **Lab Sample # 219** | **SILTY, CLAYEY SAND(SC-SM)** | | | | **4.60** | **9.41** |

| D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|
| **19** | **0.222** | **0.155** | **0.024** | **6.9** | **78.0** | **9.0** | **6.0** |

| SIEVE | % PASS | SPEC | SIEVE | % PASS | SPEC | NOTES |
|---|---|---|---|---|---|---|
| 3" | | | #10 | 90 | | Sample obtained from |
| 2" | | | #16 | | | SB-5 (26' - 31') |
| 1.5" | | | #20 | 88 | | |
| 1" | | | #30 | | | |
| 3/4" | 100 | | #40 | 85 | | |
| 5/8" | 99 | | #50 | | | |
| 1/2" | 98 | | #60 | 71 | | |
| 3/8" | 97 | | #80 | 40 | | |
| #4 | 93 | | #100 | 28 | | |
| #8 | | | #200 | 15.0 | | |

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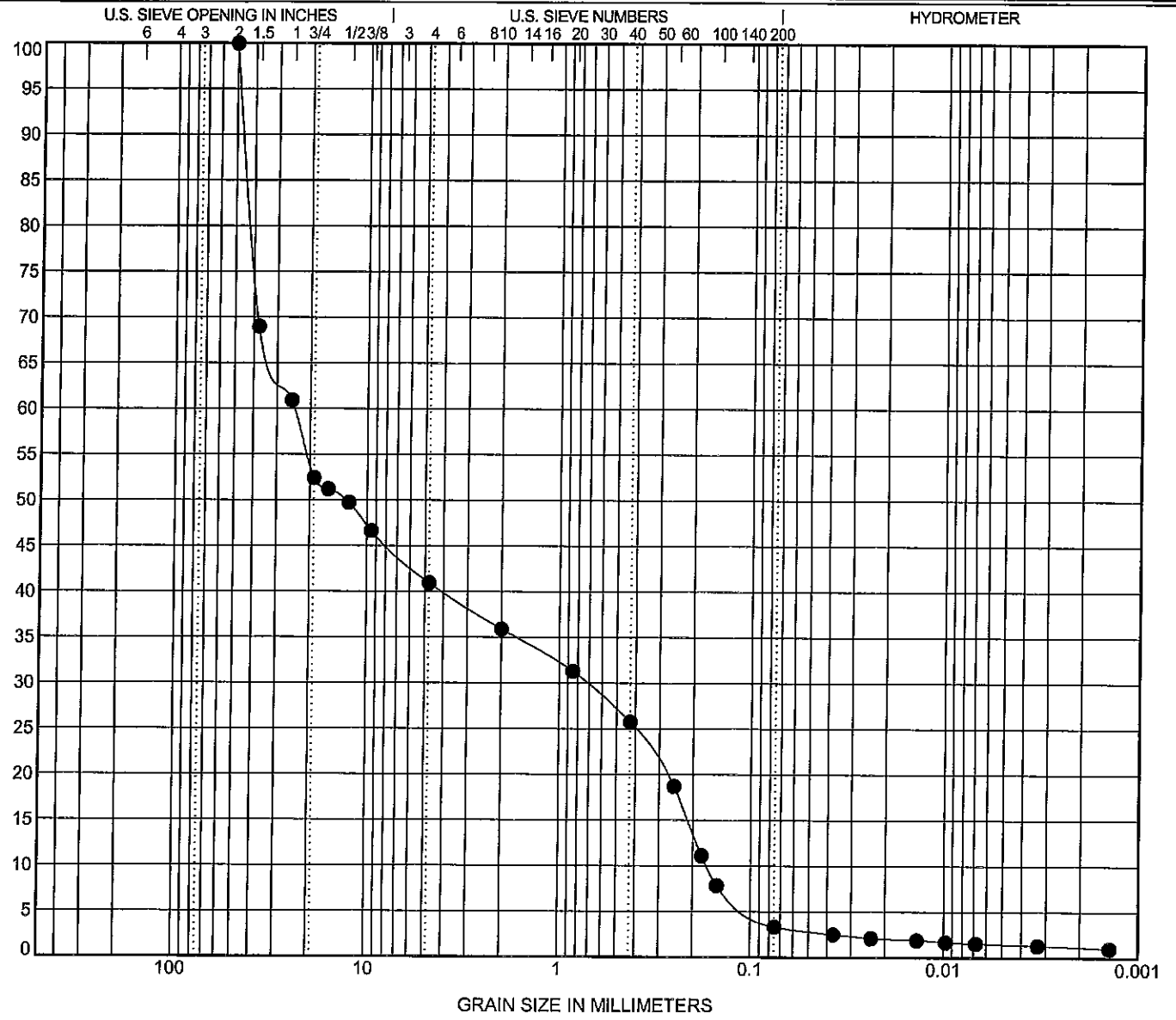
# GRAIN SIZE DISTRIBUTION

**CLIENT** LHB Corporation **PROJECT NAME** D Dock

**PROJECT NUMBER** 13E0837 **PROJECT LOCATION** Duluth, MN




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| Specimen Identification | Classification | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|
| ● Lab Sample # 220 | POORLY GRADED GRAVEL with SAND(GP) | | | | 0.13 | 143.47 |

| D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|
| 50 | 24.261 | 0.721 | 0.169 | 59.1 | 37.6 | 1.9 | 1.4 |

| SIEVE | % PASS | SPEC | SIEVE | % PASS | SPEC | NOTES |
|---|---|---|---|---|---|---|
| 3" | | | #10 | 36 | | Sample obtained from |
| 2" | 100 | | #16 | | | SB-6 (7.5' - 12.5') |
| 1.5" | 69 | | #20 | 31 | | |
| 1" | 61 | | #30 | | | |
| 3/4" | 52 | | #40 | 26 | | |
| 5/8" | 51 | | #50 | | | |
| 1/2" | 50 | | #60 | 19 | | |
| 3/8" | 47 | | #80 | 11 | | |
| #4 | 41 | | #100 | 8 | | |
| #8 | | | #200 | 3.4 | | |

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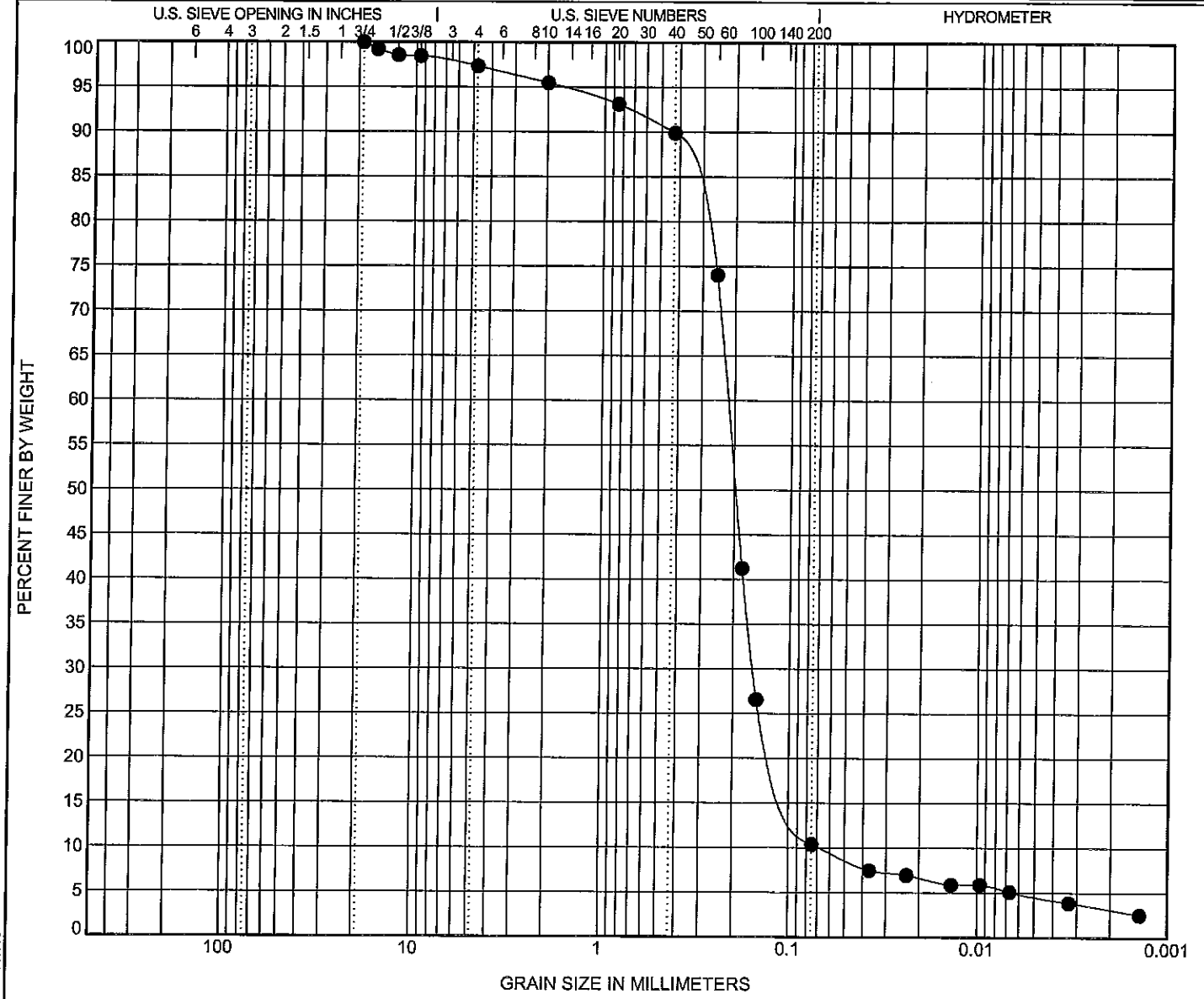
# GRAIN SIZE DISTRIBUTION

**CLIENT** LHB Corporation **PROJECT NAME** D Dock

**PROJECT NUMBER** 13E0837 **PROJECT LOCATION** Duluth, MN




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| Specimen Identification | Classification | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|
| ● Lab Sample # 221 | POORLY GRADED SAND with SILTY CLAY(SP-SC) | | | | 1.66 | 3.19 |

| D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|
| 19 | 0.217 | 0.157 | 0.068 | 2.6 | 87.0 | 5.8 | 4.6 |

| SIEVE | % PASS | SPEC | SIEVE | % PASS | SPEC | NOTES |
|---|---|---|---|---|---|---|
| 3" | | | #10 | 95 | | Sample obtained from |
| 2" | | | #16 | | | SB-6 (12.5' - 17.5') |
| 1.5" | | | #20 | 93 | | |
| 1" | | | #30 | | | |
| 3/4" | 100 | | #40 | 90 | | |
| 5/8" | 99 | | #50 | | | |
| 1/2" | 99 | | #60 | 74 | | |
| 3/8" | 98 | | #80 | 41 | | |
| #4 | 97 | | #100 | 27 | | |
| #8 | | | #200 | 10.4 | | |

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# GRAIN SIZE DISTRIBUTION

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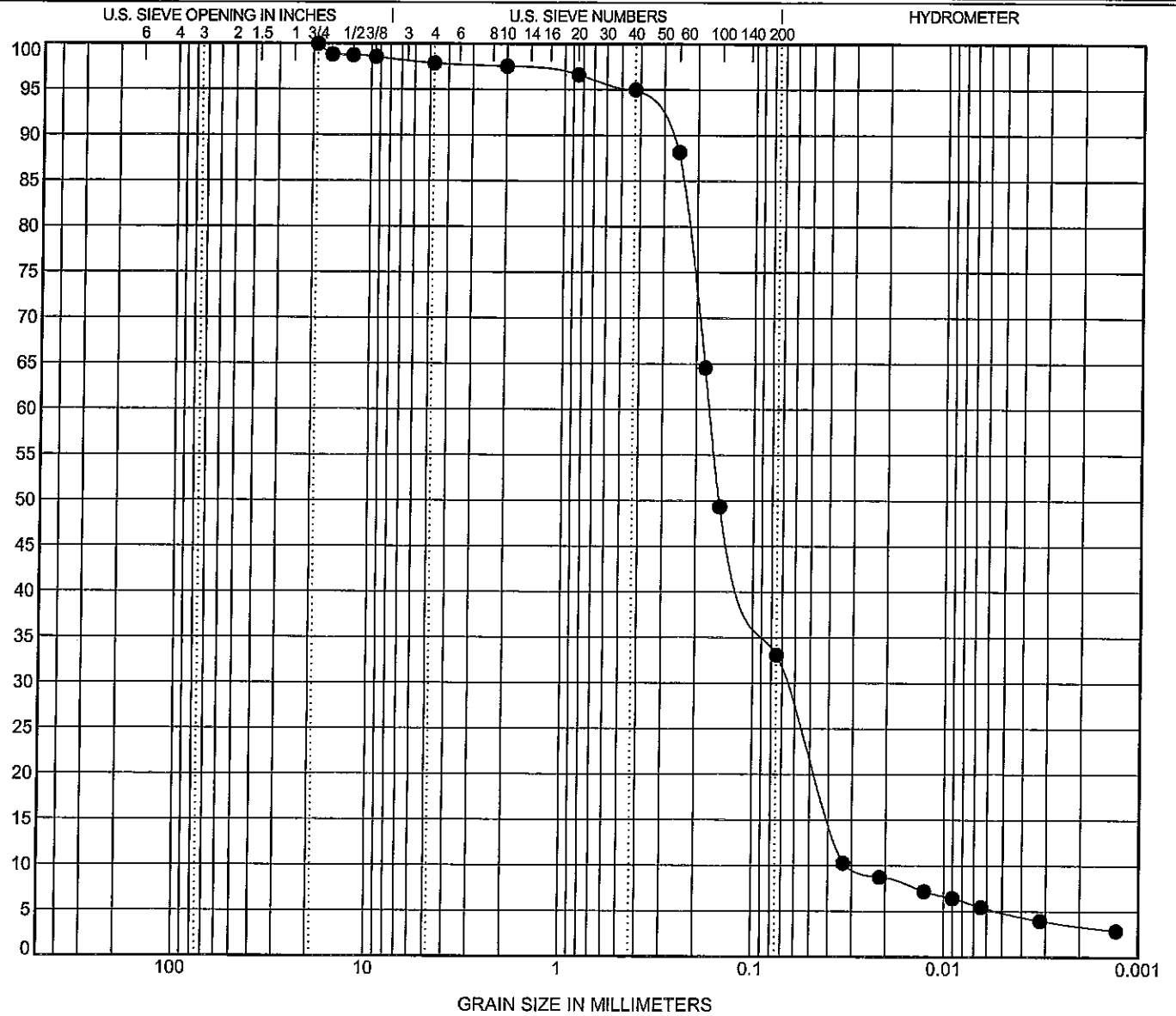
**PROJECT NUMBER** 13E0837 **PROJECT LOCATION** Duluth, MN




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| Specimen Identification | Classification | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|
| ● **Lab Sample # 222** | **SILTY SAND (SM)** | | | | **0.86** | **5.57** |

| D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|
| **19** | **0.17** | **0.067** | **0.031** | **2.1** | **64.8** | **28.2** | **4.9** |

| SIEVE | % PASS | SPEC | SIEVE | % PASS | SPEC | NOTES |
|---|---|---|---|---|---|---|
| 3" | | | #10 | 98 | | Sample obtained from |
| 2" | | | #16 | | | SB-6 (17.5' - 22.5') |
| 1.5" | | | #20 | 97 | | |
| 1" | | | #30 | | | |
| 3/4" | 100 | | #40 | 95 | | |
| 5/8" | 99 | | #50 | | | |
| 1/2" | 99 | | #60 | 88 | | |
| 3/8" | 99 | | #80 | 65 | | |
| #4 | 98 | | #100 | 49 | | |
| #8 | | | #200 | 33.1 | | |

GRAIN SIZE WITH SPEC BANDS 13E0837 D DOCK.GPJ GINT US LAB.GDT 10/17/13

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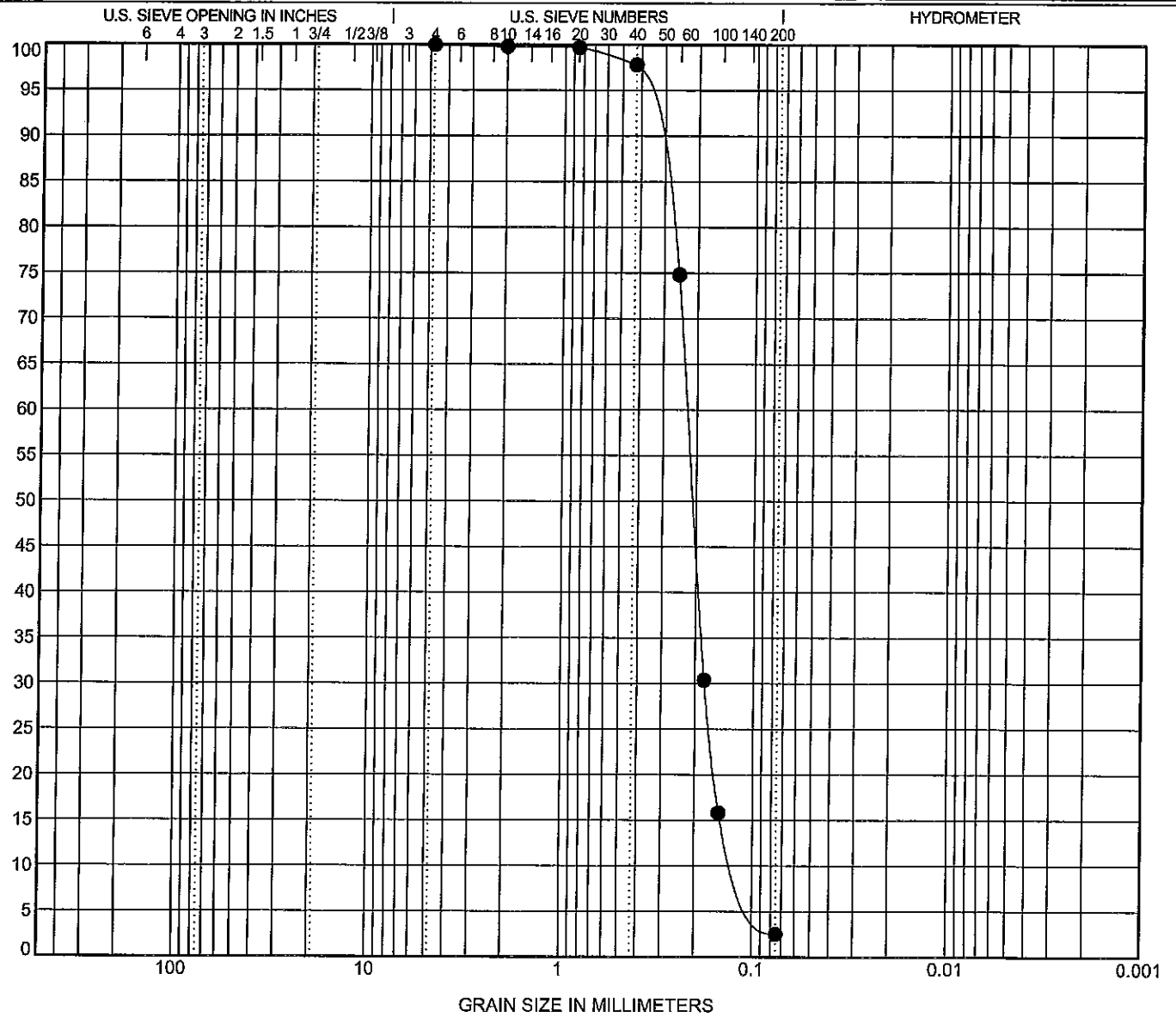
# GRAIN SIZE DISTRIBUTION

**CLIENT** LHB Corporation **PROJECT NAME** D Dock

**PROJECT NUMBER** 13E0837 **PROJECT LOCATION** Duluth, MN




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| Specimen Identification | Classification | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|
| ● **Lab Sample # 223** | **POORLY GRADED SAND(SP)** | | | | **1.29** | **2.02** |

| D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|
| **4.75** | **0.224** | **0.179** | **0.111** | **0.0** | **97.5** | **2.5** | |

| SIEVE | % PASS | SPEC | SIEVE | % PASS | SPEC | NOTES |
|---|---|---|---|---|---|---|
| 3" | | | #10 | 100 | | Sample obtained from |
| 2" | | | #16 | | | SB-6 (24' - 30.5') |
| 1.5" | | | #20 | 100 | | |
| 1" | | | #30 | | | |
| 3/4" | | | #40 | 98 | | |
| 5/8" | | | #50 | | | |
| 1/2" | | | #60 | 75 | | |
| 3/8" | | | #80 | 30 | | |
| #4 | 100 | | #100 | 16 | | |
| #8 | | | #200 | 2.5 | | |

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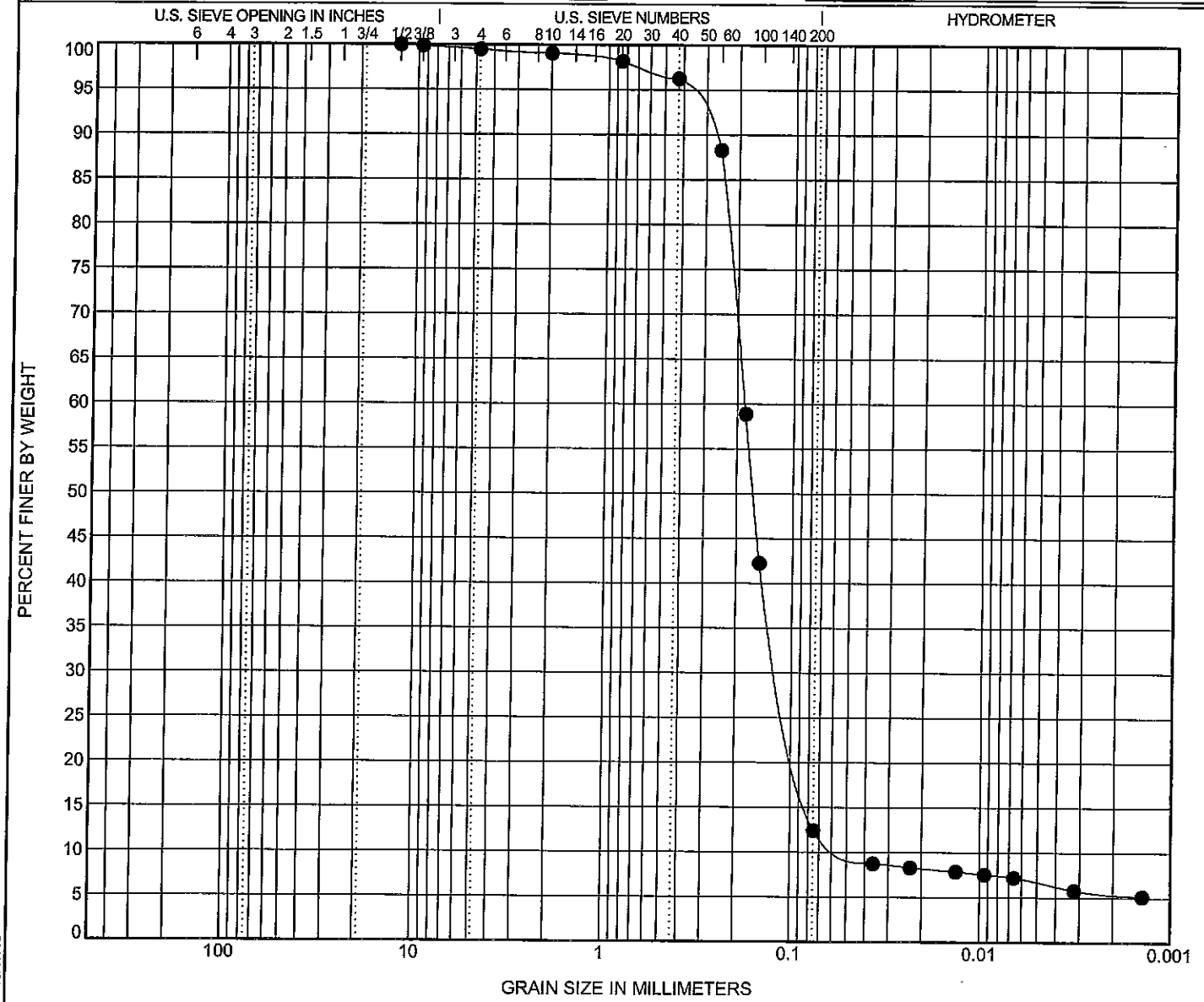
# GRAIN SIZE DISTRIBUTION

**CLIENT** LHB Corporation **PROJECT NAME** D Dock

**PROJECT NUMBER** 13E0837 **PROJECT LOCATION** Duluth, MN




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| Specimen Identification | Classification | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|
| ● Lab Sample # 224 | SILTY, CLAYEY SAND(SC-SM) | | | | 1.51 | 3.93 |

| D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|
| 12.5 | 0.182 | 0.113 | 0.046 | 0.5 | 87.1 | 5.8 | 6.7 |

| SIEVE | % PASS | SPEC | SIEVE | % PASS | SPEC | NOTES |
|---|---|---|---|---|---|---|
| 3" | | | #10 | 99 | | Sample obtained from |
| 2" | | | #16 | | | SB-7 (19' - 21.5') |
| 1.5" | | | #20 | 98 | | |
| 1" | | | #30 | | | |
| 3/4" | | | #40 | 96 | | |
| 5/8" | | | #50 | | | |
| 1/2" | 100 | | #60 | 88 | | |
| 3/8" | 100 | | #80 | 59 | | |
| #4 | 100 | | #100 | 42 | | |
| #8 | | | #200 | 12.4 | | |

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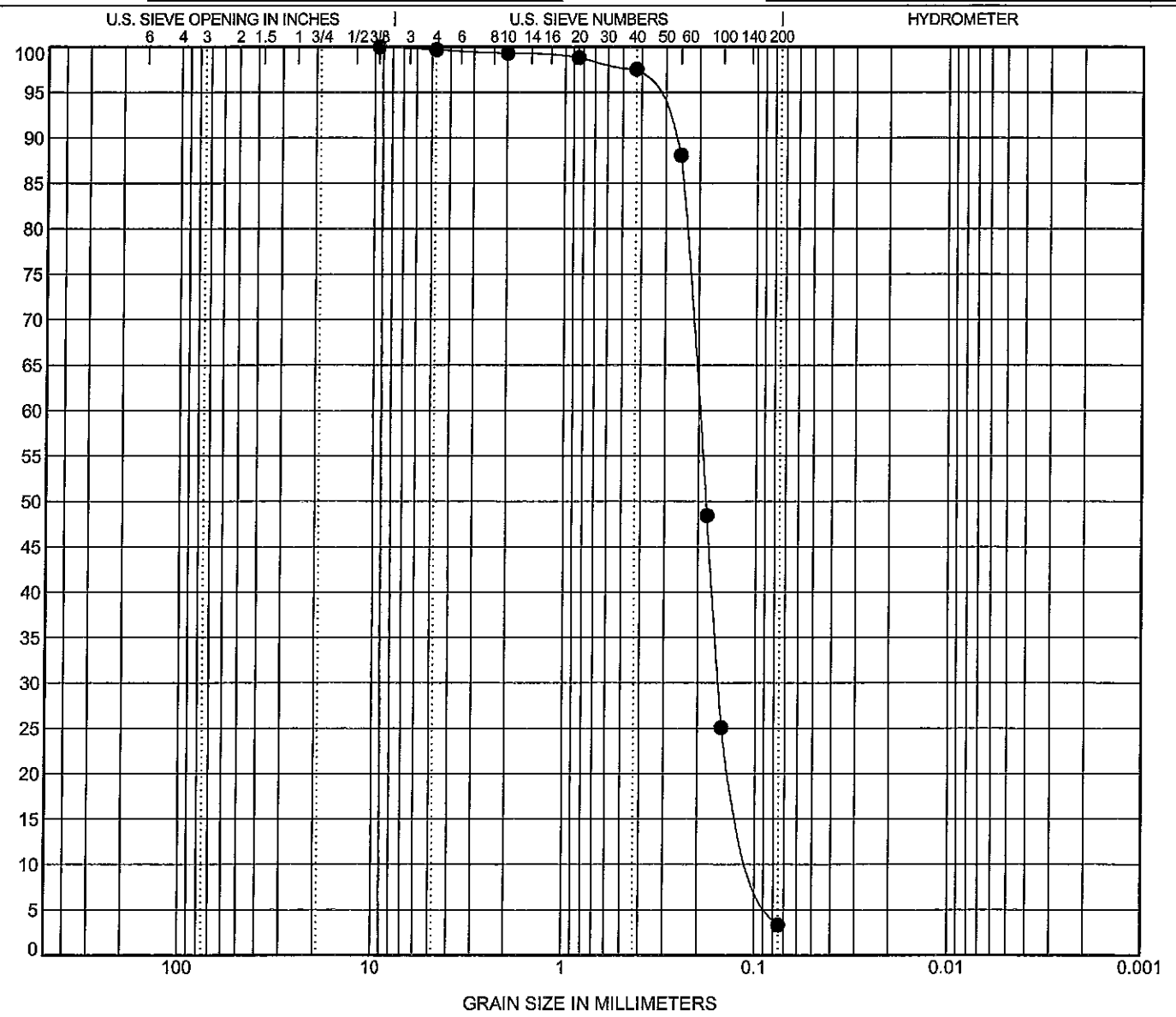
# GRAIN SIZE DISTRIBUTION

**CLIENT** LHB Corporation **PROJECT NAME** D Dock

**PROJECT NUMBER** 13E0837 **PROJECT LOCATION** Duluth, MN




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| Specimen Identification | Classification | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|
| ● Lab Sample # 225 | POORLY GRADED SAND(SP) | | | | 1.32 | 2.14 |

| D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|
| 9.5 | 0.198 | 0.156 | 0.093 | 0.3 | 96.4 | 3.3 | |

| SIEVE | % PASS | SPEC | SIEVE | % PASS | SPEC | NOTES |
|---|---|---|---|---|---|---|
| 3" | | | #10 | 99 | | Sample obtained from |
| 2" | | | #16 | | | SB-7 (21.5' - 31.5') |
| 1.5" | | | #20 | 99 | | |
| 1" | | | #30 | | | |
| 3/4" | | | #40 | 98 | | |
| 5/8" | | | #50 | | | |
| 1/2" | | | #60 | 88 | | |
| 3/8" | 100 | | #80 | 48 | | |
| #4 | 100 | | #100 | 25 | | |
| #8 | | | #200 | 3.3 | | |

GRAIN SIZE WITH SPEC BANDS 13E0837 D DOCK.GPJ GINT US LAB.GDT 10/17/13

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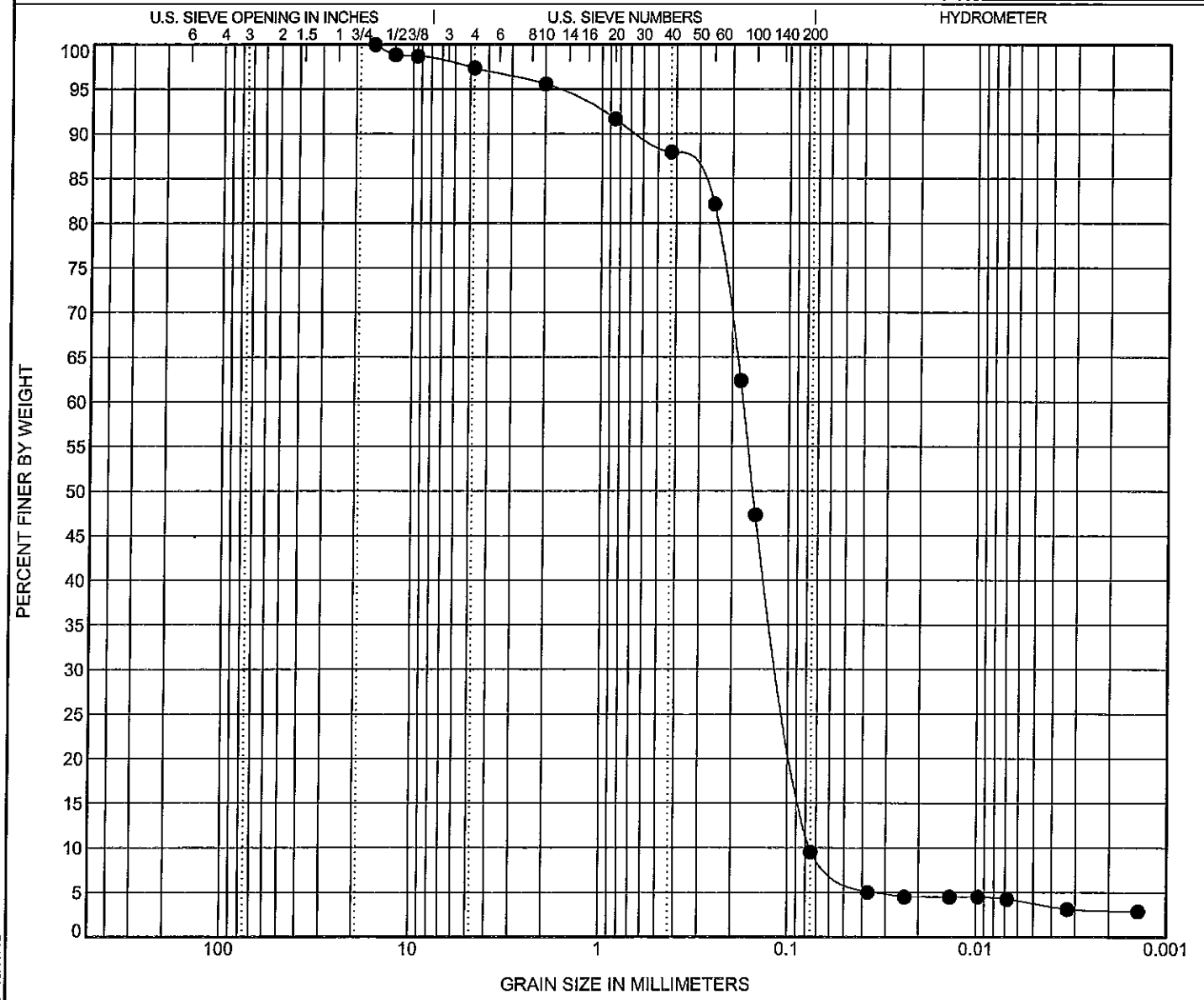
# GRAIN SIZE DISTRIBUTION

**CLIENT** LHB Corporation **PROJECT NAME** D Dock

**PROJECT NUMBER** 13E0837 **PROJECT LOCATION** Duluth, MN




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| Specimen Identification | Classification | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|
| ● **Lab Sample # 226** | **POORLY GRADED SAND with SILTY CLAY(SP-SC)** | | | | **0.90** | **2.31** |

| D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|
| **16** | **0.175** | **0.109** | **0.076** | **2.6** | **87.9** | **5.7** | **3.8** |

| SIEVE | % PASS | SPEC | SIEVE | % PASS | SPEC | NOTES |
|---|---|---|---|---|---|---|
| 3" | | | #10 | 96 | | Sample obtained from |
| 2" | | | #16 | | | SB-8 (14.5' - 17') |
| 1.5" | | | #20 | 92 | | |
| 1" | | | #30 | | | |
| 3/4" | | | #40 | 88 | | |
| 5/8" | 100 | | #50 | | | |
| 1/2" | 99 | | #60 | 82 | | |
| 3/8" | 99 | | #80 | 62 | | |
| #4 | 97 | | #100 | 47 | | |
| #8 | | | #200 | 9.5 | | |

GRAIN SIZE WITH SPEC BANDS 13E0837 D DOCK.GPJ GINT US LAB.GDT 10/17/13

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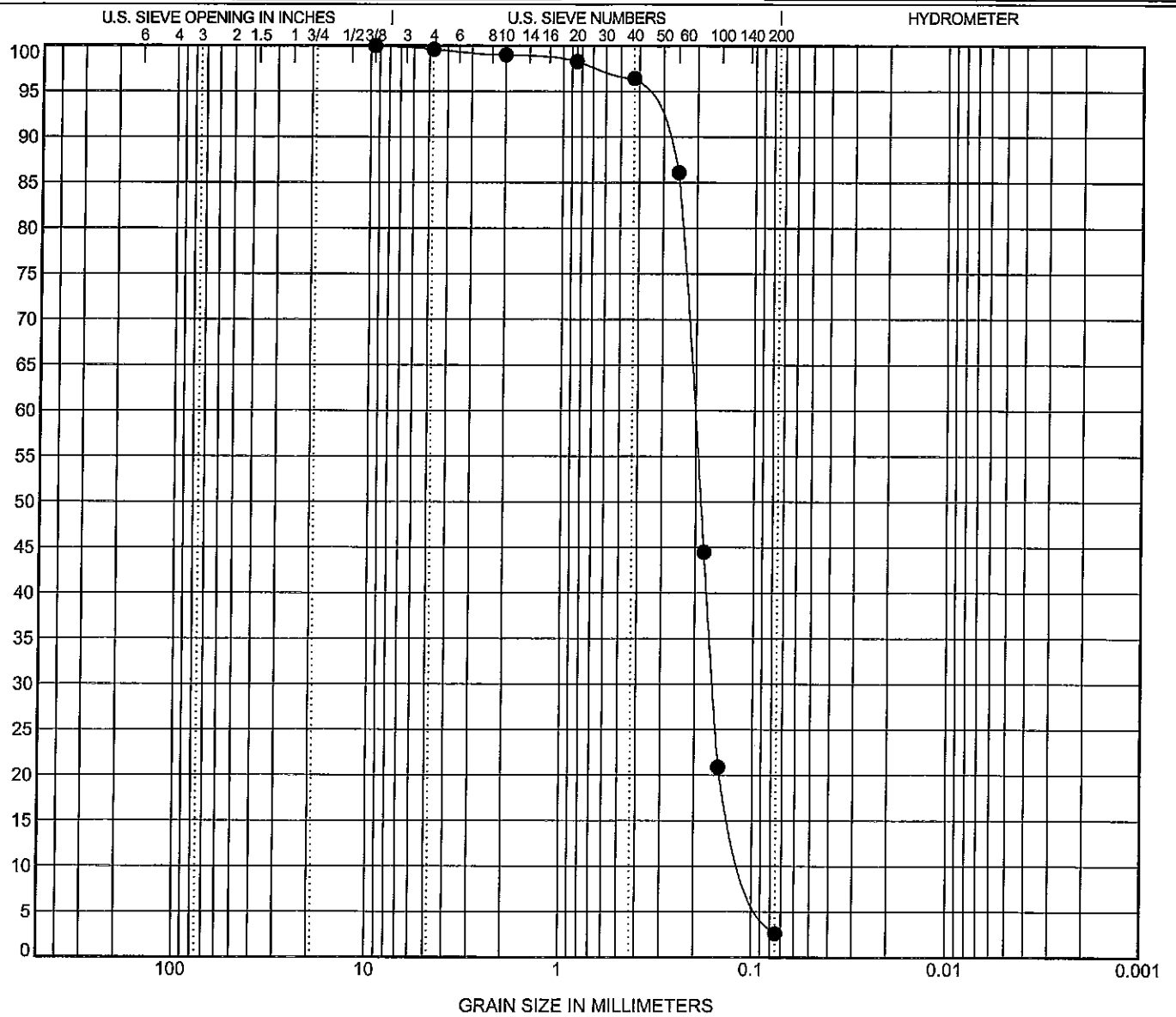
**CLIENT** LHB Corporation **PROJECT NAME** D Dock

**PROJECT NUMBER** 13E0837 **PROJECT LOCATION** Duluth, MN




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| Specimen Identification | Classification | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|
| ● Lab Sample # 227 | POORLY GRADED SAND(SP) | | | | 1.28 | 2.05 |

| D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|
| 9.5 | 0.203 | 0.161 | 0.099 | 0.4 | 97.0 | 2.7 | |

| SIEVE | % PASS | SPEC | SIEVE | % PASS | SPEC | NOTES |
|---|---|---|---|---|---|---|
| 3" | | | #10 | 99 | | Sample obtained from |
| 2" | | | #16 | | | SB-8 (17' - 32') |
| 1.5" | | | #20 | 98 | | |
| 1" | | | #30 | | | |
| 3/4" | | | #40 | 96 | | |
| 5/8" | | | #50 | | | |
| 1/2" | | | #60 | 86 | | |
| 3/8" | 100 | | #80 | 45 | | |
| #4 | 100 | | #100 | 21 | | |
| #8 | | | #200 | 2.7 | | |

GRAIN SIZE WITH SPEC BANDS 13E0837 D DOCK.GPJ GINT US LAB.GDT 10/17/13

**DSPA Dredge Sampling Bap Detections over Tier 1**
**Tier 1 Bap Equiv. Dredge Material SRV = 2**
**Tier 2 Bap Equiv. Dredge Material SRV = 3**

## SB-5-13 26'-31' BaP Equivalent

| Chemical | CAS No. | Relative Potency Factor | Enter Site Concentration mg/kg | BaP Equivalent (mg/kg) |
|---|---|---|---|---|
| Benz[a]anthra | 56-55-3 | 0.1 | 1.87 | 0.187 |
| Benzo[b]fluora | 205-99-2 | 0.1 | 1.32 | 0.132 |
| Benzo[k]fluora | 207-08-9 | 0.01 | 1.41 | 0.0141 |
| Benzo[a]pyrer | 50-32-8 | 1 | 1.74 | 1.74 |
| Chrysene | 218-01-9 | 0.001 | 1.94 | 0.00194 |
| Dibenz[ah]ant | 53-70-3 | 1 | | 0 |
| Indeno[1,2,3-c | 193-39-5 | 0.1 | 0.712 | 0.0712 |
| | | | Total BaP equivalents = | **2.14624** |
| | | | compare this value to the BaP SRV | |

Return

## S3 28.5'-30' BaP Equivalent

| Chemical | CAS No. | Relative Potency Factor | Enter Site Concentration mg/kg | BaP Equivalent (mg/kg) |
|---|---|---|---|---|
| Benz[a]anthra | 56-55-3 | 0.1 | 3.99 | 0.399 |
| Benzo[b]fluora | 205-99-2 | 0.1 | 2.8 | 0.28 |
| Benzo[k]fluora | 207-08-9 | 0.01 | 3.59 | 0.0359 |
| Benzo[a]pyrer | 50-32-8 | 1 | 3.66 | 3.66 |
| Chrysene | 218-01-9 | 0.001 | 4.44 | 0.00444 |
| Dibenz[ah]ant | 53-70-3 | 1 | | 0 |
| Indeno[1,2,3-c | 193-39-5 | 0.1 | 1.62 | 0.162 |
| | | | Total BaP equivalents = | **4.54134** |
| | | | compare this value to the BaP SRV | |

Return