Minnesota Pollution Control Agency

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October 29, 2013

Mr. Mark Rupnow
Director - Environmental Remediation
United States Steel Corporation
Penn Liberty Plaza 1
1350 Penn Ave - Suite 200
Pittsburgh, PA 15222-4211

Via E-mail and USPS

Mr. John Prusiecki, Jr.
United States Steel Corporation
Gary Works
One North Broadway, MS HB2
Gary, IN 46402-3199

RE: Approval with Modification for the Sediment Remedial Investigation Report

Dear Mr. Rupnow and Mr. Prusiecki, Jr.:

The Minnesota Pollution Control Agency (MPCA) staff has reviewed the *"SedimentRemedial Investigation Report, Former U.S. Steel Duluth Works Site, Saint Louis River"* dated March 2013, (Report), submitted by BARR on behalf of U.S. Steel. The MPCA hereby approves the Report with modifications. All the data presented within the report is approved and accepted. Several elements of the Report will require modification when presented in the FS (Feasibility Study). These modifications are listed below:

- The MPCA agrees that USS has sufficient data to consider response action alternatives. However, throughout the report, the definition and discussion of the extent of contamination is primarily limited to concentrations above the Level II SQTs. For a Remedial Investigation, the definition of the full extent and magnitude of sediment contamination should not be limited to impacts only above Level II SQTs. All levels of impact from contaminants released at the site will be considered. The Preliminary Remedial Goal provided by the MPCA will be the basis for volume calculations to be presented in the FS.
- Similar considerations for the extent discussion will involve the post-industrial cover material found over the contaminated sediments. Potential contamination levels above Level 1 (and potentially the PRG) should be considered in context of a potential bioactive zone.

Specific Comments:

- [**5.4.1** *...the Wire Mill Delta has clean sediment at the surface, with impacted sediment at the surface in a small area along the shoreline...*] This should not be characterized as a small area, even-though it may be small relative to the size of the entire area. It is a substantial area of surface exposed contaminated sediments. An estimate of the aerial extent of the surface exposed contaminated sediment should be provided in the FS.

- [**5.5 – (last paragraph)** *The upper 6 inches of sediment in the Wire Mill Delta typically contains concentrations of COIs less than the risk screening criteria, with the exception of a small area in the southwest portion of the delta.*] Specify what risk screening criteria is being used here (PEC-Q, mean PEC-Q, SQT, Level I, Level II, ESB-TU).

- [**5.7**] A review of the data and figures L-3, L-13, L-15, L-19, and L-22 identified Dioxin/furans, Lead, Mercury, Zinc, and PAH contaminant levels in MPCA/ACE/SOMAT sampling of the Munger Landing and West Mud Lake Remedial Assessment Areas (RRA) that suggest a continuation of releases from the USS Site and an additional release from an adjacent source. In the Munger Landing RRA, TCDD Equivalents, Lead, Zinc, and PAHs are at elevated levels in comparison to the rest of this part of the estuary. This mixture of chemical compounds is very similar to the USS site compounds in a downstream, low energy area (typical transport in the rest of Spirit Lake). Additional evaluation of this area should be included in the FS as an extension of the sediment units. In the Mud Lake West RRA, TCDD Equivalents, Lead, Mercury, and PAHs are at elevated levels compares to the rest of this part of the estuary. This area, that includes both land and sediment issues, USS has tentatively agreed to address in the MPCA voluntary responsible party program.

- [**5.8**] Dioxin/furans, mercury and cadmium should remain as COIs and not be screened out for the FS consideration:
    - For mercury, there are many Level 1 SQT exceedances, and a Level 2 exceedance, and it appears clear that the pattern of elevated concentrations coincides with the other site-related metals, which is more distinct from the Somat data. In addition, mercury is a primary contaminant of concern in the SLRAOC, related to the fish-consumption BUI and concern for food chain bioaccumulation, and therefore should not be eliminated as a COI without a more detailed analysis.
    - For dioxins/furans, more than 50% of the USS samples exceed the Level 2 SQT, the concentrations increase with depth near the deltas, and the comparison with the Somat data only looks at the surficial samples (same for mercury and cadmium). They are also of concern for food chain bioaccumulation.
    - For cadmium, there are many exceedances of Level 1 SQTs (and a Level 2 SQT exceedance off the Wire Mill delta), the pattern is similar to the other site-related metals (highest off the 2 deltas), conc. increases with depth near the deltas, and cadmium is included in the calculation of the mean PEC quotient for metals. It's not a driver, but appears to be a site-related distribution, even though there are a lot of level 1 SQT exceedances in the Somat data also.

- [**5.9** – (last sentence) *...these results largely coincide with areas where PAH concentrations exceed Level II SQTs, PAH mean PEC-Q values greater than 0.6, and/or PAH ESBs greater than 1, and with the areas where mean PEC-Q values are greater than 0.6, with only a few localized exceptions.*] Identify and describe the sample points or areas with "localized exceptions".

- [**6.0** – (second bullet) *Concentrations of COIs in the post-industrial sediment do not exceed the upper screening criteria.*] The lower screening criteria (Level I SQTs were generally left out of the analysis and discussion. Contamination between the Level I and II SQTs will be important to consider when PRGs and RAOs are selected for the site (Also see General Comment on screening criteria).

- **[Plates 1-6]** The Plates only identify impacts compared to a mean PEC-Q above Level II (0.6). Cross section plates carried forward to the FS should also depict contamination exceeding the PRGs provided by the MPCA for evaluation in the FS.

- **[Figures 30 & 31]** The MPCA is considering a site specific bioactive zone for this site. The results of the MPCA analysis will be provided for inclusion into the CSMs.

Response to modifications can be incorporated into the FS report. The MPCA may request specific modifications to the extent discussion as necessary.

MPCA is reserving comment on the Human Health evaluation, Appendix K. Comments will be sent in a separate correspondence.

The MPCA is also requesting a copy of the analytical database used in this analysis. It will be added to the comprehensive St. Louis River sediment database.

Please contact me at 218-302-6601 if you have any questions or concerns.

Sincerely,

Susan Johnson

Susan Johnson
Project Leader
Remediation and Redevelopment Unit
Remediation Division

SJ:kmk

cc: Bill Murray, USEPA, Chicago
Leah Evison, USEPA, St. Paul

Sediment Remedial Investigation Report
Volume 1

Great Lakes Legacy Act Project
Spirit Lake Sediment Site
Former U. S. Steel Duluth Works
Saint Louis River
Duluth, Minnesota

Prepared for
U. S. Steel and
U.S. EPA Great Lakes National Program Office

March 2013

BARR

c-s3-06ac

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List of Acronyms

Acronym	
AOC	Area of Concern
ASTM	American Society for Testing and Materials
AVS/SEM	acid volatile sulfide/simultaneously extractable metals
Barr	Barr Engineering Company
CLP	Contract Laboratory Program
COI	Constituent of Interest
CRQL	Contract required quantitation limit
CST	Capillary Suction Time
DQO	data quality objectives
ESB	Equilibrium Partitioning Sediment Benchmarks
Foc	fraction of organic carbon
FS	feasibility study
GLNPO	Great Lakes National Program Office
GPS	Global Positioning System
MDL	method detection limit
MPCA	Minnesota Pollution Control Agency
MS/MSD	matrix spike/matrix spike duplicate
NAD	North American Datum
NAVD	North American Vertical Datum
ND	non-detected
NRRI	Natural Resources Research Institute
PAH	polynuclear aromatic hydrocarbons
PCB	polychlorinated biphenyls
PEC-Q	probable effect concentration quotient
ppm	parts per million
ppb	parts per billion
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RI	remedial investigation

Acronym	
RL	reporting limit
RTK	Real Time Kinetic
SDG	sample delivery group
SOP	standard operating procedure
SQT	Sediment Quality Target
TOC	total organic carbon
TPH	total petroleum hydrocarbons
USACE	United States Army Corps of Engineers
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency
U. S. Steel	United States Steel Corporation

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1.0 Introduction

This revised Sediment Remedial Investigation (RI) report, prepared on behalf of U. S. Steel and the Great Lakes National Program Office (GLNPO), presents the results of work performed under the Great Lakes Legacy Act at the Spirit Lake Sediment site (Site) in the St. Louis River, Duluth, Minnesota. This report revises the information provided in the Draft RI of April 2012 (Barr, 2012a) and *Sediment Investigation Technical Memorandum Winter 2011 Field Program Summary* (Barr, 2011c). This report does not include the results of a Supplemental Investigation conducted October-November 2012. The results of the Supplemental Investigation activities will be reported in the Feasibility Study (FS).

1.1 Purpose

The purpose of this RI was to collect chemical and physical site data to characterize the current nature and extent of both impacted sediments and a recent, naturally-deposited cover layer previously identified at the Site. The RI was performed in two phases as outlined and approved in the Sediment Investigation Work Plan (Barr, 2011a) and Sediment Investigation Work Plan II (Barr, 2011d). The two phases of investigation are known as the "Winter Program" conducted February-March and June 2011, and "Fall Program," conducted October-November 2011, respectively. The results from each are summarized in this report. Additionally, during preparation of this report, data from an MPCA-led project conducted upstream, downstream, and adjacent to the Site became available, and the relevant portion of those results are presented here and compared to the data for this RI. Finally, a large flood event (recurrence interval of 500 years) occurred in the St. Louis River in June 2012. A second bathymetric survey was conducted in July 2012 to evaluate post-flood changes.

The goals of the two phases of sediment RI work were as follows:

1. Refine the conceptual site models (CSMs) for the deltaic areas of the Unnamed Creek and the Wire Mill Pond to provide an understanding of the nature and extent of potential sediment impacts and habitat enhancement opportunities.

2. Develop an initial understanding of the physical, chemical, and biological processes that act upon the materials in the study area as a prelude to sediment modeling exercises.

3. Evaluate the performance of natural recovery processes, such as natural sediment covering.

4. Refine a list of chemical constituents of interest (COIs) and evaluate data results with respect to further ecological risk reduction.

Objectives for the RI work included the following:

- Complete field operations in a manner that provides safe conditions for the field team and the environment.
- Obtain high quality data with appropriate accuracy.
- Present the data geospatially and graphically.
- Update the CSMs to reflect knowledge gained from evaluating the results of the work and identify any remaining data needs (the CSMs will continue to be reviewed and updated as new data and information are obtained).

In addition to the above-listed goals and objectives, additional data objectives were identified based on the initial review of data collected during the Winter Program and discussions with the MPCA and USEPA during summer 2011. The following is a list of items completed as part of the Fall Program (Barr, 2011d) to further evaluate and characterize the Site:

- Measure parameters to evaluate physical, chemical and biological processes occurring at the Site, including additional river level, groundwater level, and meteorological data.
- Obtain select geotechnical data to evaluate conditions at the Site for use in future focused feasibility study (FS)/engineering studies.
- Collect sediment samples for chemical analysis to refine the lateral and vertical extent of impacted sediment, and to document the stratigraphy, sedimentary environments, and associated characteristics of the Site, including mapping the post-industrial surface sediment layer.
- Measure the flux between groundwater and surface water and evaluate if contaminant transport may be occurring via groundwater flow through sediment to surface water in the Wire Mill and Unnamed Creek Delta areas.
- Collect bathymetry, suspended sediment concentration (SSC), river current flow direction and velocity data, and bed stability data. These data will be used to refine the CSM, and to calibrate the hydrodynamic model for the FS, evaluate bed-load sediment transport, and to

evaluate seiche effects and sediment availability for the transport of sediment in the river for natural or enhanced habitat improvement.

1.2 Investigation Setting

The Site is located in an open reach of the St. Louis River estuary referred to as Spirit Lake, near the Morgan Park neighborhood of Duluth, Minnesota (Figure 1). The Site layout and relation to the former U. S. Steel Duluth Works steel mill are shown on Figure 2.

The Site is comprised of two main areas along the western shore of Spirit Lake: the Wire Mill Delta and the Unnamed Creek Delta, as shown on Figure 2. The Wire Mill Delta is near the discharge pond from the former Duluth Works wire mill. The Unnamed Creek Delta is north of the Wire Mill Delta at the outlet of Unnamed Creek, where it empties into Spirit Lake. A man-made spit of land separates the two areas.

1.3 Overview of Historical Sediment Data

This section contains a brief chronological summary of sediment investigations that have been conducted to date at the Site in which physical or chemical sediment quality data were generated. Figure 3 shows previous sediment sample locations and notes the type of sampling conducted.

- In 1986, U. S. Steel collected sediment samples from 22 hollow-stem auger (HSA) borings advanced in the western side of the Spirit Lake area. Information obtained in this study included physical evidence of a post-industrial cover layer, and identification of the presence of non-native material. Sediment samples collected during this work were composited to provide bulk sediment analysis. The results of this work are presented in the *Remedial Investigation Final Report* (Barr, 1986).

- In 1993, MPCA and USEPA collected two shallow sediment samples and eight cores from the Unnamed Creek and Wire Mill Delta area. Eight samples collected from discrete locations and depths were analyzed for polycyclic aromatic hydrocarbons (PAHs) and other potential COIs. Additional samples were also collected from the Wire Mill Delta to characterize the chemistry of the post-industrial cover layer. The results of these investigations are reported and discussed in the sediment quality database at ftp://files.pca.state.mn.us/pub/sedimentDB/ (MPCA, 1993), *Survey of Sediment Quality in the Duluth/Superior Harbor: 1993 Sampling Results* (Schubauer-Berigan and Crane, 1997), and *Sediment Assessment of Hotspot Areas in the Duluth/Superior Harbor: 1993 sampling results* (Schubauer-Berigan, et al., 1997).

- In 1995 and 1996, the MPCA and NRRI collected two sediment surface samples, one from each delta area, which were analyzed for PAH concentrations and other potential COIs. These results are documented in MPCA data base records (MPCA, unpublished data, 1995 and 1997). Some PAH data from the 1995 sediment sampling event were also reported in an additional publication (Breneman, et al., 2000).

- In 1995, U. S. Steel collected 46 shallow sediment cores from the Unnamed Creek Delta and 74 from the Wire Mill Delta to study physical evidence of a post-industrial sediment cover layer. Thirteen discrete sediment samples were collected from the non-native material and the overlying sediment cover layer for laboratory analysis of PAH concentrations and other potential COIs. These data were presented in a technical memorandum to the MPCA (Barr, 1995).

- In 2001, the MPCA and Fond du Lac tribe collected one discrete sediment surface sample from each of the two delta areas for analysis of potential COIs other than PAHs (Costa, et al., 2001; unpublished data on file at MPCA).

- In 2002, U. S. Steel collected sediment screening information using a Laser-Induced Fluorescence (LIF) probe at 189 stations distributed at both delta areas (URS Corporation [URS], 2002a). Subsequently, an effort was made to correlate the LIF screening data to total PAH data collected during a later field effort, which is discussed below.

- In 2003, the MPCA collected one sediment surface sample from each of the two delta areas for analysis of PAHs and other potential COIs. These results are unpublished but may be accessed through the MPCA's St. Louis River sediment database (MPCA, 2003).

- In 2003, U. S. Steel collected nine direct-push sediment samples from the two delta areas (three samples from Unnamed Creek delta and six samples from Wire Mill delta) to obtain information on the vertical extent of impacted sediment, physical extent of the post-industrial sediment cover layer, chemistry of the sediment cover layer (including PAHs and other potential COIs), and physical logs of non-native material. Later in the year, U. S. Steel also collected 26 sediment surface samples from the delta areas to obtain additional information on the chemistry of the post-industrial sediment cover layer, including analysis of PAHs and other potential COIs in samples from discrete locations. An effort was made to correlate the chemical data to the 2002 LIF screening response. These results are available in a report by URS titled *Final Report: Former Duluth Works Estuary Sediments - Remedial Investigation*

Report (URS, 2008). Analytical data from the investigation were obtained from Braun Intertec, the laboratory that performed the analyses.

- An extensive sediment sampling and analysis effort was conducted in 2011 by the MPCA working with the U.S. Army Corps of Engineers (USACE) and their consultant, Somat (hereafter referred to as the MPCA/ACE/Somat investigation) encompassing the eastern half of Spirit Lake, but also including areas along the Minnesota-side of the St. Louis River extending more than 12 miles from the Chambers Grove reach in Fond du Lac downstream through Spirit Lake to Kingsbury Bay at the river's confluence with Kingsbury Creek. Vibracores were advanced at 150 locations along the 12-mile-long study area. Approximately one-third of the sample locations (54 core stations) were located in the eastern half of Spirit Lake. The total depth of the cores ranged from 2 to 7 feet, with the majority being 4-foot long cores. Sediment quality samples were targeted to be collected at 0.5 to 1-foot intervals between the depths of 0 to 4 feet. Analyses performed included PAHs (13 list), Resource Conservation and Recovery Act (RCRA) metals (8), TCDD dioxins/furans, and one sample for PCBs. Preliminary analytical data results were shared by the MPCA in September 2012. Section 5.7 of this report discusses a preliminary evaluation of these data compared to the 2011 RI data results from the western Spirit Lake area investigated by this RI study. Maps showing the sample locations are referenced in Section 5.7.

1.4 Chemical Constituents of Interest

Table 1 lists the COIs, which were based on historical Site operations, historical and RI analytical data, and MPCA guidance (MPCA, 2007). It should be noted that the COIs were modified during the phased RI program.

2.0 Field Activities and Methods

The investigation activities summarized below were initiated in February 2011 and completed in November 2011. Additional Site data collection efforts (Section 2.1) are ongoing. The results of data collection completed after November 2011 will be presented in future submissions as part of the feasibility study (FS). The sediment RI activities (Section 2.2) presented in this report were completed as three separate mobilizations: February 14 to March 14, 2011; June 7 to 14, 2011; and October 24 to November 11, 2011. The sediment investigation activities followed the procedures and methods described in the approved Quality Assurance Project Plan (QAPP) (Barr, 2011b), work plans (Barr, 2011a and d) and as noted in Section 2.2. Groundwater flux (Section 2.4) and hydrodynamic (Section 2.5) investigation activities may continue as needed during the development of the FS.

The following sections describe the field activities completed through Fall 2011 and the methods used for field sampling, data gathering and data evaluation.

2.1 Physical Site Data Collection

2.1.1 Groundwater Level Measurements and River Level Gauging

Seven existing groundwater piezometer nests, each consisting of three piezometers, are located along the western shoreline of Spirit Lake (Figure 4). Three piezometer nests are located around the Wire Mill pond (PZ-W-1, PZ-W-2, PZ-W-3), three are near the mouth of Unnamed Creek (PZ-U-1, PZ-U-2, PZ-U-3), and one is located near the former water intake structure (PZ-E-1). These nests were surveyed and quarterly water level measurements were initiated on May 3, 2011. The water level in piezometer PZ-E-1 was measured bi-weekly from May 3 to November 3, 2011, followed by continuous automatic data logging from November 3, 2011 to June 1, 2012.

A surface-water-level gauge station, designated SW-1, was established in Spirit Lake near PZ-E-1, as shown on Figure 4. Water level data logging in SW-1 was initiated at 15-minute intervals in May 2011, after ice-out. Results of groundwater level measurements and river level gauging are discussed in Section 3.1.1.

2.1.2 Meteorological Data Gathering

A 10-meter-high meteorological station was erected in April 2011 to record Site-specific wind direction, wind speed, temperature, humidity, barometric pressure and precipitation data at 5-minute intervals. The location of the meteorological station is shown on Figure 4. Due to mechanical issues

with the weather station, there are discontinuities in the data. To address the discontinuities, weather records from January 2006 through February 2012 from the Richard I. Bong Airport in Superior, Wisconsin were downloaded from the National Climatic Data Center (www.ncdc.noaa.gov) and compared with the data collected from the Site. Results of meteorological data gathering are discussed in Section 3.1.2.

2.1.3 Ice Observation

Ice observations were performed periodically during the late winter and spring melts of 2011 and 2012 to evaluate the effects of ice movement on nearshore sediment. Visual indicators such as ice movement and the presence or absence of sediment disturbance along the shoreline were recorded during ice-out. The results of this study are discussed in Section 3.1.3.

2.2 Sediment Investigation

Sediment investigation activities followed the procedures, methods and laboratories described in the approved Quality Assurance Project Plan (QAPP) (Barr, 2011b). Specific techniques, methods, or testing, if not covered in the general information presented in the QAPP, were presented in the Work Plans (Barr, 2011a and 2011d).

2.2.1 Sediment Cores/Borings

Sediment cores or borings were collected from a total of 103 locations during the RI (Figure 5). Table 2 lists the sediment core location coordinates and top of sediment elevations. The following sections describe the work completed and procedures used for each of the three investigation phases. Results of the sediment investigation are discussed in Section 3.2.

2.2.1.1 February 15 – March 14, 2011

A total of 90 sediment sampling locations were proposed for the Winter Program. Cores were collected from 74 of these locations (numbered 1-74) between February 15 and March 14, 2011, using push-core and vibracore methods. A total of 16 locations were not completed because the sediment surface was frozen. These areas were addressed in June 2011 (Section 2.2.1.2). Multiple cores were required at some locations to provide adequate sediment sample volume necessary for laboratory analysis. A total of 135 cores were collected from the 74 locations with core recoveries ranging from approximately 1 to 9 feet.

Winter Program sediment cores were collected through the ice and were advanced to refusal. Initial cores were inspected immediately to assist in selection of subsequent boring locations based on

visual observations of sediment types and layers, including potential indications of non-native impacts or post-industrial cover layer.

Vibracoring and push-coring were the primary methods for sampling at each of the stations. Prior to coring, several holes were drilled through the ice and then enlarged with a chainsaw. The ice thickness and water depth were recorded and the sediment core location surveyed (northing, easting and elevation).

Vibracores were performed by fastening an electric vibracore head to the top side of thin-walled aluminum or acrylic core tubes. The cores were then advanced into the sediment until refusal was reached. Once this depth was obtained, the length of push was noted on the cores and a tripod/winch, come-along assembly, or a truck-mounted winch, was used to extract the core tubes from the sediment.

With the push-core method, a push mount with a ball valve assembly was fastened to the top side of thin-walled aluminum or acrylic core tubes. With the ball valve open, the cores were slowly pushed into the sediment until refusal was met or the maximum push length was achieved. At the end of the push, the ball valve was closed, the depth of push was noted on the core, and the core was extracted.

Upon removal from the sediment, each core was immediately capped, labeled, and visually inspected at the sampling site. The cores were stood upright and transported in a manner minimizing disturbance. They were delivered to the on-site core processing facility for detailed stratigraphic logging and sediment sampling.

2.2.1.2 June 7 – 14, 2011

A supplemental field program was necessary to complete cores in areas that were frozen-to-ground during the Winter Program. Push cores that were not accessible in February and March were collected from 13 locations (numbered 75 through 87) between June 7 and 14, 2011. Five of the originally proposed core locations in the "cattail" area south of the Wire Mill delta were not attempted due to difficulties coring through peat and woody debris. Instead, cores were collected from two locations along the north edge of the cattail area. Sediment cores were collected from a pontoon boat platform or by wading to each location. The cores were driven with a fence post hammer and adaptor. Each core was advanced to refusal. Core recoveries ranged from 1.0 to 3.4 feet. As with the previous cores, upon removal from the sediment, each core was immediately capped, labeled, and visually inspected at the sampling site. The cores were placed upright and

transported in a manner minimizing disturbance. They were delivered to an off-site core processing facility for detailed stratigraphic logging and sediment sampling as described in Section 2.2.2.

2.2.1.3 October 24 – November 11, 2011

During the Fall Program, from October 24 to November 11, 2011, a series of cone penetrometer (CPT) borings, HSA borings, and vibracores were completed at locations numbered 88 through 103. A total of 12 CPT borings were completed with pore water dissipation tests at select intervals. Borings for flat-plate dilatometer (DMT) testing were completed adjacent to four of the CPT borings. A total of six HSA borings were completed. Of these six borings, four were sampled for chemistry, and four had associated vane shear and Shelby Tube samples collected within or adjacent to the borings. A total of four vibracores were collected and sampled for chemistry.

The CPT borings were advanced to a depth of up to 50 feet below sediment surface, and the HSA borings up to 35 feet below sediment surface. The vibracores were advanced up to 7.4 feet below sediment surface.

During the Fall Program, sediment vibracores were collected from a pontoon as described above. CPT, flat-plate dilatometer, and HSA borings were conducted using a CME 750 balloon-tired all-terrain drill rig mounted on a barge using 3.25 and 4.25-inch inside diameter HSA by EPC Engineering and Testing of Duluth, Minnesota. Sediment samples from the HSA borings were collected using either 2-inch or 3-inch split-spoon samplers as listed on the boring logs in Appendix A.

2.2.2 Sediment Core/Boring Logging and Sample Collection

Stratigraphic description and logging of cores and borings followed the ASTM D2488-06 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)" guidelines as described further in the QAPP (Barr, 2011b).

Sediment cores were delivered to a core processing facility where they were cut open lengthwise, split, logged, photographed with an adjacent scale, and sampled by a geologist. The cores were classified using the visual/manual method of soil texture classification (ASTM D2488-84), and the Field Guide for Soil and Stratigraphic Analysis V.2 by the Midwest Geosciences Group.

Sediment samples submitted for laboratory analyses were collected from within the core intervals as described in Section 6.7 of the Work Plan (Barr, 2011a), in accordance with the SOPs included in the QAPP (Barr, 2011b).

Samples collected from cores and borings that were submitted to a laboratory were typically from 0.5-foot intervals (typically three to four samples per station). The primary selection criterion for sample discretization was based on stratigraphic position of sedimentary depositional units (layered scenario):

A – Surficial sediment depositional unit. Top of core/boring (0 - 0.5 feet)

B – Intermediate sediment depositional unit

B' – Additional intermediate sediment depositional unit(s) (if encountered, or change(s) in odor or other change(s))

C – Basal apparent native sediment unit, typically the top 0.5 feet of this unit

The secondary selection criterion for sample intervals was based on default target sampling depth intervals (undifferentiated scenario):

A – Top of core/boring (0 - 0.5 feet)

B – B' 0 - 2 evenly-spaced samples:

0 if core/boring is <1.5 feet long

1 if core/boring is = 1.5 feet long (approximately)

2 if core/boring is > 1.5 feet long

C – Basal apparent native sediment unit, typically the top 0.5 feet of this unit

Other depth intervals were used in a small number of the cores, and adjustments to the target sample interval thickness was necessary in a few cases, to provide sufficient sediment volume for required samples. Cores with unique depth intervals are identified in applicable figures.

Sediment samples for chemical analysis were submitted to Test America and various USEPA CLP laboratories. Table 1 lists the laboratories and the analyses they performed in the sediment investigation. Some sample analyses were performed by the USEPA Contract Laboratory Program (CLP) under their approved Quality Assurance Project Plan: St. Louis Bay - St. Louis River Area of Concern (AOC) Sediment Investigation, Duluth, St. Louis County, Minnesota (Weston, 2010). The remaining analyses were performed by Test America, Soil Engineering Testing, Inc. (SET), and Particle Technology Labs (PTL), independent laboratories contracted by U. S. Steel.

Tables 3 and 3a include a detailed inventory of samples submitted for testing or analysis. A total of 350 sediment samples were submitted to the laboratories: 278 from the February-March 2011 event,

40 from the June 2011 event, and 32 from the Fall 2011 program. Results of laboratory analyses are described in Section 3.2.2, Sediment Chemistry Data.

Waste core material was placed in a container, characterized and disposed off-site at the Veolia ES Rolling Hills Landfill in Buffalo, Minnesota.

2.2.3 Evaluation of Concentrations Less Than Detection Limits

Following Section 7.3 of the Work Plan, *Interpretation of Concentrations Less Than Detection Limits*, (Barr 2011a), scaling censored (non-detect) data was performed with the goal of eliminating false positives and false negatives from the final data set as follows:

- Non-detected (ND) results were treated as one-half the reporting/or detection limit (RL/DL) if there was a proportional mix of ND and detected results (e.g., <5 + 5 = 7.5, where the RL/DL = 5) for the purposes of summation and comparison to relevant criteria.
- If all the results were ND, then the RL/DL was considered "zero" for the purposes of summation and comparison to relevant criteria.
- In cases where RL/DLs were elevated (due to moisture or sample volume variability, not concentrations), ND data were reviewed to ascertain the reason for the elevated reporting/detection limit, and data from nearby samples were closely evaluated. If results from nearby samples were ND (without elevated RL/DLs), then the RL/DL was considered "zero."
- Elevated RL/DL ND results were treated as one-half the reporting/detection limit (RL/DL) if there was a proportional mix of ND and detected results (e.g., <5 + 5 = 7.5, where the RL/DL = 5).
- Elevated RL/DLs ND values were also screened out by excluding ND results that have detection limits greater than the corresponding Level II SQT value and were handled on a case-by-case basis.

For the PAHs, all non-detect results were set to one-half the RL for the summation and quotient (PEC-Q and ESB) calculations. For the PCBs and some of the dioxin/furan sample results, a majority of the sample results were ND. Using one-half of either the MDL or the RL (or EDL for dioxins) in these cases would create a quotient, where none was detected; therefore, the non-detect values were set to "zero" for summation and toxicity quotients. For some samples where the dioxin/furan results had a majority of the individual 2,3,7,8-substituted congeners detected or had elevated EDLs, Barr set non-detect results to one-half the EDL. Therefore, the final Site TCDD data

are comprised of some data where non-detect results are treated as zero and some are treated as one-half the EDL for the purposes of calculating the TCDD equivalence.

Routine analytical laboratory procedures involve evaluation and quantitation of concentrations at levels below the stated reporting limits, but greater than the stated MDL or EDL (for dioxins). In these cases, data are qualified with a "j". Additionally, laboratory data for alkylated PAHs are qualified with an "X" also indicating an estimated concentration due to non-standard quantitation techniques. All estimated concentrations were reported as detects for the purposes of summations, calculations and risk-screening evaluation.

2.2.4 Ecological Screening Calculation Methods

Once the analytical results were validated through the QA/QC process (as described in Section 4.0), the data were used to calculate various ecological risk-screening data quotients for use in site data comparisons and risk-screening evaluations. The following sections describe the calculation methods used. The comparison of results and evaluation of data are discussed in Sections 3.0 and 5.0.

2.2.4.1 Probable Effect Concentration Quotient (PEC-Q) Calculation Methods

The PEC-Qs were calculated in accordance with the *Guidance for the Use and Application of Sediment Quality Targets for the Protection of Sediment-Dwelling Organisms in Minnesota* - (MPCA, 2007).

Per MPCA guidance (MPCA, 2007), the following mean PEC-Q screening value ranges were used for sediment toxicity screening:

- Mean PEC-Q $\leq$ 0.1 – effects typically not observed
- 0.1 < mean PEC-Q $\leq$ 0.6 – effects observed at 50 percent or lower probability
- Mean PEC-Q > 0.6 – effects observed at greater than 50 percent probability

These MPCA-derived screening value ranges were based on observations made from sediment data collected from the St. Louis River AOC near Duluth, Minnesota, where organic compounds dominated the sediment chemistry (MPCA, 2007). Below is a summary of the respective PEC-Q calculations for this investigation.

Appendix B provides example calculation notes and a copy of the PEC-Q calculations performed on the data.

2.2.4.1.1 PEC-Q for total PAHs

A PEC-Q was calculated for total PAHs by summing the list of 13 PAHs specified by the MPCA and dividing the sum of 13 PAHs by the Level II SQT for total PAHs (MPCA, 2007).

2.2.4.1.2 Mean PEC-Q for Metals

A mean PEC-Q for metals was calculated for each sediment sample by summing the quotient of each individual total metal concentration and respective Level II SQT for arsenic, cadmium, chromium, copper, lead, nickel and zinc and dividing that sum by the number of metals (MPCA, 2007).

2.2.4.1.3 PEC-Q for total PCBs

A PEC-Q was calculated for total PCBs by summing the PCB aroclors and dividing the sum of PCBs by the Level II SQT for total PCBs (MPCA, 2007).

2.2.4.1.4 Total Mean PEC-Q

For the majority of samples, total mean PEC-Q was calculated by adding the PEC-Q for total PAHs and the mean PEC-Q for metals and dividing that sum by two (MPCA, 2007) because only PAHs and metals were analyzed; PCBs were analyzed at approximately 10 percent of the sediment core locations. For sediment core locations where PCB data were analyzed in addition to PAHs and metals, the total mean PEC-Q was calculated by adding the PEC-Q for total PAHs, the PEC-Q for metals, and the PEC-Q for total PCBs and dividing that sum by three (MPCA, 2007).

2.2.4.2 Equilibrium Partitioning Sediment Benchmark (ESBs) Calculation Methods

2.2.4.2.1 PAH ESBs

The PAH data used for calculating PAH ESBs were reviewed and evaluated following *Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: PAH Mixtures*" (USEPA, 2003). The PAH ESBs, which are expressed as the sum of ESB toxic units based on final chronic value ($\sum$ESB TU_{fcv}), were calculated in accordance with the guidance (USEPA, 2003), using the list of 34 PAH compounds. Appendix B provides example calculation notes and a copy of the PAH ESB calculations performed on the data.

The PAH ESB ($\sum$ESB TU_{fcvi}) is calculated by dividing an individual PAH concentration by the total organic carbon concentration for that location, which results in a PAH-specific chemical concentration in sediment on an organic carbon basis ($C_{OC, PAHi}$). This value is then compared to the maximum solubility PAH concentration in sediment on an organic carbon basis ($C_{OC, PAHi, Maxi}$). If $C_{OC, PAHi}$ is greater than $C_{OC, PAHi, Maxi}$, then $C_{OC, PAHi, Maxi}$ is used for calculating $\sum$ESB TU_{fcvi}. If $C_{OC, PAHi}$ is less than $C_{OC, PAHi, Maxi}$, then $C_{OC, PAHi}$ is used for calculating $\sum$ESB TU_{fcvi} (for the data

presented in this memorandum, $C_{OC, PAHi}$ did not exceed $C_{OC, PAHi, Maxi}$). Then $C_{OC, PAHi}$ is divided by the effective concentration of a PAH in sediment on an organic carbon basis, calculated from the product of its final chronic value and organic carbon: water partition coefficient ($C_{OC, PAHi, FCVi}$), with the quotient equaling the ESB TU_{fcvi} for that PAH compound. These quotients are summed for the defined PAH analyte list to give the $\sum$ESB TU_{fcvi}, referred to in this report as the PAH ESB.

Per USEPA guidance (USEPA, 2003), if:

> PAH ESB = $\sum$ESB TU_{fcvi}= $\sum(C_{OC, PAHi}/ C_{OC, PAHi, FCVi}) \leq 1.0$ for the PAH 34 list (or scaled version of the PAH list, see Appendix B for details of the Site-specific scaling evaluation), benthic organisms should be acceptably protected from the effects of PAH mixtures in freshwater and saltwater sediments.

2.2.4.2.2 Metal ESBs

The metal ESBs were calculated in accordance with the *Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: Metal Mixtures (Cadmium, Copper, Lead, Nickel, Silver, and Zinc)* (USEPA, 2005a). In summary, the molar concentration of acid volatile sulfide (AVS) present in sediment is subtracted from the molar concentration of simultaneously extractable metal (SEM). Next, this value is divided by the fraction of organic carbon (f_{oc}) in the sediment (($\sum$SEM-AVS)/f_{oc}) to account for site-to-site heterogeneity introduced by preferential binding to organic carbon. For this report, $\sum$SEM-AVS)/f_{oc} is referred to as ESB Metals. It should be noted that silver was not analyzed for the sediment cores collected as part of this investigation because of historical facility operations knowledge silver was concluded to not be a potential COI and therefore, metal ESBs were calculated without silver concentrations. Appendix B provides example calculation notes and a copy of the metal ESB calculations performed on the data.

The range of ESB metal values given for screening the potential toxicity of metals in sediment (USEPA, 2005a) is:

- ESB metals ≤ 130 µmol/goc is predicted to be non-toxic to benthic organisms;
- 130 µmol/goc < ESB metals < 3,000 µmol/goc lies within the concentration where prediction of toxicity is uncertain for benthic organisms; and
- ESB metals ≥ 3,000 µmol/goc is predicted to be toxic to benthic organisms.

2.3 Geotechnical Evaluation

The geotechnical evaluation of site sediments consisted of performing six soil borings and 12-cone penetration test (CPT) soundings across the Site. Standard penetration test (SPT) sampling was performed using a standard split-spoon sampler in general accordance with ASTM D1586. Sampling with a modified California sampler was performed in general accordance with ASTM D3550, while Shelby (thinwall) tube samples were collected at select intervals per ASTM D1587.

CPT soundings and pore-pressure dissipation testing were performed from the barge in general accordance with ASTM D5778 by ConeTec of Salt Lake City, UT. Field vane shear testing was completed at select intervals in general accordance with ASTM D2573. Flat-plate dilatometer testing (DMT) was also performed at select locations and intervals per ASTM D6635. Soil classifications were performed per ASTM D2488 and follow the Unified Soil Classification System (USCS). Laboratory testing to document geotechnical soil characteristics was performed by Test America and SET.

2.4 Groundwater Flux Investigation

The groundwater flux investigation was begun in late summer 2012, however, the results were not available for inclusion in this report. Results will be presented in a FS report expected in 2013. As a prelude to the groundwater flux meter investigation, limited thermal profiling was conducted in nearshore sediments in November 2011, with the goal of identifying potential preferential groundwater to surface water seepage regions. Additionally, a Groundwater/Surface Water Flux Meter Sampling and Analysis Plan (SAP) (Barr, 2012b) was submitted to the MPCA and GLNPO in August 2012 to further characterize the groundwater flux in the study area. This section is limited to a description of the thermal profiling methods.

The thermal profiling was conducted using two thermocouples attached to a staff, one at the bottom of the staff, and another height-adjustable thermocouple near the middle of the staff. An 8-inch disk was located approximately 12 inches above the bottom thermocouple. To measure sediment temperature, the bottom thermocouple was inserted into the sediment until the disk was resting on top of the sediment. The top thermocouple was height-adjusted to measure the surface water temperature in the middle of the surface water column.

Upon stabilization of temperature readings, the sediment and surface water temperature measurements were recorded. Measurement locations were recorded using a handheld GPS. The measurements were collected on an approximate 25-foot spacing, along the Unnamed Creek and

Wire Mill Delta shorelines, and on two transects perpendicular to the shoreline, one in the Wire Mill Delta, and the other in the Unnamed Creek Delta.

2.5 Hydrodynamic and Sediment Stability Data Collection

Hydrodynamic characteristics of the St. Louis River have been studied to help enhance the conceptual model of the Site and to provide additional data that can be used to develop a numerical model and to assist with the evaluation of potential actions at the Site. Hydrodynamic parameters studies include the bathymetry of the river bottom, flow velocities within the river channel, the sediment capacity of the river, the stability of the bed sediment, and the potential forces associated with waves and ice within the river system.

2.5.1 Gather and Review Existing Information

Existing information related to the St. Louis River near the Site, including Spirit Lake hydrodynamics and sediment stability, was gathered and reviewed for use in refining the CSMs and guiding the additional data collection and evaluation efforts. Results of the review are presented in Section 3.5.1.

2.5.2 Bathymetric Survey

Site survey controls were established in January 2011 using the Minnesota State Plane (North) coordinate system and the NAD83 (1996) and NAVD 88 datum. Survey data were collected using a real-time kinetic (RTK) global positioning system (GPS) with an accuracy of +/- 0.1 feet.

Bathymetry data were collected at each sampling location by surveying the top of sediment using a survey staff fitted with an 8-inch disc on the bottom. A comprehensive Site bathymetric survey was performed after ice-out in May and June 2011 using boat-mounted sonar/RTK GPS and pole-mounted RTK GPS equipment on a 100-foot grid (Figure 6). The survey was expanded during the Fall Program to include the greater portion of Spirit Lake. Site bathymetry is discussed in Section 3.5.2.

A 500-year flood event occurred on the St. Louis River in June 2012. A second bathymetric survey was conducted in August 2012 after this event to document changes in the river bed morphology after the flood (Figure 7). In general broad areas of Spirit Lake showed no measurable change between 2011 and post-flood with a number of offshore areas showing net accumulations of sediment. Further analysis, including elevation difference mapping will be included in the FS report.

2.5.3 Velocity Profiles

Flow velocities were proposed to be measured in Spirit Lake during the months of anticipated extreme hydrologic/hydraulic events, which include:

- Fall – when winds are generally greatest in the area causing significant wave action;
- Winter – when the area is confined by ice cover; and
- Spring – when flows are greatest because of spring runoff and flood events.

At the time that this report was prepared, only the Fall 2011 event was completed. Ice conditions were judged to be not safe enough in the winter of 2011/2012 to complete the winter event.

Velocity profile "snapshots" were measured using a Marsh-McBirney flow meter, at specific depth intervals. Results are presented in Section 3.5.3.

Long-term velocity profiles were collected at the locations shown on Figure 8 (denoted UCVELOCITY and WMVELOCITY). A Nortek Aquadopp Acoustic Doppler Current Profiler (ADCP) was used to collect flow velocity data at each location. The ADCPs were deployed with their sensor heads level with the top of sediment. Three components of flow were recorded continuously in 25-cm bins (or intervals) across 2.5 meters of water depth. The three components were vertical, north, and east, where the north and east flow are the horizontal velocity components. An onboard compass recorded the tilt and position of the sensor head, allowing for directions to be assigned to the flow magnitudes. The three flow components were combined to create an average magnitude and direction of flow at each bin. Results are presented in Section 3.5.3.

A combination of the velocity profile snap-shots and longer-term continuous velocity profiling are being completed to better understand the flow regimes in the area and to calibrate numerical modeling in conjunction with the other data collection efforts described here. The results will be summarized in a technical memorandum prepared as part of the FS.

2.5.4 Waves

Wave height data were collected using Macro Wave gauges produced by Coastal Leasing USA. These gauges measure the pressure change caused by the water surface elevation change. Subsurface pressure data do not directly correlate to wave height, and must be processed using a transfer function. Linear Wave theory was used as the basis for transferring pressure data into wave height. A MATLAB (a numeric computing environment) script was used to process the data and return a root-mean square (rms) wave height on 20-minute intervals for the period of record. Figure 8 shows

the locations of the four wave gauges placed in Spirit Lake, denoted UCWAVE-1 and 2, and WMWAVE-1 and 2. Their locations were chosen to observe wave propagation from offshore to onshore. Wave data results are discussed in Section 3.5.4.

2.5.5 Suspended Sediment and Bed Load Characterization

Samples were collected to characterize the sediments suspended in the water column, bed load sediments, and surficial (top 6 inches) bed sediments. Suspended sediment concentration (SSC) samples were collected using a Helley-Smith 8035 cable-suspended sampler at intervals shown on Figures 9 through 12. Bed load sediment characterization samples were collected using a Helley-Smith 8015 handheld sampler, and analyzed for grain size. Results are discussed in Section 3.5.5.

2.5.6 Bed Stability

Surficial sediment samples were collected from nine locations (Figure 8) using a small clamshell-style sampler (Ponar) deployed from a pontoon to measure bed stability parameters summarized in Table 2 of Work Plan II (Barr, 2011d). The samples were analyzed by SET, PTL, and Barr. A summary of the capillary suction time (CST) tests performed by Barr is available in Section 3.5.6.

3.0 Summary of Results

Results obtained from the field activities described in Section 2 are reported here. For clarity, the order used to present the scope of field activities in Section 2 is also used in Section 3.

3.1 Physical Site Data

Physical site data collected during the investigation through November 2011 is presented in this report for informational purposes. These data will be further evaluated as part of a feasibility study (FS) and combined with additional physical data collected after November 2011. Further discussion and evaluation of these data will be presented in the FS report.

3.1.1 Groundwater Level Measurements and River Level Gauging

A hydrograph of the gauge station, piezometer PZ-E-1, and available USGS Superior Bay shipping channel data are provided in Appendix C. The USGS data is available online at: http://waterdata.usgs.gov/usa/nwis/uv?464646092052900. The Low Water Datum (International Great Lakes Datum of 1985 (IGLD 85)) of Lake Superior is 601.1 feet above mean sea level (MSL). The average elevation of Spirit Lake during the monitoring period of May 31, 2011 to March 2, 2012 was also 601.1 feet above MSL.

3.1.2 Meteorological Data Gathering

Graphs of Site meteorological data are included as Appendix D. These graphs represent the 15-minute averages of the data collected by the meteorological station, supplemented by the Richard I. Bong airport data.

3.1.3 Ice Observation

Based on observations made in late winter and spring of 2011, typical winter conditions cause ice to freeze to the shallow sediments along the shoreline of the two delta areas. Based on Site observations, water levels drop over the winter and as the spring melt occurs, this anchored ice protects shorelines and shallow sediments from disturbance and transport by pack ice travelling downstream. The details of the ice observation study are discussed in Appendix E. The ice observation reported here indicated that anchored ice primarily melted in-place during the spring thaw. Ice observations were made in 2012 and are again being made in the late winter/spring of 2013, including time-lapse photography of the shorelines at the two deltas, results of which will be reported and discussed in the FS report.

3.2 Sediment Investigation Results

3.2.1 Sediment Cores/Borings

Completed core and boring logs and photographs are included in Appendix A. Two types of boring logs were generated for the HSA borings: one featuring field observations and using the visual/manual method of soil texture classification (Appendix A), and the other presenting information in a geotechnical format with laboratory geotechnical results (Appendix F).

3.2.2 Sediment Chemistry Data

The following sections present the laboratory results from 350 samples obtained from the 2011 sediment coring and sampling events. Samples were collected in general accordance with SOPs. Quality control included the measures stated in the QAPP (Barr, 2011b) and briefly discussed in Section 4. Table 1 outlines the COIs and analytical parameters, their chemical abstract number or analyte code, and the laboratories performing the analyses. Tables 3 and 3A provide a summary of sediments sampled and analyses completed. The full available analytical non-CLP laboratory data reports are in Appendix G. The full CLP laboratory data reports are not included in this report, but are available from the USEPA Sample Management Office (SMO). It should be noted that the COIs were modified for the Fall Program (Barr, 2011d). Therefore the total number of analyses may differ for some analytes. Appendix H contains additional figure summaries of selected chemical results.

Additional sediment quality data were collected in 2011 by the MPCA in areas adjoining and up-river of the Site. The Site sediment quality data are discussed in comparison to the MPCA sediment quality data in Section 5.7 of this report.

3.2.2.1 Polynuclear Aromatic Hydrocarbons (PAHs)

The priority PAH list defined in the Work Plan (Table 2–List 1) is comprised of 17 compounds. Each sediment sample was analyzed for this list of PAH compounds and the results were screened by comparison to Sediment Quality Targets (SQTs) for those PAHs that have an SQT value (MPCA, 2007). Since multiple PAH lists and summing protocols are discussed in this report, a summary of the lists is presented in Table 4. Of the 350 total samples, 100 percent (350) were analyzed for the priority PAH list (i.e., EPA-(16-17) PAH list in Table 4), meeting the goal of all samples to be analyzed for the priority PAH list from the Work Plan (Barr, 2011a and 2011d). Because a proportional mix of ND and detected results was present throughout the PAH sample results, ND results were set to one-half the RL/DL as noted in Section 2.2.3 (case 1), for the purposes of summation or comparison to relevant screening criteria.

Table 5 summarizes the results of the priority PAH list with respect to available SQTs. Histograms showing the distribution of total PAH concentrations for all samples from both the Unnamed Creek Delta and Wire Mill Delta investigation areas are presented as Figure H-1 in Appendix H. The Level I and Level II SQT values are also marked on the histograms for comparison purposes so that total PAH concentrations are presented in each of these categories as less than Level I SQT, between Level I and Level II SQT, and greater than Level II SQT.

Figures 13 and 14 display total PAHs data (for the 13 PAH list) in comparison to SQTs for sampling locations at depths of 0 to 0.5 feet and depths greater than 0.5 feet, respectively. Additional figures are presented in Appendix H that display total PAHs in comparison to SQTs at specific depth intervals (*i.e.*, 0 to 15.24 cm (Figure H-2), 15.25 to 50 cm (Figure H-3), 51 to 101 cm (Figure H-4), and sediment sample depths greater than 101 cm (Figure H-5)) to show changes in distribution of concentrations with changes in depth. Additionally, Figure H-6 displays total PAHs in comparison to SQTS for samples from the 0 to 100-cm depth interval to show the overall lateral distribution of concentrations in the upper meter of sediment.

The lateral and vertical extent of total PAHs at concentrations greater than the Level II SQT **is** delineated. Total PAHs exceeding the Level II SQT in the surficial 0 to 0.5-feet-deep sediments do not extend as far offshore as in deeper sediments (>0.5 feet), particularly in the Wire Mill delta area.

3.2.2.1.1 Extended PAH List

The extended PAH list totals 34 PAH compounds, which are published in the USEPA "*Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: PAH Mixtures*" (*Table 6-2*; U.S. EPA, 2003) and are listed in Table 4. The extended PAH list includes the 17 PAHs on the priority PAH list presented in the previous section (see Table 4).

The results of the extended PAH analyses are summarized in Table 5. A summary of ratios comparing the 13-list and 17-list PAHs to 34-list PAHs is presented in Table 6. A site-specific scaling equation was used to calculate PAH ESBs when fewer than the 34-list PAHs were analyzed. The method used to determine the scaling equation is described in Appendix B.

PAH ESBs were calculated using the 34-list PAHs or the 17-list PAHs and scaling equation. Figures 15 and 16 display the PAH ESBs at sample locations where PAH data were collected. The location of sediment samples with PAH ESBs greater than 1 are very similar to the location of sediment samples with total PAHs greater than Level II SQT. Only five out of a total of 122 samples

had PAH ESBs greater than 1 where total PAH concentrations were less than Level II SQT. Conversely, one sample had a total PAH concentration greater than Level II SQT where the PAH ESB was less than 1.

3.2.2.2 Metals

Sediment samples were analyzed for the list of eight RCRA metals, identified in Table 2-List 1 of the Work Plan. Each sediment sample was analyzed for this list of metals and the results were screened by comparing to the respective SQT values. Metals results less than the DL/RL were few and, consequently, such results were set at one-half the RL/DL in accordance with the protocol outlined in Section 2.2.3 (case 1). Table 7 summarizes the results of the metals analyses with respect to available SQTs. Figures 17 and 18 display the PEC-Q values calculated for metals for sample locations at depths of 0 to 0.5 feet and depths greater than 0.5 feet, respectively. Additional figures are presented in Appendix H that display mean PEC-Q values for metals at specific depth intervals (*i.e.*, 15.24 cm (H-7), 15.25 to 50 cm (H-8), 51 to 101 cm (H-9), greater than 101 cm (H-10), and for all sediment depths (H-11)). Figures 19 and 20 display the metals ESB values for sample locations at depths of 0 to 0.5 feet and depths greater than 0.5 feet, respectively.

3.2.2.2.1 Arsenic

Arsenic concentrations in each delta area were compared spatially at two depth intervals (less than 0.5 feet and greater than 0.5 feet) to Level I and II SQTs as shown on Figures H-12 and H-13. The frequency of arsenic concentrations by delta were also compared to the Level I and II SQTs as shown in histograms on Figure H-14. The following subsections provide a general summary of arsenic concentrations by delta and the overall extent of arsenic in the study area with respect to the 2011 data.

Unnamed Creek Delta

Approximately 75 percent of samples had arsenic concentrations less than the Level 1 SQT for arsenic. No samples had arsenic concentrations greater than the Level II SQT.

Wire Mill Delta

Approximately 86 percent of samples had arsenic concentrations less than the Level 1 SQT. Only one sample concentration was greater than the arsenic Level II SQT, which was from WM-84 at a depth greater than 0.5 feet. The WM-84 sample from a depth of 0 to 0.5 feet had an arsenic concentration between the Level I and II SQTs.

Extent

The arsenic concentrations at the eastern boundary of the investigation area were less than the Level I SQT, with the exception of one sample location (UC-90) that had an arsenic concentration between the Level I and II SQTs.

3.2.2.2.2 Cadmium

Cadmium concentrations in each delta area were compared spatially at two depth intervals (less than 0.5 feet and greater than 0.5 feet) to Level I and II SQTs as shown on Figures H-15 and H-16. The frequency of cadmium concentrations by delta were also compared to the Level I and II SQTs, as shown in histograms on Figure H-17. The following subsections provide a general summary of cadmium concentrations by delta and the overall extent of cadmium in the study area with respect to the 2011 data.

Unnamed Creek Delta

Approximately 57 percent of samples had cadmium concentrations less than the Level 1 SQT. Only one sample had a concentration greater than the Level II SQT for cadmium, which was from UC-38 at a depth greater than 0.5 feet. The UC-38 sample from a depth of 0 to 0.5 feet had a cadmium concentration less than the Level I SQT.

Wire Mill Delta

Approximately 74 percent of samples had cadmium concentrations less than the Level 1 SQT, with no sample concentrations greater than the Level II SQT for cadmium.

Extent

The cadmium concentrations at the eastern boundary of the investigation area were less than the Level I SQT, with the exception of three sample locations (UC-15, UC-90, and WM-50) which were all less than the Level II SQT. Cadmium concentrations at UC-15 and WM-50 only exceeded the Level I SQT in samples from depths greater than 0.5 feet, and not in surficial samples.

3.2.2.2.3 Chromium

Chromium concentrations in each delta area were compared spatially at two depth intervals (less than 0.5 feet and greater than 0.5 feet) to Level I and II SQTs, as shown on Figures H-18 and H-19. The frequency of chromium concentrations by delta were also compared to the Level I and II SQTs as shown in histograms on Figure H-20. The following subsections provide a general summary of chromium concentrations by delta and the overall extent of chromium in the study area with respect to the 2011 data.

Unnamed Creek Delta

Approximately 96 percent of samples had chromium concentrations less than the Level 1 SQT, with no samples having a concentration greater than the chromium Level II SQT.

Wire Mill Delta

Approximately 84 percent of samples had chromium concentrations less than the Level 1 SQT, with eight sample concentrations greater than the Level II SQT for chromium. Samples with chromium concentrations greater than the Level II SQT were located both at less than 0.5 foot and greater than 0.5-foot depths.

Extent

The chromium concentrations at the eastern boundary of the investigation area were less than the Level I SQT, with the exception of one sample location (UC-90). The chromium concentration at UC-90 only exceeded the Level I SQT in the surficial sample from a depth less than 0.5 feet.

3.2.2.2.4 Copper

Copper concentrations in each delta area were compared spatially at two depth intervals (less than 0.5 feet and greater than 0.5 feet) to Level I and II SQTs, as shown on Figures H-21 and H-22. The frequency of copper concentrations by delta were also compared to the Level I and II SQTs, as shown in histograms on Figure H-23. The following subsections provide a general summary of copper concentrations by delta and the overall extent of copper in the study area with respect to the 2011 data.

Unnamed Creek Delta

Approximately 65 percent of samples had copper concentrations less than the Level I SQT. No samples had a copper concentration greater than the Level II SQT. Copper concentrations that were between Level I and Level II SQTs were more commonly located at depths greater than 0.5 feet.

Wire Mill Delta

Approximately 70 percent of samples had copper concentrations less than the Level I SQT. Most locations had copper concentration in some samples from depths greater than 0.5 feet that were between Level I and Level II SQTs. Copper concentrations greater than the Level II SQT are present in the Wire Mill Delta. Most samples with copper concentrations greater than the Level II SQT were from depths greater than 0.5feet.

Extent

The copper concentrations at the eastern boundary of the investigation area were less than the Level I SQT, with the exception of five sample locations (UC-90, UC-15, WM-50, WM-51, and WM-49) where the copper concentration was between the Level I and Level II SQT. Concentrations were between the Level I and Level II SQT for copper only in samples from depths greater than 0.5 feet at each of the locations, except at UC-90 where the surficial sample also had a copper concentration which was between the Level I and Level II SQT.

3.2.2.2.5 Lead

Lead concentrations in each delta area were compared spatially at two depth intervals (less than 0.5 feet and greater than 0.5 feet) to Level I and II SQTs, as shown on Figures H-24 and H-25. The frequency of lead concentrations by delta were also compared to the Level I and II SQTs, as shown in histograms on Figure H-26. The following subsections provide a general summary of lead concentrations by delta and the overall extent of lead in the study area with respect to the 2011 data.

Unnamed Creek Delta

Approximately 42 percent of samples had lead concentrations less than the Level I SQT. Lead concentrations in samples from depths less than 0.5 feet were less than the Level 1 SQT or between Level I and Level II SQTs, except three surficial samples had lead concentrations greater than the Level II SQT. Most locations had a sample(s) from depths greater than 0.5 feet that had a lead concentration greater than the Level II SQT.

Wire Mill Delta

Approximately 73 percent of samples had lead concentrations less than the Level I SQT. Lead concentrations in surficial samples from depths less than 0.5 feet were generally less than the Level I SQT. Most locations had lead concentrations in samples from depths greater than 0.5 feet that were between Level I and Level II SQTs or greater than Level II SQTs, except along the southern portion of the area.

Extent

The lead concentrations at the eastern boundary of the investigation area in samples collected from less than 0.5 feet were less than the Level II SQT, with the exception of one sample location (UC-90) where the lead concentration was greater than the Level II SQT. Concentrations exceeded the Level I SQT for lead in samples from depths greater than 0.5 feet from five locations in the northern part of the investigation area (WM-50, UC-15, UC-36, UC-56, and UC-90) and were less than the Level II SQT at each of these locations except UC-90.

3.2.2.2.6 Mercury

Mercury concentrations in each delta area were compared spatially at two depth intervals (less than 0.5 feet and greater than 0.5 feet) to Level I and II SQTs, as shown on Figures H-27 and H-28. The frequency of mercury concentrations by delta were also compared to the Level I and II SQTs,E as shown in histograms on Figure H-29. The following subsections provide a general summary of mercury concentrations by delta and the overall extent of mercury in the study area using the 2011 RI data.

Unnamed Creek Delta

Approximately 63 percent of samples had mercury concentrations less than the Level 1 SQT. Only one sample had a mercury concentration greater than the Level II SQT which was from UC-39 at a depth of 0 to 0.5 feet.

Wire Mill Delta

Approximately 72 percent of samples had mercury concentrations less than the Level I SQT. No mercury concentrations were greater than the Level II SQT.

Extent

The mercury concentrations at the eastern boundary of the investigation area were less than the Level I SQT at half the locations and between the Level I and Level II SQT at the other locations. Most samples with mercury concentrations between Level I and Level II SQTs were surficial samples from depths less than 0.5 feet.

3.2.2.2.7 Nickel

Nickel concentrations in each delta area were compared spatially at two depth intervals (less than 0.5 feet and greater than 0.5 feet) to Level I and II SQTs, as shown on Figures H-30 and H-31. The frequency of nickel concentrations by delta were also compared to the Level I and II SQTs, as shown in histograms on Figure H-32. The following subsections provide a general summary of nickel concentrations by delta and the overall extent of nickel in the study area with respect to the 2011 data.

Unnamed Creek Delta

Approximately 76 percent of samples had nickel concentrations less than the Level I SQT. No samples had a nickel concentration greater than the Level II SQT.

Wire Mill Delta

Approximately 62 percent of samples had nickel concentrations less than the Level I SQT. Nickel concentrations were generally less than the Level 1 SQT in surficial samples collected from a depth less than 0.5 feet. Five surficial samples had concentrations greater than the Level II SQT for nickel. Seventeen locations had a sample(s) from depths greater than 0.5 feet that had a nickel concentration greater than the Level II SQT.

Extent

The nickel concentrations at the eastern boundary of the investigation area in samples less than 0.5 feet deep were less than the Level I SQT, with the exception of one sample location (UC-90) where the nickel concentration was between Level I and Level II SQTs. Samples from depths greater than 0.5 feet had nickel concentration less than Level I SQT or between Level I and Level II SQT. No samples from the eastern boundary of the investigation area had nickel concentrations greater than Level II SQT.

3.2.2.2.8 Zinc

Zinc concentrations in each delta area were compared spatially at two depth intervals (less than 0.5 feet and greater than 0.5 feet) to Level I and II SQTs, as shown on Figures H-33 and H-34. The frequency of zinc concentrations by delta were also compared to the Level I and II SQTs, as shown in histograms on Figure H-35. The following subsections provide a general summary of zinc concentrations by delta and the overall extent of zinc in the study area with respect to the 2011 data.

Unnamed Creek Delta

Approximately 36 percent of samples had zinc concentrations less than the Level I SQT. Zinc concentrations in samples from depths less than 0.5 feet generally were between the Level I and Level II SQTs, and four surficial samples had zinc concentrations greater than the Level II SQT. Many locations had a sample(s) from depths greater than 0.5 feet that had a zinc concentration greater than the Level II SQT.

Wire Mill Delta

Approximately 68 percent of samples had zinc concentrations less than the Level I SQT. Zinc concentrations in surficial samples from depths less than 0.5 feet were generally less than the Level I SQT, and six surficial samples had zinc concentrations greater than the Level II SQT. Most locations had zinc concentration in samples from depths greater than 0.5 feet that were between Level I and Level II SQTs or greater than Level II SQTs, except along the southern portion of the area.

Extent

The zinc concentrations at the eastern boundary of the investigation area in samples collected from less than 0.5 feet were less than the Level I SQT, with the exception three sample locations (UC-36, UC-37, and UC-90). The zinc concentration was greater than the Level II SQT only at UC-90. Concentrations were less than the Level I SQT for zinc in approximately half the samples from depths greater than 0.5 feet and between Level I and Level II SQTs in the remaining samples.

3.2.2.3 Cyanide

Total cyanide was analyzed in the Winter Program sediment samples. Table 8 summarizes the results of the total cyanide analyses. Sediment pH measurements were collected at nineteen (19) total cyanide sample locations to evaluate whether sediment conditions were favorable for "free cyanide" (hydrogen cyanide) to be present. Figures H-36 and H-37 show cyanide concentrations and pH values at depths less than or equal to 0.5 feet and greater than 0.5 feet, respectively. Sediment toxicity is based upon hydrogen cyanide. Sediment pH conditions measured in the Winter Program ranged from 5.5 to 7.2 pH units, which indicates that conditions are not conducive for hydrogen cyanide to be present at potentially toxic concentrations; therefore, total cyanide was not included in the sampling plan for the Fall program, as presented in Sediment Investigation Work Plan II (Barr, 2011d).

3.2.2.4 Polychlorinated Biphenyls (PCBs)

Winter Program sediment samples were analyzed for PCB Aroclors and compared to SQTs (MPCA, 2007). Table 9 summarizes the results of the PCB Aroclor analyses with respect to the SQTs. Figures H-38 and H-39 in Appendix H display the total PCB concentrations with respect to SQTs. All locations have total PCBs less than Level I SQT values. Additionally, the mean PEC-Q values for PCBs were all below 0.1. Two locations (UC-11 and UC-23) had estimated values for individual Aroclors in four sediment samples. These values were used as presented in Section 2.2.3. All other PCB congeners with ND results were set to zero when calculating the sum of PCBs. As shown in Table 9, using MDLs set at zero, the Aroclor summation results are less than the Level I SQT at all locations.

3.2.2.5 Total Dioxins/Furans

Total dioxins/furans analyses were performed on surficial sediment samples. To the extent possible, the dioxin/furans samples were co-located with the extended-list PAH sample locations. Table 10 summarizes the dioxin/furan results. Following MPCA SQT guidance, 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) equivalents have been calculated using the 1998 toxicity equivalency factors, and are

presented in Table 10. When estimated values were reported by the laboratory, those values were used. All other dioxin/furans results were handled as outlined in Section 2.2.3, when calculating the TCDD equivalents and risk-screening quotients. Figures H-40, H-41, and H-42 in Appendix H display the results of dioxin/furan analysis. Histograms showing the distribution of TCDD equivalents for all samples from both the Unnamed Creek Delta and Wire Mill Delta investigation areas are presented on Figure H-43. Two locations within the Wire Mill Delta (WM-4, and WM-10) area have TCDD equivalents greater than Level II SQT at depths of 0 to 0.5 feet. However, 12 locations out of 21 spread across both the Unnamed Creek and Wire Mill delta areas have TCDD values greater than the Level II SQT at depths greater than 0.5 feet.

Further discussion of dioxins/furans is provided in Section 5.7, where the Site data are compared to 2011 MPCA sediment quality data from areas around the Site and up-river.

3.2.2.6 Bioavailability Parameters (TOC, Black Carbon, AVS and SEM) Results

The TOC and black carbon results are summarized in Table 11 and displayed on Figures H-44 and H-45 in Appendix H. The AVS-SEM analysis results are summarized in Table 12. These data were used to evaluate potential availability of PAHs and/or metals to benthic invertebrates in sediment as discussed in Sections 2.2.4 and Section 5. Black carbon and TOC analyses were performed on all sediment quality samples collected. TOC was used in all bioavailability calculations as required by the Guidance.

While the majority of the black carbon sample results are less than the TOC result values, of the more than 300 samples analyzed only 21 individual samples had black carbon concentrations exceeding the corresponding TOC result. Of these 21 samples, 10 were 3 to 5 percent greater than the corresponding TOC result, seven of the samples were within 10 to 20 percent greater than the corresponding TOC result, and only four (UC-55-3, UC-79-2, UC-81-1, and UC-82-1) were more than 40 percent greater than the TOC result. Three of those four samples were located at the edge of the Unnamed Creek Delta, in an area that has been observed to have apparent coke or coal fines, consistent with historic pyrogenic processes. Those samples had total PAHs (13 PAH list) greater than Level II SQT. However, for the small subset of samples where the black carbon concentration was significantly greater than the TOC, there is no specific correlation between black carbon and total PAHs concentration.

On a qualitative level, it is expected that black carbon concentrations would typically be less than TOC concentrations. However, other than black carbon being a subset of the TOC analysis, because

they are likely derived from different sources and deposited and/or redistributed by different mechanisms, correlation between these measurements is not expected.

3.2.2.7 Total Petroleum Hydrocarbons (TPH)

TPH provides gross characterization of the petroleum hydrocarbons present in sediment. The laboratory quantified TPHs in the C10 through C34 range with a silica gel cleanup procedure that was performed to remove non-polar interferences inherent to the underlying native peat material. Table 8 summarizes the TPH sample results. Figures H-46 and H-47 show TPH concentrations at depths less than or equal to 0.5 feet and greater than 0.5 feet, respectively.

TPH samples were collected from core intervals and locations exhibiting apparent impacts based on sheen or staining and/or the presence of non-native sediment material. In sediments from 0 to 0.5 feet. TPH C10 through C20 range results were all less than the detection limits reported at all nine locations sampled. Non-detect results were reported for the TPH C20-C34 range on the east and south sides of the Wire Mill delta area. TPH is present as higher molecular weight range hydrocarbon forms at both delta areas and is associated with non-native sediment deposits generally below 0.5 feet deep. The greatest values were present in the Wire Mill delta area.

3.2.2.8 Sediment Nutrient Characterization

Select sediment samples were analyzed for total nitrogen, ammonia, and phosphorus to characterize sediment nutrient concentrations. Table 8 summarizes the sediment nutrient sample results. These data may be used to help evaluate alternatives during the FS.

3.2.2.9 Mean PEC-Q

Mean PEC-Q values were compared spatially at four depth intervals (0 to 15.24 cm (H-48), 15.25 to 50 cm (H-49), 51 to 100 cm (H-50), greater than 101 (H-51)) to values of 0.1 and 0.6. Figure H-52 shows the maximum mean PEC-Q value at any sample interval with respect to values of 0.1 and 0.6. The frequency of mean PEC-Q values by delta were also compared to the values of 0.1 and 0.6, as shown in histograms on Figure H-53.

Unnamed Creek Delta

All surficial samples (depth of 0 to 15.24 cm) within approximately 900 feet of the current mouth of Unnamed Creek had mean PEC-Q greater than 0.6. However, no surficial samples collected more than 1,600 feet from the mouth of Unnamed Creek had mean PEC-Q greater than 0.6. Samples collected from progressively deeper sediment depths had mean PEC-Q greater than 0.6 extending further out from the mouth of Unnamed Creek than the surficial samples although mean PEC-Q

values were not greater than 0.6 at locations and depths beyond approximately 2,000 feet from the mouth of Unnamed Creek.

Wire Mill Pond Delta

Seven of the ten surficial samples collected within approximately 800 feet of the outlet of the Wire Mill Pond had mean PEC-Q values greater than 0.6, and no surficial samples collected further than 800 feet from the outlet had mean PEC-Q values greater than 0.6. Samples collected from deeper depths at distances up to approximately 2,100 feet from the outlet had mean PEC-Q values greater than 0.6.

Extent

The mean PEC-Q value at the eastern boundary of the investigation area were all less than 0.6. Mean PEC-Q values in surficial sediment (0-15.4 cm) were less than 0.1 except for the four northernmost locations (UC36, UC-37, UC-56, and UC-90) where the value was between 0.1 and 0.6. Mean PEC-Q values were less than 0.1 or between 0.1 and 0.6 in samples from the eastern boundary of the investigation area in all depth intervals. The number of locations where values were between 0.1 and 0.6 varied between two and five for the different intervals and the locations were variable between intervals.

3.3 Geotechnical Evaluation

The geotechnical evaluation for the present phase of the project served to document general geotechnical soil characteristics across the Site by means of field and laboratory testing. Descriptions of field and laboratory tests performed are described in Appendix F. Field and laboratory test results are also summarized in Appendix F. Geotechnical data collected during the investigation through the Fall 2011 program are presented in this report. These data will be further evaluated as part of a FS. Therefore, further discussion and evaluation of these data will be presented in a later report.

3.3.1 Field Testing

Geotechnical subsurface exploration was performed in conjunction with the environmental investigation. As discussed briefly in Section 2.3, the geotechnical field investigation consisted of soil borings, SPT, CPT soundings, pore-pressure dissipation testing, DMT, and vane shear testing. Each of these field tests is described in more detail in Appendix F.

3.3.2 Laboratory Testing

Laboratory testing consisted of moisture content, unit weight, grain size analyses, Atterberg limits, permeability, consolidation, and consolidated-undrained triaxial testing. Test results are discussed and summarized in Appendix F.

3.3.2.1 Grain Size

Grain size was analyzed at approximately 10 percent of the stations distributed equally across the two delta areas. At the stations where sediment samples were collected for grain size, the analysis was performed from all vertical sample horizons. Grain size distribution charts are presented in Appendix G.

3.3.2.2 Atterberg Limits

Atterberg limits were measured on the same set of samples as the grain size analysis. Results are presented in Appendix G. Duplicate samples were not collected for physical parameters (i.e., grain size and Atterberg limits).

3.4 Groundwater Flux

The results of the sediment-surface water temperature measurement differences were plotted on a map to guide the future placement of groundwater flux meters. Readings revealed differences between surface water and groundwater temperatures ranging from 0 to 3.1 degrees Celsius. However, when accounting for other factors which may have influenced temperature readings (i.e. time of day, amount of cloud cover, depth of water, instrument accuracy) the results were generally inconclusive. Additional groundwater flux data will be collected during an additional phase of the investigation. A SAP was prepared (Barr, 2012b) describing the methods of data collection and analysis for the flux meter study. These data will be further evaluated as part of the FS. Therefore, further discussion and evaluation of these data will be presented in the FS report.

3.5 Hydrodynamic and Sediment Stability

Hydrodynamic and sediment stability site data collected during the investigation through the Fall 2011 program is presented in this report for informational purposes. These data will be further evaluated and discussed as part of the FS.

A number of Sampling and Analysis Plans (SAPs) are related to further hydrodynamics and sediment stability site characterization, they have been shared, and the work described in each has been performed or is underway as part of ongoing FS work. The studies recently completed or underway include; hydrodynamic and morphodynamic modeling , groundwater/surface water flux study,

sediment profile imaging, and supplemental investigation. The results of these individual studies will be presented in a final FS report planned for the Site.

3.5.1 Summary of Existing Information

A literature review found few studies focused on hydrodynamics and sediment transport in the St. Louis River estuary. Previous work includes surface water modeling (e.g., Chiu & Hsu, 1973), a historical geologic description of the estuary (Norton, 2000), and investigation reports related to a remediation of a nearby site (SERVICE, 2002). Of the studies considered as background for the RI, the following were found to be the most relevant and informative:

- A collection of 36 bathymetric cross sections surveyed by the U.S. Army Corps of Engineers (USACE, 2009) through the St. Louis River estuary. The southernmost of these cross sections incorporates the northernmost portion of Spirit Lake.

- An adaptation of an existing dynamic estuary model to the St. Louis River estuary by Chiu & Hsu (1973), and further described by Chiu & Woodall (1974) and McElroy & Chiu (1974) — all work developed under EPA contracts. This model was subsequently adapted to include seiche behavior (Stortz & Sydor, 1980), and more recently to study the transport of mercury (Glass, *et al.*, 1990).

- A Data Gap report prepared by SERVICE Engineering Company for the St. Louis River/Interlake/Duluth Tar Site (SERVICE, 2002). Extensive surface water quality and hydrodynamic modeling was performed as part of this investigation, as well as a thorough review of literature relevant to the St. Louis River estuary.

- A review of St. Louis River geology by a Master's degree student at University of Minnesota Duluth (Norton, 2000). The Norton thesis contains a discussion of geological history affecting the present day geometry of the estuary.

3.5.2 Bathymetric Survey

Bathymetry surveys were conducted in 2011 and in 2012 after a 500-year flood event on the St. Louis River. Results of the 2011 site bathymetry survey are depicted on Figure 6. Results of the 2012 post-flood bathymetry survey are depicted on Figure 7. In general broad areas of Spirit Lake showed no measurable change between 2011 and post-flood with a number of offshore areas showing net accumulations of sediment. Further analysis, including elevation difference mapping will be included in the FS report.

3.5.3 Velocity Profiles

3.5.3.1 Velocity Profile Snap-Shots

Short-term velocity profiles were measured at the locations on Figure 8. Figures 9 through 12 show cross-sectional views of the locations identified on Figure 8, with the velocity data at each depth interval.

3.5.3.2 Long-Term Velocity Profiles

Figures 21 and 22 show the velocity profiles for Unnamed Creek and Wire Mill, respectively. The regions shaded by gray show periods of increased water velocities due to meteorological events. The discontinuity in data at Unnamed Creek is due to the temporary removal of the instrument to verify that it was properly collecting data. The instrument was functioning properly and the data are usable.

3.5.4 Waves

Time series data for the four wave gauges are shown on Figure 23. In addition to the root mean square (RMS) wave height, the wind directions recorded during the period are shown to highlight the effect that wind direction has on wave height at each location. Significant meteorological events are indicated by the grey shading in the time series.

For the period of record, several significant wind events were recorded, and highlight the dependence on wind for wave generation within Spirit Lake. The first major event occurred during the time period of November 6-8, 2011. During this time period, waves were higher at the two offshore wave gauges due to the west and southwesterly winds.

A second wind event which occurred on November 9 and 10, 2011, showed the influence of a northerly wind. During this event, in addition to large waves at WMWAVE-1 and UCWAVE-2, UCWAVE-1 also showed an increase in wave height.

3.5.5 Suspended Sediment and Bed Load Characterization

Suspended sediment concentration and bed load sampling events were performed in the fall of 2011. Once the sampling events are completed and data are summarized, the suspended and bed load sediment data can be evaluated in context with the other physical site characteristics. Results of suspended sediment concentration and bed load characterization completed to date are provided in Appendix G and will be discussed in the FS. Particle size distributions were analyzed for these samples with the results provided in Appendix G.

3.5.6 Bed Stability

The results of the analyses of data related to bed stability are presented in Appendix G, Analytical Laboratory Data Reports, and Appendix I, Hydrodynamic/Bed Stability Data. These data will be used to evaluate bed stability of surficial sediment at the Site, refine the CSMs, and perform numerical modeling as part of the FS.

4.0 Data Quality Review

4.1 Analytical Data QA/QC Review

In accordance with the *Former U. S. Steel Duluth Works Site Sediment Investigation QAPP, Revision 1, dated February 2011*, the specific components of the data validation of the organic and inorganic analyses (PAHs, extended PAHs (including alkylated PAHs), total metals, cyanide, PCBs, and dioxins/furans) were performed by a USEPA CLP contractor under the supervision of GLNPO. It is noted that all the USEPA-generated CLP data from the first two events (February and June 2011) underwent full CLP data validation. The subsequent data, collected and analyzed as part of the Fall 2011 event, underwent 10 percent full CLP data validation and 90 percent Level II data validation. Non-CLP data including total organic carbon, black carbon, acid volatile sulfide, simultaneously extracted metals (AVS/SEM), total petroleum hydrocarbons (TPH) and nutrients (ammonia, total kjeldahl nitrogen and orthophosphate) data were generated by Test America laboratories and reviewed in accordance with the approved QAPP using Barr Engineering Company standard operating procedures (SOP), as well as specific method and laboratory SOP criteria. In general, the areas covered by the validation process included:

- Holding times, preservation and storage
- Initial calibration and initial calibration verification (CLP)
- Continuing calibration verification (CLP)
- Method blank analysis
- Laboratory control samples
- Field duplicate precision
- Matrix spikes (where available)
- Overall assessment

The QA/QC review for the CLP data included verification of the data validation performed by the USEPA GLNPO contractors via individual Data Validation Reports for each of the laboratory sample delivery groups (SDGs). This verification included an in-depth secondary CLP review of one of each of the analytical fractions (i.e., PAHs, extended PAHs, total metals, etc.). Since no systematic issues were identified (either in the laboratory data or the data validation procedures), subsequent verification consisted primarily of reviewing the findings (qualifiers) from the data validation reports as compared to the electronic Z-file supersets provided from EPA.

While minor discrepancies were found, individual data validation reports for each analytical batch or SDG contained a statement of acceptability and usability from the EPA, indicating that the analytical data are of sufficient quality to satisfy the analytical components of the data quality objectives (DQOs) as detailed in Section A9.1.18 in the approved QAPP (Barr, 2011b). Furthermore, optimized sampling design, mitigation of sampling errors, and favorable results from the five overall quality assurance objectives for accuracy and precision, > 95 percent completeness, representativeness, comparability (as detailed in Section A9.2 of the QAPP), indicate that overall the DQOs were met. The data meet the data quality objectives (DQOs) in the QAPP.

Any minor discrepancies found during data verification steps were addressed and resolved prior to using the electronic data deliverables.

With one exception, all qualifiers applied by EPA were accepted and reported as Barr qualifiers in the final data summary tables and associated database. In the lone exception, EPA qualifier 'R' (rejected) was applied to one set of arsenic data and one dioxin/furan compound. The arsenic matrix spike recovery was below laboratory criteria in SDG ME0003. It was decided by Barr that the low matrix spike recovery did not impact any sample but the source sample; therefore, only the source sample qualified as "R" was retained. The non-source sample qualifiers were modified from "R" rejected to "j" estimated.

Per the EPA data validators, field duplicates with relative percent differences (RPD) > 40 percent were not qualified in the final data set. Due to the matrix of the samples being sediment with varying moisture contents, RPDs >40 percent are not unexpected.

Barr performed final calculations for toxicity equivalents following both MPCA and EPA guidelines.

Additionally, Barr performed data validation/verification on the analytical data from Test America, including total organic carbon (TOC) and black carbon (BC). Following the QAPP, 10 percent of the data was reviewed using CLP-like procedures. The laboratory experienced some difficulties with the analyses and had to reanalyze many samples at a reduced sample size to bring the result within the calibration curve. However, the overall lab procedures were found to be acceptable and met the DQOs of the project as stated in the QAPP. The data, therefore, are useable.

4.2 Interpretation of Concentrations Less Than Detection Limits

The USEPA CLP reporting data protocols routinely quantitate concentrations less than the CRQL (or RL) but above the method detection limits (MDL) (qualified with a "j" in the data summary

reports). Test America also reported the AVS/SEM concentrations this way. Since computational guidance for calculations of toxicity quotients do not prescribe which scaling factor for non-detect results should be used, initial evaluation on this project indicates that because the "j" qualified values tend to be fairly low and relatively close to approximately one-half the range of the CRQL (or RL), using the data as a detect with the "j" does not bias the final summations and toxicity quotients. Therefore, with the exception of the PCBs and some of the dioxin/furan sample results, data were used as reported using concentrations estimated between the RL and the MDL (qualified with a "j"). For the PCBs and some of the dioxin/furan sample results, a majority of the sample results were ND. Using one-half of either the MDL or the RL in these cases would create a quotient where none was detected. Therefore, the non-detect values were set to "zero" for summation and toxicity quotients. This approach followed the procedures in the Work Plan (Barr, 2011a).

4.3 Other Data Review

Laboratory tests performed for bed stability analysis included capillary suction time, bulk density, salinity, organic content, suspended sediment, and zeta potential. These tests were performed by Barr, Test America, Soil Engineering Testing, and/or Particle Technology Labs. These data do not fall under the same rigorous QA/QC protocols as chemical analytical testing; however, data have been thoroughly reviewed and found acceptable for use.

Laboratory testing performed for geotechnical purposes included grain size, triaxial compression, Atterberg limits, consolidation, permeability, and organic content testing. This testing was performed by Soil Engineering Testing (SET) and/or Test America. All sample collection and lab testing was performed per the applicable American Society of Testing and Materials (ASTM), American Association of State Highway and Transportation Officials (AASHTO), or U.S. Army Corps of Engineers (USACE) standard. Laboratory testing by SET was performed by or under the direct supervision of a technician certified by the National Institute for Certification in Engineering Technologies (NICET). Geotechnical laboratory testing results were reviewed for completeness by Barr geotechnical engineers licensed in the state of Minnesota. Geotechnical laboratory results are included in Appendix F.

It should be noted that the interpretation of the particle size division between silt and clay reported by Test America, 0.005 mm, does not follow geotechnical standard of practice. As such, gradation results have been adjusted to incorporate the particle size division between silt and clay of 0.002 mm. This update is reflected in the data tables generated by Barr, but not the Test America report sheets.

4.4 Summary

Overall, while deviations occurred, no significant data quality issues were identified. The chemistry and geotechnical data received thus far were acceptable, meeting the DQOs, and are useable as reported and qualified in the data summary reports. Additional detailed information can be found in the individual Data Validation Reports for each of the laboratory SDGs.

5.0 Discussion

The focus of this section is to synthesize the results obtained from various data collection efforts reported in the RI and provide a basis for any additional data collection efforts or studies needed to support the evaluation of alternatives in the FS. The review of historical photos, assessment of sediment characteristics, and river hydraulics all help to reinforce and expand the conceptual site models that are updated in Section 5.4. Similarly, the preliminary screening of human and ecological risks, as well as the comparison of site data to reference data in the St. Louis River, help to narrow the focus for future efforts.

5.1 Historical Map and Aerial Photograph Review

A review was conducted of published historical maps, drawings, and aerial photographs of the Spirit Lake area. Selected maps and photographs are presented in Appendix J. Historical survey and transportation maps and drawings date from 1861 to 1935. Historic topographic maps from 1917, 1954, and 1993 were reviewed. Several aerial photographs are available for the time period from 1939 to 1989, as well as the currently used aerial photographic site map from 2008.

The Hearding survey map, published in 1861, depicts the area prior to development (Figure J-1). A large vegetated area is shown in the middle of Spirit Lake, with Spirit Island adjacent to the east. Based on soil borings from the vegetated area, the large vegetated area was a peat bog. Unnamed Creek is shown on the map with a small area of vegetation at the mouth of the creek. Spirit Lake is shown as being separated from the channel of the St. Louis River by a natural levee with the exception of an outlet at the north end of the lake. The Merritt's sectional survey map from 1889 depicts similar, pre-development landforms (Figure J-2).

A 1902 map from the Frank Atlas includes the Northern Pacific Railway line along the western shore of Spirit Lake, spanning across the Wire Mill Pond and Unnamed Creek waterbodies (Figure J-3). A small channel is shown at the south end of Spirit Lake, connecting the St. Louis River to the lake. The 1909 Duluth Street Railway Company transit map shows the "Minnesota Steel Company" facility on the western shore of Spirit Lake (Figure J-4). A Northern Scenic Publishing Company "aerial" drawing map from 1910 depicts an industrial facility on the western shore of Spirit Lake (Figure J-5). The USGS topographic map from 1917 shows similar landforms (Figure J-6).

A channelized/dredged area in the north half of Spirit Lake is shown on the 1927 McGill Warner Duluth-Superior map (Figure J-7). A wide land area, interpreted to be a natural levee separating eastern Spirit Lake from the river, is noted as "Kilchlis Meadows."

A man-made spit connecting the Unnamed Creek area to the vegetated area (peat bog) at the center of Spirit Lake is shown on the 1935 Wellbanks map of Duluth (Figure J-8). Visible in the 1939 aerial photograph, the spit was extended further to the northeast and sediment deposition is also visible on the north side of the spit (Figure J-9). Based on anecdotal information from former facility personnel and shallow auger borings advanced during the initial remedial investigation (Barr, 1986), the spit was constructed of steel mill slag and included a railroad spur. The spit likely was constructed to provide a potential boat pier but the pier and boat slip construction project was abandoned for unknown reasons. The spit has protected the Unnamed Creek and Wire Mill Deltas from longshore drift currents and, in particular, has facilitated accumulation of new sediment in the Unnamed Creek delta area. The presence of the spit of land also serves to reduce potential longshore drift currents from the north or south and reduces the wave fetch along the shoreline on either side of the spit up to the present day. In the 1939 aerial photograph, there is a wider area of connection to the St. Louis River at the southern end of Spirit Lake which may reflect a period with relatively high water level in the lower St. Louis River (Figure J-9).

Indications of sediment deposition, and apparent increased accumulation of sediment in the Unnamed Creek delta area northwest of the man-made spit, are visible on the 1948 aerial photograph (Figure J-10). The 1954 USGS topographic map depicts a larger Unnamed Creek delta, a submerged central vegetated area of the lake, and a narrowing of the Kilchlis Meadow apparent natural levee (Figure J-11).

A comparison of aerial photographs from July and August of 1961 show higher and lower water levels, respectively, in the area (Figures J-12 and J-13). The peat bog area is mostly submerged in the July photograph and is more visible in the August photograph. There is visible braiding of Unnamed Creek in its delta area. The water level in the 1972 aerial photograph (Figure J-14) appears to be similar to that in the August 1961 photo. The aerial photographs from 1981 and 1989, and a topographic map from 1993, show further apparent depositional accretion of the Unnamed Creek delta, a mostly submerged vegetated area southeast of the man-made spit, and a submerged/narrow Kilchlis Meadow natural levee (Figures J-15, J-16, and J-17).

Historic maps show an increasing connection between the St. Louis River and the southern inlet and northern outlets of Spirit Lake beginning in the 1930s continuing through the 1960s and remaining so to the present day.

Overall, the chronology of photos shows that many factors have influenced the observed changes to Spirit Lake, including changes to upstream flows and changes to the landscape throughout the St. Louis River watershed, which have all contributed to changes in vegetation, sedimentation, and flow patterns within Spirit Lake.

5.2 Sediment Stratigraphy

The types of sediments encountered at the Site are typical of fluvial environments and include: clay, silt, organic silt, sandy silt, silty sand, sand, gravel, and peat. Material classified as fill (non-native material) was also encountered in borings. Fill material was sediment that included sand and gravel-sized anthropogenic materials mixed with natural sediment material. Anthropogenic material included oily and/or stained material, metal shavings or fragments, or other non-native debris or particles such as apparent coke or coal fines (generally less than fine-sand sized) or apparent mill scale, and naphthalene crystals. The native sediment types are interlayered. Most layers are not laterally extensive and individual layers of a specific sediment type do not extend completely across the investigation area. However, generalized depositional areas of certain sediment types appear to exist.

Ten geologic cross sections were prepared across the investigation area. A cross-section location map is presented as Figure 24. Cross sections A-A' through J-J' are presented as Plates 1 through 6. The surficial sediment texture type at the time of the investigation in 2011 is presented on Figure 25.

Silt and organic silt is the predominant surficial sediment type in the investigation area based on the samples collected during the 2011 investigation and previous investigations (Figure 25). Sand and granular sediments are present in the Wire Mill Pond and Unnamed Creek deltas and in the down-current edges of those two areas. Sand is also present as the surficial sediment in the area near the main channel of the St. Louis River downstream of Boathouse Point (south and upstream of Wire Mill Pond). Peat is present as the surficial material on the downstream edge of Boathouse Point, in the area of the spit of land between Wire Mill Pond and Unnamed Creek, and north and downstream of Unnamed Creek. The areas with peat at the surface also appear to be areas that historically had emergent vegetation, as discussed in Section 5.1. Buried peat deposits encountered during the investigation were also found mainly in those areas.

Generally, sediment types in the upper 5 to 15 feet below the top of sediment include all sediment types listed in a previous paragraph although not all types are present at any one location. There do not appear to be laterally extensive layers of any sediment type and the sediment types are interlayered at thicknesses of less than 0.5 feet to over 5 feet. Commonly, the sediment type encountered at depths greater than 15 to 25 feet is composed mainly of silt and/or sand.

The sediment interlayering is typical of a dynamic fluvial setting. Individual layers of sediment are not drawn on cross sections A-A' through J-J' due to the complexity of tracing individual layers based on sediment type. However, it appears that anthropogenic materials appear in an interval that extends across sediment types. This non-native sediment interval is mapped on the cross sections as a layer that contains one or more of the following attributes:

- Mean PEC-Q value greater than 0.6;
- Presence of non-native material such as metal particles or crystalline flakes; and
- Presence of observable petroleum-like or chemical odor, sheen, and/or staining.

A layer of anthropogenic material that meets the above criteria is present at both the Wire Mill Pond and Unnamed Creek deltas, but the layers from the two areas do not appear to be connected. At the Unnamed Creek delta, the anthropogenic layer meeting the criteria is present from the surface to depths up to 15 feet below the surface in the confluence area of the creek and Spirit Lake. Additionally, in the Unnamed Creek delta, this non-native (anthropogenic) layer is an interval of several layers of similar material. This interval includes material that extends into Spirit Lake approximately 500 feet from the shoreline. Non-native material is also present onshore. The anthropogenic layers become thinner outward from the mapped deposit present at the shoreline and extend approximately 2,000 feet from the shoreline. At the Wire Mill Pond delta, the anthropogenic layer meeting the criteria is present from the surface to depths up to approximately 7 feet below surface in the confluence area. The thickest portion of this layer extends approximately 200 to 500 feet into Spirit Lake from the shoreline where the thickness of the layer is less than 2 to 3 feet. Overall, the layer extends outward from the shoreline approximately 1,200 to 2,200 feet.

The extent of sediment with mean PEC-Q values greater than 0.6 have been delineated, both laterally and vertically. The vertical extent is presented on the cross sections. Laterally, the anthropogenic layer meeting the above criteria can be interpreted from Figures 26 and 27 that present the mean PEC-Q values in sediment samples at depths less than 0.5 feet and greater than 0.5 feet, respectively. These figures indicate shallow sediment with mean PEC-Q values greater than 0.6 do not extend as

far offshore as those in samples collected from depths greater than 0.5 feet. The furthest offshore portions of this layer at both the Wire Mill Delta and Unnamed Creek delta are generally under sediment with a mean PEC-Q less than 0.6 and with no observable anthropogenic materials, discoloring or staining. The non-native sediment layer begins to be covered in the areas beyond approximately 900 to 1,500 feet away from shore. The thickness of the cover layer also appears to be thicker further from shore. The thickness of the cover layer is shown on Figure 28.

5.3 Hydrodynamic Observations

During periods of low river discharge, St. Louis River flow is largely confined to the deep channel along the east side of Spirit Lake. Flow patterns within the central portion of the lake are dominated by lake level changes associated with Lake Superior seiche dynamics. The varying water levels lead to periodically reversing flow through the dredge channel at the northern end of Spirit Lake. As water levels drop, flow from Spirit Lake passes out of the lake through the dredge channel. Conversely, rising water levels can cause flow reversal and southward flow through the dredge channel into Spirit Lake. Velocities throughout Spirit Lake were observed to be relatively small during low river discharge periods. Sedimentation rates during these periods are also very low, due to the lack of sediment delivery from the upstream reaches of the St. Louis River.

Wave height, ADCP velocity, wind speed, wind direction, and water level for the Wire Mill area are compared on Figure 29. The interrelationship between wind speed, direction and other hydrodynamic variables is illustrated by the shaded areas corresponding high wind speed events on these plots. For example, as the wind velocity increased during the November 6 – 8 event, the wind shifted to a westerly origin. As the wind blew from west to east, water in Lake Superior was pushed eastward, leading to a set-down condition where the local water level dropped over a period of several hours. Concurrent with this water level change, wave heights and measured flow velocities increased. As the westerly winds decreased, the lake level returned to its pre-storm level. Additionally, note that short-period oscillations associated with ongoing seiche dynamics in Lake Superior are present throughout the record.

Periods of high river discharge create an entirely different flow regime within the lake, which is dominated by river-related flow patterns. In 2012, two high flow events occurred—the typical spring flood in late May, and the unusual historic flood in late June. As the river discharge increased during these events, so did the water elevation. At a certain point during each flood a, threshold was reached above which the river flow began to bypass the eastern channel through the main body of Spirit Lake. Bathymetric surveys show incision of a channel where the river flow passed into the

southern end of Spirit Lake. Within the central portion of the lake, the flow through this erosional channel passed around Spirit Island, and primarily exited through the dredged channel. Observations indicate that this high river discharge flow pattern had relatively little impact (erosion or deposition) on the nearshore sediment areas within both the Wire Mill and Unnamed Creek areas.

However, high sedimentation rates would be expected during a high flow event in certain portions of Spirit Lake. High discharge events lead to dramatically increased sediment loads in the river, due to availability of additional sediment from various processes. In addition to overland flooding, the upstream impoundments are less able to trap natural sediment loads, and other significant events can create spikes in river sediment load. The relatively high sediment loads during these periods are prone to deposition in Spirit Lake, due to widening of the flow and associated decrease in velocity through the lake The size and location of sediment deposited depends on how the velocities of the river flow are distributed as the flow propagates across the lake. Bathymetric scans indicate sediment deposition throughout the eastern half of Spirit Lake in association with the 2012 floods.

5.4 Updated Conceptual Site Models

Conceptual Site Models (CSMs) were developed during the work plan phase of the project to help guide investigation activities and evaluate the effects from physical and environmental factors impacting the two delta areas. CSMs are iterative and are updated as new data are obtained during investigation activities.

Separate CSM diagrams were prepared for three primary areas adjacent to the former steel mill site in Spirit Lake; one for the portion of Spirit Lake adjacent to the Wire Mill Pond (Figure 30); one for the area immediately south of the spit of land (referred to as the Upper Wire Mill) (Figure 31); and one for the Unnamed Creek Delta (Figure 32). The spit of land extends eastward into Spirit Lake and separates the Unnamed Creek Delta area from the southern portion of western Spirit Lake. The three areas are on the west side of Spirit Lake, which is adjacent to the main channel of the St. Louis River and separated from the river by a series of barrier islands, shoals, and/or natural levees, the largest of which is Spirit Island. These landforms are generally elongate and parallel to the current river channel or apparent former abandoned channels.

A more detailed discussion of the CSM updates is provided in the sections below. Data obtained during the RI are presented in the context of the CSMs developed during the work plan phase of the project and relative to established project measures of benthic toxicity (the ecological risk-screening criteria are presented in Section 5.5). Figure 33 shows potential risk exposure pathways of interest.

Figure 28 presents the modeled inferred thickness of recent (post-industrial era) sediment deposition. Figure 25 presents the predominant USCS classification of the surface (0-0.5') sediments based on boring log descriptions.

As discussed in Section 5.3, seiche activity has a significant role in flow velocities across the water column in each of the CSM areas of Spirit Lake, with two different seiche sources apparent from the preliminary water level and flow gauging completed to date. Lake Superior seiches affect the estuary from the harbor to the Site, with a dredged shipping channel that extends to the spit acting as a conduit for flow both into and out of Spirit Lake. Additionally, sustained winds created an observed localized seiche within Spirit Lake, causing long waves to form and oscillate within the confines of the lake created by the shoreline on the west and the barrier islands. These effects may have been magnified by low water levels observed in the estuary during the Fall 2011 monitoring period.

River flow does not appear to have a significant effect in Spirit Lake, possibly due to control of the river flow from the upstream dams and low water levels observed during the monitoring period. This initial observation was supported by the additional bathymetric survey conducted for Spirit Lake after the significant (500-year occurrence interval) flood event that occurred in June 2012. The post-flood observations showed that sediments in Spirit Lake were generally not removed by flooding and, in fact, most areas were covered with new post-industrial sediment, which was carried by the flood into Spirit Lake. A hydrodynamic model will be developed to assess the relationship between river hydraulics and sediment stability in Spirit Lake over a wider range of conditions for evaluation of potential enhancements during the FS.

Groundwater-surface water interaction at the shoreline was not evaluated during the RI and will be investigated during the FS.

5.4.1 Wire Mill Delta Conceptual Site Model

The Wire Mill Delta is located on the south side of the man-made spit of land that separates the two delta areas, with a natural land barrier, wetland, and the main river channel defining the southern boundary, and the shallow flats of eastern Spirit Lake defining the eastern boundary of the Wire Mill delta area. The Wire Mill Pond was remediated in the 1990s to reduce the flux of contaminants and sediment from the pond to the river. Currently the pond discharges to the St. Louis River (Spirit Lake) through a narrow, sorbent-boom-lined outlet. As a result of controlling the upland source, the majority of the Wire Mill Delta has clean sediment at the surface, with impacted sediment at the surface in a small area along the shoreline where other factors inhibit the deposition of new sediment.

The lateral and vertical extent of impacted sediments is defined in the Wire Mill Delta, by sediment with sheen, odor, staining, industrial material and/or mean PEC-Q values greater than 0.6 encountered at the bottom of only one boring in the south central portion of the delta (see cross sections). Numerous other deep borings obtained sediment samples with concentrations screening less than the mean PEC-Q of 0.6 (Plates 1-6).

The stratigraphy of the Wire Mill Delta consists predominantly of silt near the surface, with layers of fibrous peat and clay near the shoreline. Silt, fibrous peat and clay are underlain by sandy silt grading into silty sand to a depth of at least 50 feet. The impacted sediment is observed to be present only in the silt, clay and peat overlying the silty sand. Downward migration of COIs to the sand is not apparent, nor is upward migration of PAHs through ebullition or other means, based on the data obtained to date. Post-industrial sediment that does not have sheen, odor, staining, industrial material, and/or mean PEC-Q values greater than 0.6 covers the majority of the impacted sediment in this area of the Site. The post-industrial sediment is likely delivered to the surface of the Wire Mill Delta from the adjacent St. Louis River Channel through seiche activity and river flow. Figure 28 shows the modeled extent of post-industrial cover. Two areas remain, however, where little-to-no post-industrial cover has occurred. One area extends eastward from the Wire Mill Pond outlet. The other area is north of the Wire Mill Pond outlet, approximately 200 feet offshore, in the area of borings WM-71 and WM-72.

Wind generated waves do not appear to have a significant effect on the Wire Mill Delta due to a short fetch for westerly and southerly winds, and protection from waves from northerly winds by the spit. Easterly winds were infrequent and not sustained during the monitoring period, so waves propagating across the Wire Mill Delta to the shoreline were not well characterized in the preliminary assessment of the flow conditions. Easterly and northeasterly winds are prominent during April to July, based on historic wind data for the area, so the effect of these winds will be evaluated as part of the modeling in support of the FS.

The Wire Mill Delta portion of Spirit Lake appears to be stable with respect to sediment impacts from COI due to control of the potential upland source, sedimentation providing cover material with COI concentrations less than screening levels, and protection from wind-generated waves that potentially could cause disturbance transport of nearshore sediment by the land forms on the north, south and west.

5.4.2 Unnamed Creek Delta Conceptual Site Model

The Unnamed Creek Delta is located north of the spit separating the two areas of Spirit Lake and consists of a broad flat delta at the mouth of the creek, barrier islands defining the eastern boundary at the main river channel, and a dredged shipping channel that extends from the main river channel on the north towards the spit on the south. Surface sediment throughout a majority of the delta is impacted by PAHs. Significant work on upland source control is progressing on a parallel path. The lateral and vertical extent of sediments with COI concentrations less than Level II SQTs and/or mean PEC-Q values less than 0.6 in the Unnamed Creek Delta have been defined (Figures 26, 27, and H-48 through H-52).

The stratigraphy of the Unnamed Creek Delta consists predominantly of PAH-impacted native and non-native sediments at the surface, underlain by thin layers of silty sand and sandy silt. The silty sand/sandy silt is underlain by fibrous peat on the western half to an unknown depth, and clay and silty sand on the eastern half of the delta to a depth of at least 50 feet. The impacted sediments are more than 10 feet thick near the shoreline with a thinning wedge extending into the lake.

Wind-generated waves from northerly winds were the only significant waves observed in the Unnamed Creek Delta during the Fall 2011 monitoring period. Westerly winds do not generate significant waves due to a short fetch and the delta is protected from southerly wind waves by the spit. Easterly winds were infrequent and not sustained during the monitoring period, so waves propagating across the Unnamed Creek Delta to the shoreline were not well characterized in the preliminary assessment of the flow conditions. Easterly and northeasterly winds are prominent during April to July, based on historic wind data for the area, so the effect of these winds will be evaluated as part of the modeling in support of the FS.

Figure 28 shows the modeled extent of post-industrial cover. There appears to be one fairly contiguous area where little post-industrial cover has occurred. This area extends eastward from the Unnamed Creek outlet and surrounding shoreline, out towards the dredged channel.

5.4.3 Upper Wire Mill Delta (area south of spit of land) Conceptual Site Model

The Upper Wire Mill area is located immediately on the south side of the man-made spit of land that separates the two delta areas and north of the Wire Mill Pond delta. The spit of land defines the northwestern boundary, the shallow flats of eastern Spirit Lake define the southeastern boundary, and a shallow flat with emergent stumps and Spirit Island define the northeast portion of the Upper Wire Mill area. The area of emergent stumps historically was an area of emergent vegetation up to the

1970s, if not beyond (see Section 5.1). The dredged channel along the eastern side of the Unnamed Creek delta extends south to the northeast portion of the Upper Wire Mill area, and an irregular-shaped dredged basin is present nearshore in the northwest portion of the area where the spit of land converges with the natural shoreline. A water intake was present near the dredged basin.

A direct contaminant source area is not currently, nor was one historically, present at the Upper Wire Mill delta area. Note, however, the Wire Mill Pond outlet is downstream of the area. As previously discussed in Section 5.4.2, the Wire Mill Pond was remediated in the 1990s to reduce the flux of constituents and sediment from the pond to the river. Currently the pond discharges to the river through a narrow, sorbent-boom-lined outlet. Historically, discharge from Unnamed Creek may have had a more direct connection to the Upper Wire Mill delta area prior to the creation of the spit of land in the late 1920s or early 1930s (see Section 5.1).

The Upper Wire Mill area has un-impacted sediment at the surface, with no areas where the mean PEC-Q is greater than 0.6 or observed non-native material (Figure 26, Plates 2, 5). The lateral and vertical extent of impacted sediments is defined in the Upper Wire Mill area. Sediment samples with mean PEC-Q greater than 0.6, and/or non-native material were observed in a thin buried layer in the dredged basin and at the eastern shoreline (Figure 31). Also, sediment with mean PEC-Q values greater than 0.6 are present in the southern portion of the area that appear to be continuous with the Wire Mill Pond Delta (Figure 27).

The stratigraphy of the Wire Mill Delta consists predominantly of silt near the surface, with an area of fibrous peat in the northern area at the end of the spit of land. Silt, organic silt, and fibrous peat are underlain by silty sand and silt to a depth of at least 50 feet. The impacted sediment is observed to be present only in the silt and organic silt near the surface. Downward migration of contaminants to the sand is not apparent, nor is upward migration of PAHs through ebullition or other means, based on the data obtained to date. Post-industrial sediment that does not have sheen, odor, staining, industrial material, and/or mean PEC-Q values greater than 0.6 covers the impacted sediment in this area of the Site. The post-industrial sediment is likely delivered to the surface of the Wire Mill Delta from the adjacent St. Louis River Channel through seiche activity and river flow. Figure 28 shows the modeled extent of post-industrial cover.

Wind generated waves do not appear to have a significant effect on the Upper Wire Mill area due to a short fetch for westerly and southerly winds, and protection from waves from northerly winds by the spit. Easterly winds were infrequent and not sustained during the monitoring period, so waves

propagating across the Upper Wire Mill area to the shoreline were not well characterized in the preliminary assessment of the flow conditions. Easterly and northeasterly winds are prominent during April to July, based on historic wind data for the area, so the effect of these winds will be evaluated as part of the modeling in support of the FS.

The Upper Wire Mill portion of Spirit Lake appears to be stable with respect to sediment impacts from COIs due to control of the potential upland source, sedimentation providing cover material with concentrations of COIs less than screening levels, and protection from wind-generated waves that potentially could cause disturbance transport of nearshore sediment by the land forms on the north, south and west. However, the presence of shoreline to the west, the spit of land to the north, shallow vegetation and woody debris covered area to the east, and flow from the south likely indicates this area is primarily depositional.

5.5 Preliminary Sediment Risk-Screening Evaluation

As proposed in the work plans (Barr, 2011a and 2011d), the analytical results were screened with respect to established sediment screening criteria as described in Section 3.2. Analytical data obtained from sediment core samples were used to evaluate potential sediment toxicity to benthic invertebrates. This included calculation of mean PEC-Qs and ESBs as described in Sections 2.2.4.1 and 2.2.4.2, respectively, and presented in Table 13. The results of the screening are depicted on Figures 15 through 20, and 26 and 27.

The PEC-Q and ESB methods both provide a conservative integrated assessment to determine whether there is a potential for sediment toxicity by accounting for the parameters that are likely to contribute to benthic toxicity; however, the methods used to develop these two screening criteria vary significantly. Mean PEC-Qs rely on total bulk chemistry and correlations with toxicity testing results for freshwater and marine environments and do not account for site-specific binding mechanisms. Mean PEC-Q, therefore, may be a more conservative screening measure than the ESB for screening for the potential toxicity. By comparison, the ESBs are based upon equilibrium partitioning between the sediment and pore water by chemical analysis of the sediment, accounting for some site-specific binding mechanisms, but do not account for binding to black carbon. Thus, both mean PEC-Q and ESBs are conservative screening tools for the assessment of potential toxicity which may be mitigated by site-specific considerations. These methods are typically used to focus the area of potential concern, followed by further evaluation of that area of potential concern, which includes site-specific risk factors and use.

Black carbon is created by various natural and anthropogenic combustion processes and is known to reduce the bioavailability of compounds in sediment pore water by increasing the sorption of the compound to black carbon as compared to organic carbon (USEPA, 2003 and MPCA, 2007). The presence of black carbon reduces the potential for toxicity of compounds (primarily organic compounds) to benthic invertebrates because of an increased binding affinity of organic compounds to black carbon. Black carbon was a significant component of the total carbon observed in sediment as summarized in Table 11. Thus, for areas with black carbon, the screening calculations completed (mean PEC-Q and ESBs) are likely conservative estimates of the potential for toxicity, since they do not account for a compound's increased binding affinity to black carbon.

The risk screening presented in this report follows the protocol outlined in MPCA guidance (2007). This screening provides a framework for reviewing the data results and for evaluating the Conceptual Site Models (CSMs) for the two sediment delta areas. It is, however, a conservative estimate of the potential for toxicity to benthic invertebrates in the two deltas because the effects of black carbon on the site-specific bioavailability or toxicity of compounds have not been undertaken. Pore water samples were collected in late 2012 to further assess the effects of black carbon on PAH solubility and metals solubility in pore water. Those results have not been received from the laboratory yet. They will be presented in the FS and may be used to further refine the area of interest.

The results obtained from the sediment risk screening (comparing sediment results to mean PEC-Qs, ESBs, and SQTs) suggest that PAHs are the primary COIs for the two deltas, with other constituents observed above screening values at some locations (i.e., metals and dioxins), but to a lesser degree. Where the risk screening values were exceeded for non-PAH compounds, they were usually co-located with PAHs that exceeded risk screening values. Therefore, the CSMs will focus on PAHs and the potential sediment risk screening that was completed for the two deltas. The PAH17 list was collected at all locations with chemical analyses and the PAH34 list was collected at all surficial sample locations and at a reduced rate for deeper locations as described in Section 2.2.2. At locations where the sample locations were analyzed for the expanded PAH 34 list, the majority of the PAHs detected were on the narrower, PAH17 list.

The evaluation of risk screening results was condensed graphically by evaluating the upper 6 inches of sediment (where most freshwater benthic invertebrates are present) and sediment at depths greater than 6 inches (where little to no benthic invertebrate activity is expected) (USEPA, 2005b and ITRC, 2011). Additional studies for support of evaluation of these depths will be included in the FS. The upper 6 inches of sediment in the Wire Mill Delta typically contains concentrations of COIs less than

the risk screening criteria, with the exception of a small area in the southwest portion of the delta. In contrast, the Unnamed Creek Delta has a greater percentage of the upper 6 inches of sediment containing concentrations of COIs that exceed risk screening criteria..

5.6 Screening Level Human Health Evaluation

This Revised RI includes an evaluation of the potential pathways for human exposure to sediments in Spirit Lake along with a numerical-based screening of sediment quality in relation to potential human exposures. The detailed analysis of existing site data for this evaluation is included in Appendix K. When taking under consideration the conservative reasonable maximum exposure assumptions regarding incidental ingestion of sediment and dermal contact with sediment, the conservative assumptions in the derivation of the toxicity values, the institutional controls in place to limit exposure to COIs associated with the Spirit Lake Sediment Site, and that all of the individual and summed potential health risks for dermal contact and/or incidental ingestion at both Unnamed Creek and Wire Mill delta areas were below the MDH guideline values, exposure to COIs present in sediments by incidental ingestion or dermal contact are not expected to pose a risk to public health.

Potential pathways for human exposure are not of primary concern. The significant availability of higher quality environmental resources for human activities within the region likely limit the potential for even limited exposures to impacts in this area of Spirit Lake and virtually eliminates the potential for repeated, long-term, or chronic exposures to the sediments in this portion of Spirit Lake. Thus, the primary focus of the investigative activities that have been completed, and any subsequent additional actions that may be implemented, is to reduce the potential for unacceptable risk to ecological receptors while improving habitat.

5.7 Comparison of MPCA/ACE/SOMAT Data to Site Data

The RI data were compared to the MPCA/ACE/Somat data, which were collected from the lower St. Louis River estuary in 2011, as part of the risk-screening evaluation of the RI sediment sample data. The purpose of this comparison was to understand the nature and extent of sediment quality in the lower St. Louis estuary and evaluate whether sediment quality at the Site differs from sediment quality in the lower St. Louis estuary. The two sediment quality data sets are comparable in that they were collected using similar methods (vibracoring and soil borings) during the same field season (2011). The Site adjoins the MPCA study area which also extends up-river and down-river from the Site as shown on Figures L-1 and L-2 in Appendix L. As explained in Section 1.0, the Site area reported in this RI report, was studied by USS and GLNPO.

The evaluation presents the two data sets geospatially and graphically to compare the sample results of the MPCA/ACE/Somat investigation to the results from the RI data from Spirit Lake. To provide further context for the sediment quality data results, both data sets are shown graphically in comparison to various screening criteria (Appendix L, Figures L-3 through L-24). The details of the evaluation are presented in Appendix L while a summary is presented below.

The MPCA/ACE/Somat data encompass the eastern half of Spirit Lake as well as areas along the Minnesota-side of the St Louis River extending more than 12 miles from the Chambers Grove reach in Fond du Lac downstream through Spirit Lake to Kingsbury Bay at the river's confluence with Kingsbury Creek. Appendix L, Figure L-1 shows the MPCA/ACE/Somat investigation area and sample locations. Vibracores were advanced at 150 locations along the 12-mile long study area. Approximately one-third of the sample locations, 54 core stations, were located in the eastern half of Spirit Lake (Figure L-1). The cores ranged from 2 to 7 feet deep, with the majority being 4-foot long cores. Sediment quality samples were targeted to be collected at 0.5 to 1-foot intervals between the depths of 0 to 4 feet. Analyses performed included:

- PAH13 list;
- RCRA metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc);
- dioxins/furans summarized as TCDD Equivalent;
- PCBs; and
- additional physical and chemical parameters.

Preliminary analytical data results were shared by the MPCA in September 2012 in the form of an electronic database package (Mike Bares, MPCA, communication, 2012). The MPCA/ACE/Somat locations shown on the Appendix L maps are based on the geographic positioning system coordinates provided in the database provided by the MPCA. Both Barr Engineering Co. and the MPCA staff acknowledge that the MPCA/ACE/Somat data set is provisional since the MPCA has not completed a full data review and validation of the data, as of the date of this report. The sediment cores or borings conducted for the Spirit Lake sediment investigation were collected from a total of 103 locations in the western half of Spirit Lake, during the investigation described in the Draft RI report (Barr, 2012a). Details of the methods, procedures, and results of the sediment investigation are discussed in the Draft RI report (Barr, 2012a). A similar list of analytical parameters to that listed above for the MPCA/ACE/Somat data were evaluated. However, analyses for the Spirit Lake sediment investigation included 17-list and 34-list PAHs as opposed to the 13-list PAHs analyzed for the MPCA/ACE/Somat investigation. Additionally, a greater range of sediment sample depths were targeted by the Spirit Lake investigation. The majority of sample stations were drilled using vibracoring methods, which ranged from 1 foot to 9 feet of depth. Some locations were drilled using push coring

procedures (up to 3 feet deep) or hollow stem auger drilling (up to 50 feet deep). The Spirit Lake Site investigation targeted-sample-depth intervals and other details of the RI investigation are presented in Section 3.0 of this report and Appendix L.

Qualifications Regarding the Data Comparisons

As noted above, the MPCA/ACE/Somat data are preliminary and have not been fully validated by the MPCA as of the date of this report. The Appendix L discussion and figures are annotated to denote some differences in how the MPCA/ACE/Somat data treated non-detect results such as for the TCDD Toxic Equivalents calculations. This potentially affects the comparison of the two data sets in instances where different protocols were used in the treatment of non-detect results and in how some data summations were performed. Therefore, the MPCA/ACE/Somat data were evaluated and the relevant calculations were modified to be consistent in the treatment of non-detect results with the Spirit Lake sediment Site data for the PAH and metals analyses of interest for the data comparison. For TCDD, it appears that although the lab calculated values for the MPCA/ACE/Somat data treated non-detect results less conservatively (i.e., used zero for non-detect results) than non-detect results were treated for the Spirit Lake sediment Site (see Appendix L for details), for this screening evaluation, adjustment of the TCDD equivalence calculations was not believed necessary because it is believed that the two disparate treatments do not significantly affect the magnitude of the values and the fact that the Spirit Lake Sediment Site data were treated in the more conservative manner.

Sample Locations and Up-River Sediment Quality Reference Area

The MPCA/ACE/Somat data were collected from a variety of depositional environments along the Minnesota side of the lower St. Louis River estuary as shown in Appendix L, Figure L-1. The locations of the MPCA/ACE/Somat data that represent up-river sediment samples are shown in Appendix L, Figure L-2. These samples are assumed to represent a reference set reflective of sediment quality from up-river areas of the St Louis River drainage not affected by the former U. S. Steel operations area. These up-river areas are: Chambers Grove Reach, Rask Bay, Fond du Lac Stretch, Perch Lake, North Bay, New Duluth Stretch, Cedar Yard Bay (aka Radio Tower Bay), New Duluth Stretch, and Steelton Bay (Appendix L, Figure L-2). Displaying the Spirit Lake sediment investigation data with the MPCA/ACE/Somat data on a series of maps allows the two data sets to be compared and evaluated for patterns and distributions of potential COIs in the Upper St. Louis River and the Spirit Lake site. The data result for each parameter in the 0 to 0.5-foot depth and below the 0.5-foot depth was mapped for the following potential COIs:

- Dioxins/furans expressed as "TCDD Equivalent" concentrations (compared to Level I and II SQTs);
- RCRA metals – arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc (compared to Level I and I SQTs);
- The calculated Mean Probable Effects Concentration - Quotient (mean PEC-Q) for the combination of metals, PCBs, and PAHs (compared to PEC-Q 0.1 and PEC-Q 0.6 quotients);
- PEC-Q metals (compared to the quotients above); and
- PEC-Q PAHs (compared to the quotients above).

PCBs

PCBs were eliminated from further evaluation as discussed in the Draft Remedial Investigation report (Barr, 2012a) and Section 3.0 of this report. Of the 33 PCB analyses performed on sediment samples from the Spirit Lake sediment Site, two locations (UC-11 and UC-23) had estimated values for individual Aroclors in four sediment samples (Table 9). None of the other PCB analyses detected PCBs above the laboratory detection limits. The MPCA/ACE/Somat data similarly detected PCB congeners in only a few samples. PCBs, therefore, are not considered COIs and are excluded from further consideration at the Spirit Lake sediment Site.

The following discussion and conclusions were derived from the detailed evaluation presented in Appendix L:

TCDD Equivalent – The map and graphical patterns suggest TCDD Equivalent concentrations are not associated with the Spirit Lake Site industrial sediment deposits but appear to be associated with the entire sample area shown (Appendix L, Figures L-3 and L-4). In addition, the up-river and all other data sets have a significant portion of the concentration distribution falling between the Level I and II SQTs (Appendix L, Figure L-4). These concentration ranges, and geospatial and graphical distribution patterns suggest that up-river sediment quality is not distinguishable from down-river. Based on these data characteristics, TCDD Equivalent is not of specific interest for the Spirit Lake sediment Site and is not a COI.

Arsenic – Based on the distributions shown on Appendix L, Figures L-5 and L-6, most of the arsenic concentrations are below the Level I SQT and the two delta areas in the Spirit Lake sediment Site have a unique distribution that peaks around the Level I SQT. Arsenic is concluded to be a potential COI, but is only present in concentrations between the Level I and II SQTs.

Cadmium – Comparing all three histograms (Appendix L, Figure L-8- All Sites, Unnamed Creek Delta and Wire Mill Delta, and Up-River) indicates that cadmium is present in concentration ranges and a frequency distribution consistent with the up-river reference areas. The map and graphical patterns suggest that cadmium is not associated with the Spirit Lake Site industrial sediment deposits, but appears to be associated with the entire sample area shown (Appendix L, Figure L-7). In addition the up-river and all other data sets have a significant portion of the concentration distribution falling between the Level I and II SQTs. These concentration ranges and geospatial and graphical distribution patterns suggest that cadmium is not a potential COI for the Spirit Lake sediment Site.

Chromium – Chromium is a potential COI at the Wire Mill Delta area in the nearshore only (Appendix L, Figure L-9) where concentrations exceed the Level II SQTs. The reference concentration distribution is generally from 9 to 45 mg/kg which is near the Level I SQT provided for chromium. The Level I SQT coincides with the upper limit of the reference data set concentrations (Appendix L, Figure L-10).

Copper – The up-river reference concentration distribution range for copper extends up to approximately 100 mg/kg which is slightly below the Level II SQT (Appendix L, Figure L-12). The Level I SQT for copper falls within the mid-range of the up-river reference data set. Copper is a potential COI for the Wire Mill Delta area, where concentrations in industrial sediment samples exceed the Level II SQT, but not elsewhere in the study area (Appendix L, Figure L-11).

Lead – Concentrations of lead between Level I and II SQTs appear to be a characteristic of up-stream sediments for this section of the St. Louis River Estuary (Appendix L, Figure L-13 and L-14). Lead is a potential COI for the Spirit Lake sediment Site and the Level II SQT approximately coincides with concentrations that appear indicative of the industrial deposits at the two delta areas in Spirit Lake (Appendix L, Figure L-14).

Mercury – The up-river concentration distribution and histogram provides a reference distribution for sediment quality regarding mercury in this section of the St. Louis River (Appendix L, Figure L-16). Mercury is not a COI based on the map and histogram information as the up-river reference and the Site data set distribution patterns generally match one another (Appendix L, Figures L-15 and L-16). The reference concentration distribution extends to between the Level I and II SQTs. Notably, there appears to be a possible association of mercury concentrations greater than Level I SQT with low energy depositional environments – which are generally backwater embayed

areas or wide spots in the river – example areas include Rask Bay, Perch Lake, North Bay, and Spirit Lake.

The map and graphical patterns suggest that mercury is not associated with the Spirit Lake Site industrial sediment deposits, but appears to be associated with the entire sample area shown. In addition the up-river and all other data sets have a portion of the concentration distribution falling between the Level I and II SQTs. The single mercury result that exceeds the Level II SQT in the Unnamed Creek delta area coincides with observed industrial deposits in co-location with other confirmed elevated COI concentrations.

Nickel – A significant portion of nickel concentrations in the entire sample area occur between the Level I and II SQT. Based on the distribution of concentrations in the up-river data, nickel concentrations between Level I and II appear to be associated with low energy depositional environments – which are generally backwater embayed areas or wide spots in the river – example areas include Rask Bay, Perch Lake, North Bay, and Spirit Lake. As shown on the data figures Nickel concentrations exceeding the Level II SQT are associated with industrial sediments in the Wire Mill Delta area but not the Unnamed Creek (Appendix L, Figure L-17). Consequently, nickel is considered a potential COI for the Wire Mill Delta area only.

Zinc – The second concentration distribution shown in Appendix L, Figure L-20 – middle histogram-centered around the 400 mg/kg concentration level, coincides with the Level II SQT. Based on this information zinc is of interest for the two delta areas in the Spirit Lake sediment Site area (Appendix L, Figure L-19). Similar to the distributions of cadmium, copper, mercury, and nickel, concentrations of zinc between the Level I and II SQT appear to be associated with low energy depositional environments – which are generally backwater embayed areas or wide spots in the river as illustrated up-river of the Site on Appendix L, Figure L-19.

PEC-Q Metals – The two sediment delta areas in the Spirit Lake sediment Site area had numerous locations where the PEC-Q metals quotients were greater than 0.6 (Appendix J, J-21). The PEC-Q metals results less than 0.6 are within the range for the reference up-river data set. The only PEC-Q metals quotient results above 0.6 are associated with identified industrial sediment deposits as seen by the mapping of quotients in the Unnamed Creek and Wire Mill Delta areas where known industrial sediment deposits are present (Appendix L, Figure L-21). This is particularly true for delta sediment samples below 0.5 feet deep.

PAH(13) – A small number of PAH(13) concentrations between Level I and II SQT are present in the up-river reference data set (lower histogram, Appendix L, Figure L-23). There are two populations of PAH(13) sample concentration results at the Spirit Lake sediment Site area- impacted sediment samples associated with the industrial deposits mainly occurring within the two delta areas and having concentrations above Level II SQT; or pre- or post-industrial sediment samples located above or beneath the industrial sediment deposits in the Spirit Lake sediment Site area and having PAH(13) concentrations less than Level I SQT with a frequency distribution pattern similar to the up-river reference data set (Appendix l, Figure l-23).

PEC-Q PAH – The mapped sample locations of PEC-Q PAH quotient results greater than 0.6 on Appendix L, Figure L-24 are very similar to the mapped locations of Total PAH(13) results greater than Level II SQT in Appendix L, on Figure L-22. PAH(13) concentrations compared to the level II SQT indicates a similar extent and location of PAH impact to that displayed using PEC-Q PAHs exceeding 0.6. The two versions also show a similar pattern of shallow sediment samples less than either screening criterion in the 0 to 0.5-foot interval.

5.8 Focused COIs

The data comparison in Section 5.7 identified potential COIs, while identifying other constituents that are not associated specifically with potential Spirit Lake sediment Site management and FS evaluation needs. These screened out COIs include: PCBs, dioxin/furans, cadmium, and mercury. The potential COIs of interest for further evaluation with respect to potential future Spirit Lake sediment Site management needs and FS evaluation include:

- Arsenic
- Chromium
- Copper – for the Wire Mill Delta area only
- Lead
- Nickel – for the Wire Mill Delta area only
- Zinc
- PEC-Q-metals
- PAH(13)
- PEC-Q-PAHs

Table 14 lists the focused COIs that will be evaluated in the FS.

5.9 Defined Distribution of Focused COIs

This section describes the pattern of COI distribution in the two delta areas. Based on the screening evaluation and comparisons of the Site data to reference sediment quality data, the metals and PAHs exceeding screening criteria are largely co-located. In fact, the various screening criteria, when mapped as on Figures 14, 16, 18, and H-52, show close correspondence to one another with respect to their lateral extents. As presented in Section 5.7, reference sediment quality data show that most potential COIs in Spirit Lake also occur in up-river sediments above the lower level screening criterion (e.g., Level I SQTs for metals or PAHs, 0.1 of the metals PEC-Q, 0.1 of the PAH PEC-Q). Therefore, the following discussion presents the COI distribution patterns with regard to the upper screening criteria (e.g., Level II SQTs or Mean PEC-Q > 0.6).

The lateral and vertical extents of total PAHs, arsenic, chromium, copper, and nickel at concentrations less than Level II SQTs are delineated within the investigation area as discussed in Section 3.2.2. The vertical extent of lead and zinc are also delineated within the investigation area; however, sediment samples from one location (UC-90) at the northeastern edge of the investigation area had lead and zinc concentrations greater than Level II SQTs. Sediment samples collected during the MPCA/ACE/Somat investigation discussed in Section 5.7 had lead and zinc concentrations less than Level II SQTs at locations outside the investigation area near UC-90 indicating the lateral extents are delineated. The extent of COIs with respect to the mean PEC-Q is delineated to a value of 0.6 within the investigation area (Figure H-52). The mean PEC-Q value includes both PAHs and metals and provides an overview of the overall extent of focused COIs.

Individually, the lateral extents of PAHs and the extents of metals appear to correspond well to the extent of mean PEC-Q values greater than 0.6 (Figure H-52). Only eight sample locations have a mean PEC-Q value greater than 0.6 where total PAH concentrations are less than Level II SQTs (Figure 14; four each in the Unnamed Creek and Wire Mill deltas). Only three sample locations have mean PEC-Q values greater than 0.6 where PAH ESB values are less than 1 (Figure 16). Conversely, six sample locations have a PAH PEC-Q value greater than 0.6 where the mean PEC-Q value is less than 0.6.

Two locations have mean PEC-Q Metals values greater than 0.6 (Figure 18) where mean PEC-Q values are less than 0.6, and more than ten locations have mean PEC-Q values greater than 0.6 where mean PEC-Q Metals values are less than 0.6.

These comparisons indicate that where metals concentrations exceed screening values of Level II SQTs and/or mean PEC-Q Metals values of 0.6, these results largely coincide with areas where PAH concentrations exceed Level II SQTs, PAH mean PEC-Q values greater than 0.6, and/or PAH ESBs greater than 1, and with the areas where mean PEC-Q values are greater than 0.6, with only a few localized exceptions.

6.0 Conclusions

Objectives of the two phases of sediment RI work conducted in 2011 included determining the extent of COIs and refining the conceptual Site models (CSMs) for the deltaic areas of the Unnamed Creek and the Wire Mill Pond. Initial CSMs were developed for the Work Plan (Barr, 2011) based on historical data and were used to prepare the sampling plan. Data collected during the RI was in reasonable agreement with the historic data. Additionally, data collected during the RI provided information to build on and refine the initial CSM.

The refined CSMs include the following information determined during the RI:

- A significant portion of the Wire Mill delta is covered with post-industrial sediment, as shown on Figures 30 and 31. Concentrations of COIs in the post-industrial sediment do not exceed the upper screening criteria.
- Compared to the Wire Mill delta, the Unnamed Creek delta has less area covered with post-industrial sediment, as shown on Figure 32. The nearshore area is a shallow shelf that extends up to 900 feet from the shoreline. This shallow shelf area is sometimes exposed during low water periods of the year and winter ice is frequently frozen to the bed in the area of the shallow shelf feature. Offshore areas of the Unnamed Creek delta are covered by post-industrial sediment. Concentrations of COIs in the post-industrial sediment do not exceed the upper screening criteria.

In both deltas, the post-industrial sediment layer is identified as a lighter colored silt-rich sediment layer overlying industrial sediment deposits that contain particles associated with the past industrial operations of the former upland facility. The post-industrial layer is identified by its stratigraphic position, the absence of abundant industrial layer particles and COI concentrations that do not exceed the upper screening criteria. The industrial sediment layer is identified by the presence of particles potentially associated with former industrial processes. Particles observed in the industrial layer include low-density apparent coke fines (generally fine sand to silt sized), metallic flakes (generally less than 1-mm diameter, and magnetic), apparent mill scale (generally less than 1 mm, angular and non-magnetic).

Physical data indicates waves and seiche appear to cause most water currents. By comparison, even significant flooding has limited potential to resuspend sediments and, in fact, was a source of additional sediment cover. The largest waves are generated by winds from the north or northeast.

The delta areas appear to be largely depositional areas. A sand-rich shoal is present in the offshore area of the Wire Mill delta area. This feature is shown as an area of raised bottom topography on the bathymetric maps (Figures 6 and 7). The bathymetric survey shows the presence of apparent abandoned channels in Spirit Lake which are beyond the investigation area. The dredged channel is mapped and extends south of the end of the spit of land. It has an average depth of more than 15 feet.

The Wire Mill Delta and Unnamed Creek Delta areas focused COIs are PAHs, arsenic, chromium, lead, and zinc. Additionally, copper and nickel are also focused COIs for the Wire Mill Delta area.

PAHs are co-located with the potential metal COIs, suggesting that the PAH impacts define the primary areas of concern with respect to sediment impacts with respect to screening evaluations of the sample results. Additionally, screening criteria of mean PEC-Q values greater than 0.6, Level II SQTs, and ESBs greater than 1 are mostly coincident within the investigation area and the extent of these criteria is defined within the investigation area.

The cross sections (Plates 1 to 6) show the stratigraphic configuration of the impacted sediments (indicated as those sediments with COIs exceeding the screening criteria; i.e., mean PEC-Q > 0.6) and the position and thickness of the post-industrial sediment layer for the Unnamed Creek and Wire Mill delta areas with summarized PEC-Q analytical chemistry results superimposed. In locations where the post-industrial sediment layer is identified and sampled, the top layer of post-industrial sediment contrasts with the underlying industrial sediment layer by having low PEC-Q ratio results less than the PEC-Q values in the industrial layer sediments. Pre-industrial sediments, where sampled, also indicate PEC-Q values less than those in the industrial sediment layer. Pre-industrial sediment units are identified by the absence of industrial sediment particles, absence of staining, presence of peat deposits and concentrations of COIs less than the upper screening criteria.

The physical observations, analytical chemistry results, and screening evaluation indicate that the industrial layers of interest in the two delta areas are thin and laterally defined. In both delta areas the industrial layer thins from the nearshore towards the offshore. The overlying post-industrial layer is absent in some nearshore areas of the Unnamed Creek and thickens towards the offshore, as shown on the geologic cross sections (Plates 1 through 6).

The main objectives of the RI were met. Additional investigation was conducted in 2012 to collect supplemental data for the FS. The data from the additional investigation will be presented in the FS. Please see Section 7 for a discussion of the additional investigation and FS.

7.0 Additional Investigation and Feasibility Study

Based on the review of data collected in 2011 and on discussions with GLNPO and the MPCA, the following efforts are being undertaken to support the ongoing development of the FS. Many of the tasks have already been initiated and some have been completed:

- **Groundwater Flux – Thermal Profiling.** A second round of thermal profiling was completed in the spring of 2012. The results of that work plus field inspections and shoreline topography were then used to plan for deployment of seepage meters as discussed in the following bullet.

- **Groundwater Flux – Flux Meters**. Groundwater flux meters were installed at offshore locations to determine water flux between groundwater and surface water and evaluate the potential for COI transport via groundwater flow through sediment to surface water in the Wire Mill and Unnamed Creek Delta areas. This work was conducted from late August through October 2012. The results of that data gathering are being evaluated and will be discussed with the project team and presented in the FS.

- **Data Collection in Support of Hydrodynamic Modeling**. Continued collection of total suspended solids (TSS) samples in the estuary and at upland discharge locations, and river flow direction and velocity profile data occurred in fall 2012 and flow direction and velocity profile data gathering occurred through the ice this winter (2013). These additional physical data will be used to help calibrate the hydrodynamic model, for bed load analysis, and to evaluate seiche effects and sediment availability or transport in the river.

- **Data Collection in Support of Hydrodynamic Modeling.** It is anticipated that wave gauges may be re-deployed in spring or summer 2013 to collect data to use along with meteorological data for refraction, shoaling, and reflection coefficients for hydrodynamic modeling.

- **Pore Water Quality Data Collection.** Pore water samples were collected from the Wire Mill delta for metals and PAHs and from the Unnamed Creek delta for PAHs, and analyzed for pore water. Pore water data can be used to assess bioavailability and have been shown to be more consistent than bulk sediment quality data for purposes of characterizing impact areas of potential concern.

- **Supplemental Investigation.** Additional sediment cores were collected and described to provide further refinement of sediment lithology and stratigraphy, to refine sediment quality concentration mapping of COIs, and to estimate shear strength in sediment at various locations at the Site. The data collected will be used to evaluate the nature and extent of potential sediment impacts and refine the CSMs for the deltaic areas of the Unnamed Creek and the Wire Mill Pond as well as intervening areas between them.

- **Wetland Delineation and Habitat Evaluation**. A wetland delineation and habitat evaluation were conducted in the summer of 2012 to provide information which may be needed for permitting and habitat enhancement planning. The results of these studies will be provided in a report to the project team in Spring 2013 and will be included in the FS report.

- **Sediment Profile Imaging.** Sediment profile imaging was conducted in late fall 2012 to examine the near-surface benthic habitat conditions at the Site to document sediment characteristics and benthic habitat conditions.

These items will be reported in technical memoranda or other formats and included in the FS report. SAPs were submitted for these activities and most field work was conducted in late 2012 or winter 2013.

8.0 References

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Tables

Table 1

Analytical Testing Parameters
Spirit Lake Sediment Site
Former U. S. Steel Duluth Works
Saint Louis River, Duluth, Minnesota

Analytical Parameters	Chemical Abstract Number or Analyte Code	Laboratory[2]
Initial Sediment Chemical Constituents of Interest (COIs) - List 1[3]		
PAHs (16 to 17 priority pollutant PAHs)[1]		
2-Methylnaphthalene	91-57-6	EPA/CLP
Acenaphthene	83-32-9	EPA/CLP
Acenaphthylene	208-96-8	EPA/CLP
Anthracene	120-12-7	EPA/CLP
Benzo(a)anthracene	56-55-3	EPA/CLP
Benzo(a)pyrene	50-32-8	EPA/CLP
Benzo(b)fluoranthene[1]	205-99-2	EPA/CLP
Benzo(k)fluoranthene[1]	207-08-9	EPA/CLP
Benzo(g,h,i)perylene	191-24-2	EPA/CLP
Chrysene	218-01-9	EPA/CLP
Dibenz[a,h]anthracene	53-70-3	EPA/CLP
Fluoranthene	206-44-0	EPA/CLP
Fluorene	86-73-7	EPA/CLP
Indeno (1,2,3-cd)pyrene	193-39-5	EPA/CLP
Naphthalene	91-20-3	EPA/CLP
Phenanthrene	85-01-8	EPA/CLP
Pyrene	129-00-0	EPA/CLP
Sum of PAHs	--	
Total Metals		
Arsenic	7440-38-2	EPA/CLP
Chromium	7440-47-3	EPA/CLP
Mercury	7439-97-6	EPA/CLP
Cadmium	7440-43-9	EPA/CLP
Copper	7440-50-8	EPA/CLP
Lead	7439-92-1	EPA/CLP
Nickel	7440-02-0	EPA/CLP
Zinc	7440-66-6	EPA/CLP
General Chemistry		
Total Cyanide	57-12-5	EPA/CLP
PCBs		
Aroclor-1016	12674-11-2	EPA/CLP
Aroclor-1221	1104-28-2	EPA/CLP
Aroclor-1232	11141-16-5	EPA/CLP
Aroclor-1242	53469-21-9	EPA/CLP
Aroclor-1248	12672-29-6	EPA/CLP
Aroclor-1254	11097-69-1	EPA/CLP
Aroclor-1260	11096-82-5	EPA/CLP
Total PCBs		

Table 1

Analytical Testing Parameters
Spirit Lake Sediment Site
Former U. S. Steel Duluth Works
Saint Louis River, Duluth, Minnesota

Analytical Parameters	Chemical Abstract Number or Analyte Code	Laboratory[2]
Dioxins/Furans		
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1746-01-6	EPA/CLP
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	40321-76-4	EPA/CLP
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	57653-85-7	EPA/CLP
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	39227-28-6	EPA/CLP
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	19408-74-3	EPA/CLP
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	35822-46-9	EPA/CLP
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	3268-87-9	EPA/CLP
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	51207-31-9	EPA/CLP
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	57117-41-6	EPA/CLP
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	57117-31-4	EPA/CLP
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	57117-44-9	EPA/CLP
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	72918-21-9	EPA/CLP
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	70648-26-9	EPA/CLP
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	60851-34-5	EPA/CLP
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	67562-39-4	EPA/CLP
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	55673-89-7	EPA/CLP
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	39001-02-0	EPA/CLP
TCDD Equivalent	--	
Bioavailability Parameters - List 2		
General Chemistry		
Total Organic Carbon	--	TA
Black Carbon	--	TA
Acid Volatile Sulfide (AVS)	--	TA
Simultaneously Extracted Metals		
Cadmium	7440-43-9	TA
Copper	7440-50-8	TA
Lead	7439-92-1	TA
Nickel	7440-02-0	TA
Mercury	7439-97-6	TA
Zinc	7440-66-6	TA
Supplemental Sediment Characterization Parameters - List 3		
Nutrients		
Ammonia	--	TA
TKN	--	TA
Phosphorus (as orthophosphate)	--	TA
Physical Testing		
Grain Size	--	TA
Atterberg Limits	--	TA

Table 1

Analytical Testing Parameters
Spirit Lake Sediment Site
Former U. S. Steel Duluth Works
Saint Louis River, Duluth, Minnesota

Analytical Parameters	Chemical Abstract Number or Analyte Code	Laboratory[2]
Total Petroleum Hydrocarbons		
Total Petroleum Hydrocarbons C10-C34	--	TA
Extended 34 PAHs [1]		
Combined with List 1 - PAHs	--	
1-Methylnaphthalene	90-12-0	EPA/CLP
Benzo(e)pyrene	192-97-2	EPA/CLP
Perylene	198-55-0	EPA/CLP
C1-Benzo(a)anthracenes/chrysenes	C1CHRYS	EPA/CLP
C2-Benzo(a)anthracenes/chrysenes	C2CHRYS	EPA/CLP
C3-Benzo(a)anthracenes/chrysenes	C3CHRYS	EPA/CLP
C4-Benzo(a)anthracenes/chrysenes	C4CHRYS	EPA/CLP
C1-Fluoranthenes/pyrenes	C1FLPY	EPA/CLP
C1-Fluorenes	C1FLUOR	EPA/CLP
C2-Fluorenes	C2FLUOR	EPA/CLP
C3-Fluorenes	C3FLUOR	EPA/CLP
C2-Naphthalenes	C2NAPH	EPA/CLP
C3-Naphthalenes	C3NAPH	EPA/CLP
C4-Naphthalenes	C4NAPH	EPA/CLP
C1-Phenanthrenes/anthracenes	C1PHAN	EPA/CLP
C2-Phenanthrenes/anthracenes	C2PHAN	EPA/CLP
C3-Phenanthrenes/anthracenes	C3PHAN	EPA/CLP
C4-Phenanthrenes/anthracenes	C4PHAN	EPA/CLP
Geotechnical Testing Parameters - List 4		
Suspended Sediment Concentrations	--	SET
Triaxial Compression	--	SET
Bulk Density	--	SET
Grain size	--	SET
Atterberg Limits	--	SET
Capillary Suction Time (field)	--	BARR
Cone Penetrometer Testing (field)	--	N/A
Vane Shear Tests (field)	--	BARR
Zeta Potential	--	PTL

[1]Benzo(b)fluoranthene and benzo(k)fluoranthene are commonly reported as their sum because of insufficient chromatographic separation.

[2] Laboratory performing analyses for 2011 Winter Program- TA- Test America for U. S. Steel/Barr, EPA/CLP- Contract Laboratory Program (CLP) for U.S. EPA Great Lakes National Program Office, Great Lakes Legacy Act sediment program.

[3] See also- Table 14 Focused Chemical Constituents of Interest (COIs).

Table 2
Sediment Core Location and Elevation Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

Location ID	East *	North *	Top of Sediment Elevation **
WM-1	2851548.64	394264.57	598.32
WM-2	2851746.65	394263.40	598.45
WM-3	2852155.53	394268.21	597.55
WM-4	2850574.34	396571.79	598.79
WM-5	2851359.33	396067.51	596.57
WM-6	2851381.63	396894.69	600.17
WM-7	2852424.15	397295.15	597.29
WM-8	2849750.01	396482.71	595.19
WM-9	2850936.96	397305.82	597.82
WM-10	2850766.78	394268.04	597.36
UC-11	2850767.81	398273.57	596.39
UC-12	2851151.24	398390.07	594.86
WM-13	2852499.29	394490.36	597.39
WM-14	2851157.16	394262.95	597.06
UC-15	2852212.51	398515.98	592.67
UC-16	2851368.52	398489.28	594.21
UC-17	2850766.13	399269.81	594.57
WM-18	2850748.80	394885.39	596.21
WM-19	2851151.08	395053.45	594.91
UC-20	2850573.35	399090.69	594.97
WM-21	2851370.68	395264.24	592.25
WM-22	2852491.01	395668.46	598.42
UC-23	2850393.74	398877.94	594.12
WM-24	2850782.69	395276.74	595.41
WM-25	2851602.33	395451.34	592.12
WM-26	2850791.87	395475.17	594.07
WM-27	2850966.35	395674.08	593.31
WM-28	2850544.12	395680.20	592.90
UC-29	2849984.30	399256.98	597.48
WM-30	2851345.66	393487.37	598.60
UC-31	2850115.92	399470.61	597.39
WM-32	2851755.48	393216.36	592.24
WM-33	2850560.26	393669.33	598.76
WM-34	2850945.28	393680.16	598.63
UC-35	2850249.29	399732.50	597.67
UC-36	2850760.83	400119.51	596.26
UC-37	2851582.22	399751.10	596.83
UC-38	2850600.16	398657.04	594.84
UC-39	2850885.93	398833.57	594.34
UC-40	2851190.48	398983.18	593.29
WM-41	2851374.63	393688.16	598.76
WM-42	2851158.97	393673.39	598.25
WM-43	2851169.29	394871.41	595.88
WM-44	2852008.09	393695.21	593.27
WM-45	2851659.85	393685.38	598.36
WM-46	2851367.60	394879.76	596.35
WM-47	2851767.95	394888.84	597.71
WM-48	2852155.89	394873.68	597.82
WM-49	2852503.81	394883.91	598.64

*Coordinate type = NAD83_MN_North
**Elevation unit = ft/MSL

Table 2
Sediment Core Location and Elevation Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

Location ID	East *	North *	Top of Sediment Elevation **
WM-50	2852301.74	398104.12	594.62
WM-51	2852629.34	396486.30	596.50
UC-52	2851997.81	399292.52	596.01
UC-53	2850763.54	398466.05	595.02
UC-54	2849722.63	399415.73	599.09
UC-55	2849774.07	399671.14	599.12
UC-56	2849752.30	400212.45	598.98
UC-57	2850171.87	399101.63	597.06
WM-58	2850769.01	393933.11	598.42
WM-59	2851161.84	393934.63	597.99
WM-60	2851575.83	393939.82	598.68
WM-61	2851753.58	393941.66	598.53
WM-62	2851973.75	393953.90	597.48
WM-63	2850561.10	394488.77	597.72
WM-64	2850421.13	394601.85	597.43
WM-65	2850894.58	394645.99	596.32
WM-66	2851162.84	394652.19	596.25
WM-67	2851540.75	394669.25	597.72
WM-68	2851767.90	394669.29	598.20
WM-69	2852164.61	394664.15	597.81
WM-70	2851379.24	394480.39	597.33
WM-71	2850555.69	395060.76	599.28
WM-72	2850458.78	395308.24	598.13
WM-73	2850164.18	395681.60	596.95
WM-74	2851558.93	395077.61	596.51
UC-75	2849554.46	398457.00	601.25
UC-76	2849821.78	398206.01	601.17
UC-77	2850058.56	397944.52	601.30
UC-78	2850403.87	397685.54	601.12
UC-79	2850764.13	397881.80	600.11
UC-80	2850434.10	398080.46	600.01
UC-81	2850085.59	398500.35	599.86
UC-82	2849711.72	398862.42	599.81
UC-83	2849918.00	398680.61	599.42
WM-84	2850426.21	394109.92	600.75
WM-85	2850951.96	393346.02	599.16
WM-86	2850444.94	393618.02	599.38
WM-87	2850583.02	393500.71	599.00
WM-88	396232.31	2849727.38	577.99
WM-89	396219.50	2849997.06	578.97
UC-90	400119.43	2850957.96	582.75
UC-90A	400165.94	2850968.85	584.22
UC-91	398497.85	2851738.05	588.74
UC-92	400119.51	2850760.83	596.26
UC-93	399789.89	2851504.26	596.39
UC-94	399372.21	2851039.74	595.90
UC-95	398834.91	2850354.20	596.39
UC-96	398768.02	2849948.36	598.99
UC-97	398193.49	2850483.09	599.22

*Coordinate type = NAD83_MN_North
**Elevation unit = ft/MSL

Table 2
Sediment Core Location and Elevation Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

Location ID	East *	North *	Top of Sediment Elevation **
UC-98	398527.14	2851320.17	594.16
WM-99	396515.32	2850516.45	597.68
WM-100	395879.46	2849780.55	598.69
WM-101	394279.30	2850783.46	597.14
WM-102	394638.25	2851561.03	597.78
WM-103	394490.26	2852579.72	596.35
WMWAVE1	396424.69	2852958.14	594.15
WMWAVE2	395016.67	2850611.07	597.82
WMVELOCITY	395142.39	2851222.92	594.52
UCVELOCITY	398963.87	2850472.32	595.78
UCWAVE1	398664.01	2850312.65	596.97
UCWAVE2	398739.04	2851766.15	593.88

*Coordinate type = NAD83_MN_North
**Elevation unit = ft/MSL

Table 3
Summary of Analysis
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

Barr Engineering Company
Field Log Data Sheet
Sediment Samples

Client: U. S. Steel

Location: Duluth, MN (Morgan Park)

Project #: 23/69 1125 300 001

Project Name: Spirit Lake

	Sample Identification	Sample Location ID	Sample Collection Interval (ft)		Sample Collection		Matrix			Type				Number of Containers/ Analysis																		Core Collection Date	Sample Ship Date
			Begin	End	Date	Time	Soil	Sludge	Sediment	Grab	Comp.	Field Dup	MS/MSD	2 oz. Pres.	2 oz. Unpres.	4 oz. Unpres.	8 oz. Unpres.	Moisture-plastic vial etc.	Other:	34 PAH	17 PAH	Total Metals	TOC	Black Carbon	PCB	Nutrients/TPH	AVS/SEM	Dioxin/Furan	Cyanide	Grain Size/Atterberg Limits		
1	WM-1-1	155	0.0	0.7	02/17/11	16:08			X		X									X		X	X	X								02/15/11	02/18/11
2	WM-1-2	155	0.7	1.9	02/17/11	16:08			X		X									X		X	X	X								02/15/11	02/18/11
3	WM-1-3	155	1.9	2.1	02/17/11	16:08			X		X									X		X	X	X								02/15/11	02/18/11
4	WM-1-4	155	2.5	3.0	02/17/11	16:08			X		X									X		X	X	X								02/15/11	02/18/11
5	WM-2-1	154	0.0	0.5	02/19/11	10:14			X		X									X		X	X	X								02/16/11	02/21/11
6	WM-2-2	154	1.2	1.4	02/19/11	10:14			X		X										X	X	X	X								02/16/11	02/21/11
7	WM-2-3	154	1.4	1.9	02/19/11	10:14			X		X										X	X	X	X								02/16/11	02/21/11
8	WM-3-1	153	0.0	1.0	02/20/11	15:11			X		X									X		X	X	X	X	X	X	X	X	X		02/16/11	02/21/11
9	WM-3-2	153	2.0	4.0	02/20/11	15:11			X		X									X		X	X	X	X	X	X	X	X	X		02/16/11	02/21/11
10	WM-3-3	153	4.2	4.75	02/20/11	15:11			X		X									X		X	X	X	X	X	X	X	X	X		02/16/11	02/21/11
11	WM-3-4	153	4.75	5.25	02/20/11	15:11			X		X									X		X	X	X	X	X	X	X	X	X		02/16/11	02/21/11
12	WM-4-1	110	0.0	0.5	02/21/11	10:48			X		X									X		X	X	X				X				02/17/11	02/21/11
13	WM-4-2	110	0.5	1.0	02/21/11	10:48			X		X									X		X	X	X				X				02/17/11	02/21/11
14	WM-5-1	112	0.0	0.5	02/22/11	7:50			X		X									X		X	X	X								02/17/11	02/24/11
15	WM-5-2	112	1.0	1.5	02/22/11	7:50			X		X										X	X	X	X								02/17/11	02/24/11
16	WM-6-1	108	0.0	1.0	02/22/11	12:01			X		X									X		X	X	X				X				02/18/11	02/24/11
16A	Field Dup (WM-6-1)	108	0.0	1.0	02/22/11	12:01			X		X	X																				02/18/11	02/24/11
17	WM-6-2	108	1.4	1.8	02/22/11	12:01			X		X									X		X	X	X				X				02/18/11	02/24/11
18	WM-7-1	109	0.0	0.5	02/22/11	13:51			X		X									X		X	X	X								02/19/11	02/24/11
19	WM-7-2	109	1.1	1.6	02/22/11	13:51			X		X										X	X	X	X								02/19/11	02/24/11
20	WM-8-1	111	0.0	0.5	02/24/11	12:23			X		X									X		X	X	X				X				02/19/11	02/24/11
21	WM-8-2	111	0.75	1.25	02/24/11	12:23			X		X									X		X	X	X				X				02/19/11	02/24/11
22	WM-8-3	111	1.25	1.75	02/24/11	12:23			X		X		X							X		X	X	X				X				02/19/11	02/24/11

Table 3
Summary of Analysis
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

Barr Engineering Company
Field Log Data Sheet
Sediment Samples

Client: U. S. Steel

Location: Duluth, MN (Morgan Park)

Project #: 23/69 1125 300 001

Project Name: Spirit Lake

Sample Identification		Sample Location ID	Sample Collection Interval (ft)		Sample Collection		Matrix			Type				Number of Containers/ Analysis																Core Collection Date	Sample Ship Date
			Begin	End	Date	Time	Soil	Sludge	Sediment	Grab	Comp.	Field Dup	MS/MSD	2 oz. Pres.	2 oz. Unpres.	4 oz. Unpres.	8 oz. Unpres.	Moisture-plastic vial etc.	Other:	34 PAH	17 PAH	Total Metals	TOC	Black Carbon	PCB	Nutrients/TPH	AVS/SEM	Dioxin/Furan	Cyanide	Grain Size/Atterberg Limits		
23	WM-10-1	181	0.0	1.0	02/25/11	14:11			X		X									X		X	X	X	X	X	X	X	X	X	02/21/11	02/28/11
24	WM-10-2	181	1.0	2.0	02/25/11	14:11			X		X									X		X	X	X	X	X	X	X	X	X	02/21/11	02/28/11
25	WM-10-3	181	2.0	2.8	02/25/11	14:11			X		X									X		X	X	X	X	X	X	X	X	X	02/21/11	02/28/11
26	UC-11-1	131	0.0	1.0	02/26/11	13:57			X		X									X		X	X	X	X	X	X	X	X	X	02/22/11	02/28/11
27	UC-11-2	131	1.0	2.0	02/26/11	13:57			X		X									X		X	X	X	X	X	X	X	X	X	02/22/11	02/28/11
28	UC-11-3	131	2.0	3.0	02/26/11	13:57			X		X									X		X	X	X	X	X	X	X	X	X	02/22/11	02/28/11
29	UC-11-4	131	3.0	3.50	02/26/11	13:57			X		X									X		X	X	X	X	X		X	X		02/22/11	02/28/11
30	UC-12-1	133	0.00	0.50	02/27/11	11:08			X		X									X		X	X	X							02/22/11	02/28/11
31	UC-12-2	133	1.5	2.0	02/27/11	11:08			X		X										X	X	X	X							02/22/11	02/28/11
32	UC-12-3	133	2.5	3.1	02/27/11	11:08			X		X										X	X	X	X							02/22/11	02/28/11
33	UC-12-4	133	3.1	3.6	02/27/11	11:08			X		X										X	X	X	X							02/22/11	02/28/11
34	WM-14-1	184	0.0	0.5	02/27/11	14:30			X		X									X		X	X	X							02/22/11	02/28/11
35	WM-14-2	184	0.5	1.0	02/27/11	14:30			X		X										X	X	X	X							02/22/11	02/28/11
36	WM-14-3	184	1.0	1.5	02/27/11	14:30			X		X										X	X	X	X							02/22/11	02/28/11
37	WM-14-4	184	1.5	2.0	02/27/11	14:30			X		X										X	X	X	X							02/22/11	02/28/11
38	UC-15-1	105	0.0	1.0	02/27/11	18:53			X		X									X		X	X	X				X			02/23/11	02/28/11
39	UC-15-2	105	1.0	2.0	02/27/11	18:53			X		X									X		X	X	X				X			02/23/11	02/28/11
40	UC-15-3	105	2.0	3.0	02/27/11	18:53			X		X									X		X	X	X				X			02/23/11	02/28/11
41	UC-15-4	105	3.0	4.0	02/27/11	18:53			X		X		X							X		X	X	X				X			02/23/11	02/28/11
41A	Field Dup (UC-15-3)				02/27/11	18:53						X																				
42	UC-16-1	132	0.0	0.5	02/28/11	13:23			X		X									X		X	X	X							02/23/11	03/03/11
43	UC-16-2	132	2.0	2.5	02/28/11	13:23			X		X										X	X	X	X							02/23/11	03/03/11
44	UC-16-3	132	3.0	3.5	02/28/11	13:23			X		X										X	X	X	X							02/23/11	03/03/11
45	UC-16-4	132	4.0	4.5	02/28/11	13:23			X		X										X	X	X	X							02/23/11	03/03/11
46	UC-17-1	125	0.0	0.5	03/01/11	8:30			X		X									X		X	X	X				X			02/23/11	03/03/11
47	UC-17-2	125	1.0	1.5	03/01/11	8:30			X		X									X		X	X	X				X			02/23/11	03/03/11
48	UC-17-3	125	2.0	2.5	03/01/11	8:30			X		X									X		X	X	X				X			02/23/11	03/03/11
49	UC-17-4	125	2.5	3.0	03/01/11	8:30			X		X									X		X	X	X				X			02/23/11	03/03/11

Table 3
Summary of Analysis
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

Barr Engineering Company
Field Log Data Sheet
Sediment Samples

Client: U. S. Steel

Location: Duluth, MN (Morgan Park)

Project #: 23/69 1125 300 001

Project Name: Spirit Lake

	Sample Identification	Sample Location ID	Sample Collection Interval (ft)		Sample Collection		Matrix			Type				Number of Containers/ Analysis																Core Collection Date	Sample Ship Date
			Begin	End	Date	Time	Soil	Sludge	Sediment	Grab	Comp.	Field Dup	MS/MSD	2 oz. Pres.	2 oz. Unpres.	4 oz. Unpres.	8 oz. Unpres.	Moisture-plastic vial etc.	Other:	34 PAH	17 PAH	Total Metals	TOC	Black Carbon	PCB	Nutrients/TPH	AVS/SEM	Dioxin/Furan	Cyanide	Grain Size/Atterberg Limits		
50	WM-18-1	176	0.0	0.7	03/01/11	13:54			X		X									X		X	X	X	X	X	X	X	X	02/23/11	03/03/11
51	WM-18-2	176	0.7	1.7	03/01/11	13:54			X		X									X		X	X	X	X	X	X	X	X	02/23/11	03/03/11
52	WM-18-3	176	1.7	2.7	03/01/11	13:54			X		X									X		X	X	X	X	X	X	X	X	02/23/11	03/03/11
53	UC-20-1	126	0.0	0.5	03/02/11	8:30			X		X									X		X	X	X							02/24/11	03/03/11
54	UC-20-2	126	1.5	2.0	03/02/11	8:30			X		X										X	X	X	X							02/24/11	03/03/11
55	UC-20-3	126	2.5	3.0	03/02/11	8:30			X		X										X	X	X	X							02/24/11	03/03/11
56	UC-20-4	126	3.5	4.0	03/02/11	8:30			X		X										X	X	X	X							02/24/11	03/03/11
57	WM-19-1	139	0.0	0.5	03/02/11	12:22			X		X									X		X	X	X							02/24/11	03/03/11
58	WM-19-2	139	0.75	1.25	03/02/11	12:22			X		X										X	X	X	X							02/24/11	03/03/11
59	WM-19-3	139	1.25	1.75	03/02/11	12:22			X		X										X	X	X	X							02/24/11	03/03/11
60	UC-23-1	127	0.0	0.5	03/03/11	10:00			X		X									X		X	X	X	X	X	X	X	X	X	02/24/11	03/03/11
61	UC-23-2	127	1.5	2.0	03/03/11	10:00			X		X									X		X	X	X	X	X	X	X	X	X	02/24/11	03/03/11
62	UC-23-3	127	2.5	3.0	03/03/11	10:00			X		X									X		X	X	X	X	X	X	X	X	X	02/24/11	03/03/11
63	UC-23-4	127	3.75	4.25	03/03/11	10:00			X		X									X		X	X	X	X	X	X	X	X	X	02/24/11	03/03/11
64	UC-29-1	124	0.0	0.5	03/03/11	14:20			X		X									X		X	X	X	X	X	X	X	X	X	03/01/11	03/07/11
65	UC-29-2	124	1.0	1.5	03/03/11	14:20			X		X									X		X	X	X	X	X	X	X	X	X	03/01/11	03/07/11
66	UC-29-3	124	2.0	2.5	03/03/11	14:20			X		X									X		X	X	X	X	X	X	X	X	X	03/01/11	03/07/11
67	UC-29-4	124	2.5	3.0	03/03/11	14:20			X		X		X							X		X	X	X	X	X	X	X	X	X	03/01/11	03/07/11
67A	Field Dup (UC-29-2)				03/03/11	14:20						X																				
68	WM-21-1	138	0.0	0.5	03/04/11	7:55			X		X									X		X	X	X	X	X	X	X	X	X	03/03/11	03/07/11
69	WM-21-2	138	2.0	2.5	03/04/11	7:55			X		X									X		X	X	X	X	X	X	X	X	X	03/03/11	03/07/11
70	WM-21-3	138	4.0	4.5	03/04/11	7:55			X		X									X		X	X	X	X	X	X	X	X	X	03/03/11	03/07/11
71	WM-21-4	138	5.0	5.5	03/04/11	7:55			X		X									X		X	X	X	X	X	X	X	X	X	03/03/11	03/07/11
72	WM-22-1	114	0.0	0.5	03/06/11	14:02			X		X									X		X	X	X				X			03/05/11	03/07/11
73	WM-22-2	114	1.5	2.0	03/06/11	14:02			X		X									X		X	X	X				X			03/05/11	03/07/11
74	WM-22-3	114	4.0	4.5	03/06/11	14:02			X		X									X		X	X	X				X			03/05/11	03/07/11
75	WM-22-4	114	5.5	6.0	03/06/11	14:02			X		X									X		X	X	X				X			03/05/11	03/07/11

Table 3
Summary of Analysis
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

Barr Engineering Company
Field Log Data Sheet
Sediment Samples

Client: U. S. Steel

Location: Duluth, MN (Morgan Park)

Project #: 23/69 1125 300 001

Project Name: Spirit Lake

Sample Identification		Sample Location ID	Sample Collection Interval (ft)		Sample Collection		Matrix			Type				Number of Containers/ Analysis																Core Collection Date	Sample Ship Date
			Begin	End	Date	Time	Soil	Sludge	Sediment	Grab	Comp.	Field Dup	MS/MSD	2 oz. Pres.	2 oz. Unpres.	4 oz. Unpres.	8 oz. Unpres.	Moisture-plastic vial etc.	Other:	34 PAH	17 PAH	Total Metals	TOC	Black Carbon	PCB	Nutrients/TPH	AVS/SEM	Dioxin/Furan	Cyanide	Grain Size/Atterberg Limits		
76	WM-24-1	173	0.0	0.5	03/07/11	10:00			X		X									X		X	X	X							03/04/11	03/07/11
76A	Field Dup (WM-24-2)				03/07/11	10:00						X																				
77	WM-24-2	173	1.0	1.5	03/07/11	10:00			X		X										X	X	X	X							03/04/11	03/07/11
78	WM-24-3	173	2.0	2.5	03/07/11	10:00			X		X										X	X	X	X							03/04/11	03/07/11
79	WM-24-4	173	3.0	3.5	03/07/11	10:00			X		X		X								X	X	X	X							03/04/11	03/07/11
80	WM-13-1	116	0.0	0.5	03/04/11	13:29			X		X									X		X	X	X							03/04/11	03/07/11
81	WM-13-2	116	1.5	2.0	03/04/11	13:29			X		X										X	X	X	X							03/04/11	03/07/11
82	WM-13-3	116	3.25	3.75	03/04/11	13:29			X		X										X	X	X	X							03/04/11	03/07/11
83	WM-13-4	116	3.75	4.25	03/04/11	13:29			X		X										X	X	X	X							03/04/11	03/07/11
84	WM-9-1	107	0.0	0.5	03/07/11	13:30			X		X									X		X	X	X							03/06/11	03/10/11
85	WM-9-2	107	0.5	1.0	03/07/11	13:30			X		X										X	X	X	X							03/06/11	03/10/11
86	WM-9-3	107	1.5	2.0	03/07/11	13:30			X		X										X	X	X	X							03/06/11	03/10/11
87	WM-9-4	107	2.0	2.5	03/07/11	13:30			X		X										X	X	X	X							03/06/11	03/10/11
88	WM-25-1	137	0.0	0.5	03/07/11	16:00			X		X									X		X	X	X							03/05/11	03/10/11
89	WM-25-2	137	2.5	3.0	03/07/11	16:00			X		X										X	X	X	X							03/05/11	03/10/11
90	WM-25-3	137	5.5	6.0	03/07/11	16:00			X		X										X	X	X	X							03/05/11	03/10/11
91	WM-25-4	137	6.0	6.5	03/07/11	16:00			X		X										X	X	X	X							03/05/11	03/10/11
92	WM-30-1	158	0.0	0.5	03/08/11	10:30			X		X									X		X	X	X	X	X	X	X	X	X	03/04/11	03/10/11
93	WM-30-2	158	1.0	1.5	03/08/11	10:30			X		X									X		X	X	X	X	X	X	X	X	X	03/04/11	03/10/11
94	WM-30-3	158	2.0	2.5	03/08/11	10:30			X		X									X		X	X	X	X	X	X	X	X	X	03/04/11	03/10/11
95	WM-30-4	158	3.5	4.0	03/08/11	10:30			X		X									X		X	X	X	X	X	X	X	X	X	03/04/11	03/10/11
96	WM-33-1	186	0.0	0.5	03/08/11	16:00			X		X									X		X	X	X							03/04/11	03/10/11
97	WM-33-2	186	0.5	1.0	03/08/11	16:00			X		X										X	X	X	X							03/04/11	03/10/11
98	WM-33-3	186	1.5	2.0	03/08/11	16:00			X		X										X	X	X	X							03/04/11	03/10/11
99	WM-33-4	186	2.5	3.0	03/08/11	16:00			X		X										X	X	X	X							03/04/11	03/10/11
100	UC-31-1	123	0.0	0.5	03/09/11	9:30			X		X									X		X	X	X							03/01/11	03/10/11
101	UC-31-2	123	0.5	1.0	03/09/11	9:30			X		X										X	X	X	X							03/01/11	03/10/11

Table 3
Summary of Analysis
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

Barr Engineering Company
Field Log Data Sheet
Sediment Samples

Client: U. S. Steel

Location: Duluth, MN (Morgan Park)

Project #: 23/69 1125 300 001

Project Name: Spirit Lake

Sample Identification		Sample Location ID	Sample Collection Interval (ft)		Sample Collection		Matrix			Type				Number of Containers/ Analysis																Core Collection Date	Sample Ship Date
			Begin	End	Date	Time	Soil	Sludge	Sediment	Grab	Comp.	Field Dup	MS/MSD	2 oz. Pres.	2 oz. Unpres.	4 oz. Unpres.	8 oz. Unpres.	Moisture-plastic vial etc.	Other:	34 PAH	17 PAH	Total Metals	TOC	Black Carbon	PCB	Nutrients/TPH	AVS/SEM	Dioxin/Furan	Cyanide	Grain Size/Atterberg Limits		
102	UC-31-3	123	1.0	1.5	03/09/11	9:30			X		X										X	X	X	X						03/01/11	03/10/11
103	UC-31-4	123	2.0	2.5	03/09/11	9:30			X		X		X								X	X	X	X						03/01/11	03/10/11
103A	Field Dup (UC-31-3)				03/09/11	9:30						X																			
104	UC-35-1	122	0.0	0.5	03/09/11	13:30			X		X									X		X	X	X							03/01/11	03/10/11
105	UC-35-2	122	0.5	1.0	03/09/11	13:30			X		X										X	X	X	X							03/01/11	03/10/11
106	UC-35-3	122	2.0	2.5	03/09/11	13:30			X		X										X	X	X	X							03/01/11	03/10/11
107	UC-35-4	122	4.0	4.5	03/09/11	13:30			X		X										X	X	X	X							03/01/11	03/10/11
108	UC-36-1	102	0.0	0.5	03/09/11	15:18			X		X									X		X	X	X				X			03/01/11	03/10/11
109	UC-36-2	102	1.0	1.5	03/09/11	15:18			X		X									X		X	X	X				X			03/01/11	03/10/11
110	UC-36-3	102	2.0	2.5	03/09/11	15:18			X		X									X		X	X	X				X			03/01/11	03/10/11
111	UC-36-4	102	2.5	3.0	03/09/11	15:18			X		X									X		X	X	X				X			03/01/11	03/10/11
112	UC-37-1	103	0.0	0.5	03/10/11	8:36			X		X									X		X	X	X							03/03/11	03/10/11
113	UC-37-2	103	0.5	1.0	03/10/11	8:36			X		X										X	X	X	X							03/03/11	03/10/11
114	UC-37-3	103	3.0	3.5	03/10/11	8:36			X		X										X	X	X	X							03/03/11	03/10/11
115	UC-37-4	103	5.5	6.0	03/10/11	8:36			X		X										X	X	X	X							03/03/11	03/10/11
116	WM-64-1	174	0.0	0.5	03/10/11	14:30			X		X									X		X	X	X				X			03/09/11	03/15/11
117	WM-64-2	174	1.0	1.5	03/10/11	14:30			X		X									X		X	X	X				X			03/09/11	03/15/11
118	WM-64-3	174	2.0	2.5	03/10/11	14:30			X		X									X		X	X	X				X			03/09/11	03/15/11
119	WM-64-4	174	3.0	3.5	03/10/11	14:30			X		X									X		X	X	X				X			03/09/11	03/15/11
120	UC-40-1	130	0.0	0.5	03/10/11	16:30			X		X									X		X	X	X							03/03/11	03/15/11
121	UC-40-2	130	1.5	2.0	03/10/11	16:30			X		X										X	X	X	X							03/03/11	03/15/11
122	UC-40-3	130	3.0	3.5	03/10/11	16:30			X		X										X	X	X	X							03/03/11	03/15/11
123	UC-40-4	130	4.5	5.0	03/10/11	16:30			X		X		X								X	X	X	X							03/03/11	03/15/11
123A	Field Dup (UC-40-3)				03/10/11	16:30						X																			
124	WM-26-1	140	0.0	0.5	03/11/11	9:30			X		X									X		X	X	X							02/28/11	03/15/11
125	WM-26-2	140	0.5	1.0	03/11/11	9:30			X		X										X	X	X	X							02/28/11	03/15/11
126	WM-26-3	140	1.3	1.8	03/11/11	9:30			X		X										X	X	X	X							02/28/11	03/15/11
127	WM-26-4	140	1.8	2.1	03/11/11	9:30			X		X										X	X	X	X							02/28/11	03/15/11

Table 3
Summary of Analysis
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

Barr Engineering Company
Field Log Data Sheet
Sediment Samples

Client: U. S. Steel

Location: Duluth, MN (Morgan Park)

Project #: 23/69 1125 300 001

Project Name: Spirit Lake

Sample Identification		Sample Location ID	Sample Collection Interval (ft)		Sample Collection		Matrix			Type				Number of Containers/ Analysis															Core Collection Date	Sample Ship Date
			Begin	End	Date	Time	Soil	Sludge	Sediment	Grab	Comp.	Field Dup	MS/MSD	2 oz. Pres.	2 oz. Unpres.	4 oz. Unpres.	8 oz. Unpres.	Moisture-plastic vial etc.	Other:	34 PAH	17 PAH	Total Metals	TOC	Black Carbon	PCB	Nutrients/TPH	AVS/SEM	Dioxin/Furan	Cyanide	Grain Size/Atterberg Limits		
128	UC-38-1	128	0.0	0.5	03/11/11	15:30			X		X									X		X	X	X							03/03/11	03/15/11
129	UC-38-2	128	1.5	2.0	03/11/11	15:30			X		X										X	X	X	X							03/03/11	03/15/11
130	UC-38-3	128	2.0	2.5	03/11/11	15:30			X		X										X	X	X	X							03/03/11	03/15/11
131	UC-38-4	128	2.9	3.4	03/11/11	15:30			X		X										X	X	X	X							03/03/11	03/15/11
132	WM-32-1	118	0.0	0.5	03/13/11	14:00			X		X									X		X	X	X	X	X	X	X	X	X	03/11/11	03/15/11
133	WM-32-2	118	0.5	1.0	03/13/11	14:00			X		X									X		X	X	X	X	X	X	X	X	X	03/11/11	03/15/11
134	WM-32-3	118	1.0	1.5	03/13/11	14:00			X		X									X		X	X	X	X	X	X	X	X	X	03/11/11	03/15/11
135	WM-32-4	118	3.5	4.0	03/13/11	14:00			X		X									X		X	X	X	X	X	X	X	X	X	03/11/11	03/15/11
136	WM-27-1	136	0.0	0.5	03/13/11	16:00			X		X									X		X	X	X							02/28/11	03/15/11
137	WM-27-2	136	0.5	1.0	03/13/11	16:00			X		X										X	X	X	X							02/28/11	03/15/11
138	WM-27-3	136	1.4	1.9	03/13/11	16:00			X		X										X	X	X	X							02/28/11	03/15/11
139	WM-28-1	135	0.0	0.5	03/13/11	17:00			X		X									X		X	X	X							03/11/11	03/15/11
140	WM-28-2	135	2.0	2.5	03/13/11	17:00			X		X										X	X	X	X							03/11/11	03/15/11
141	WM-28-3	135	2.5	3.0	03/13/11	17:00			X		X										X	X	X	X							03/11/11	03/15/11
142	WM-28-4	135	3.0	3.5	03/13/11	17:00			X		X		X								X	X	X	X							03/11/11	03/15/11
142A	Field Dup (WM-28-2)				03/13/11	17:00						X																				
143	WM-34-1	187	0.0	0.5	03/14/11	9:51			X		X									X		X	X	X							03/01/11	03/15/11
144	WM-34-2	187	0.5	1.0	03/14/11	9:51			X		X										X	X	X	X							03/01/11	03/15/11
145	WM-34-3	187	1.0	1.5	03/14/11	9:51			X		X										X	X	X	X							03/01/11	03/15/11
146	UC-39-1	129	0.0	0.5	03/14/11	14:30			X		X									X		X	X	X							03/14/11	03/15/11
147	UC-39-2	129	2.0	2.5	03/14/11	14:30			X		X										X	X	X	X							03/14/11	03/15/11
148	UC-39-3	129	3.0	3.5	03/14/11	14:30			X		X										X	X	X	X							03/14/11	03/15/11
149	UC-39-4	129	4.0	4.5	03/14/11	14:30			X		X										X	X	X	X							03/14/11	03/15/11
150	WM-41-1	189	0.0	0.5	03/15/11	9:00			X		X									X		X	X	X							03/05/11	03/15/11
151	WM-41-2	189	1.0	1.5	03/15/11	9:00			X		X										X	X	X	X							03/05/11	03/15/11
152	WM-41-3	189	2.0	2.5	03/15/11	9:00			X		X										X	X	X	X							03/05/11	03/15/11
153	WM-41-4	189	3.0	3.4	03/15/11	9:00			X		X										X	X	X	X							03/05/11	03/15/11

Table 3
Summary of Analysis
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

Barr Engineering Company
Field Log Data Sheet
Sediment Samples

Client: U. S. Steel

Location: Duluth, MN (Morgan Park)

Project #: 23/69 1125 300 001

Project Name: Spirit Lake

Sample Identification		Sample Location ID	Sample Collection Interval (ft)		Sample Collection		Matrix			Type				Number of Containers/ Analysis																Core Collection Date	Sample Ship Date
			Begin	End	Date	Time	Soil	Sludge	Sediment	Grab	Comp.	Field Dup	MS/MSD	2 oz. Pres.	2 oz. Unpres.	4 oz. Unpres.	8 oz. Unpres.	Moisture-plastic vial etc.	Other:	34 PAH	17 PAH	Total Metals	TOC	Black Carbon	PCB	Nutrients/TPH	AVS/SEM	Dioxin/Furan	Cyanide	Grain Size/Atterberg Limits		
154	WM-42-1	188	0.0	0.5	03/15/11	11:30			X		X									X		X	X	X							03/05/11	03/17/11
155	WM-42-2	188	1.0	1.5	03/15/11	11:30			X		X										X	X	X	X							03/05/11	03/17/11
156	WM-42-3	188	2.0	2.5	03/15/11	11:30			X		X										X	X	X	X							03/05/11	03/17/11
157	WM-42-4	188	2.5	3.0	03/15/11	11:30			X		X										X	X	X	X							03/05/11	03/17/11
158	WM-43-1	178	0.0	0.5	03/15/11	14:00			X		X									X		X	X	X							03/05/11	03/17/11
159	WM-43-2	178	1.7	2.2	03/15/11	14:00			X		X										X	X	X	X							03/05/11	03/17/11
160	WM-43-3	178	2.2	2.7	03/15/11	14:00			X		X										X	X	X	X							03/05/11	03/17/11
161	WM-43-4	178	5.0	5.5	03/15/11	14:00			X		X										X	X	X	X							03/05/11	03/17/11
162	WM-44-1	117	0.0	0.5	03/16/11	9:30			X		X									X		X	X	X							03/06/11	03/17/11
163	WM-44-2	117	0.5	1.0	03/16/11	9:30			X		X										X	X	X	X							03/06/11	03/17/11
164	WM-44-3	117	1.0	1.5	03/16/11	9:30			X		X										X	X	X	X							03/06/11	03/17/11
165	WM-44-4	117	2.0	2.5	03/16/11	9:30			X		X										X	X	X	X							03/06/11	03/17/11
166	WM-45-1	156	0.0	0.5	03/16/11	11:30			X		X									X		X	X	X							03/05/11	03/17/11
167	WM-45-2	156	1.5	2.0	03/16/11	11:30			X		X										X	X	X	X							03/05/11	03/17/11
168	WM-45-3	156	3.0	3.5	03/16/11	11:30			X		X										X	X	X	X							03/05/11	03/17/11
169	WM-45-4	156	5.0	5.5	03/16/11	11:30			X		X		X								X	X	X	X							03/05/11	03/17/11
169A	Field Dup (WM-45-2)				03/16/11	11:30						X																				
170	WM-46-1	146	0.0	0.5	03/16/11	14:00			X		X									X		X	X	X							03/06/11	03/17/11
171	WM-46-2	146	2.3	2.8	03/16/11	14:00			X		X										X	X	X	X							03/06/11	03/17/11
172	WM-46-3	146	2.8	3.3	03/16/11	14:00			X		X										X	X	X	X							03/06/11	03/17/11
173	WM-46-4	146	4.0	4.5	03/16/11	14:00			X		X										X	X	X	X							03/06/11	03/17/11
174	WM-47-1	145	0.0	0.5	03/16/11	16:30			X		X									X		X	X	X							03/06/11	03/17/11
175	WM-47-2	145	2.5	3.0	03/16/11	16:30			X		X										X	X	X	X							03/06/11	03/17/11
176	WM-47-3	145	3.0	3.5	03/16/11	16:30			X		X										X	X	X	X							03/06/11	03/17/11
177	WM-47-4	145	3.5	4.0	03/16/11	16:30			X		X										X	X	X	X							03/06/11	03/17/11
178	WM-48-1	144	0.0	0.5	03/17/11	9:30			X		X									X		X	X	X							03/06/11	03/17/11
179	WM-48-2	144	2.0	2.5	03/17/11	9:30			X		X										X	X	X	X							03/06/11	03/17/11

Table 3
Summary of Analysis
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

Barr Engineering Company
Field Log Data Sheet
Sediment Samples

Client: U. S. Steel

Location: Duluth, MN (Morgan Park)

Project #: 23/69 1125 300 001

Project Name: Spirit Lake

Sample Identification		Sample Location ID	Sample Collection Interval (ft)		Sample Collection		Matrix			Type				Number of Containers/ Analysis																Core Collection Date	Sample Ship Date
			Begin	End	Date	Time	Soil	Sludge	Sediment	Grab	Comp.	Field Dup	MS/MSD	2 oz. Pres.	2 oz. Unpres.	4 oz. Unpres.	8 oz. Unpres.	Moisture-plastic vial etc.	Other:	34 PAH	17 PAH	Total Metals	TOC	Black Carbon	PCB	Nutrients/TPH	AVS/SEM	Dioxin/Furan	Cyanide	Grain Size/Atterberg Limits		
180	WM-48-3	144	2.5	3.0	03/17/11	9:30			X		X										X	X	X	X						03/06/11	03/17/11
181	WM-48-4	144	3.0	3.5	03/17/11	9:30			X		X										X	X	X	X						03/06/11	03/17/11
182	WM-49-1	115	0.0	0.5	03/17/11	11:30			X		X									X		X	X	X						03/06/11	03/21/11
183	WM-49-2	115	2.5	3.0	03/17/11	11:30			X		X										X	X	X	X						03/06/11	03/21/11
184	WM-49-3	115	4.8	5.3	03/17/11	11:30			X		X										X	X	X	X						03/06/11	03/21/11
185	WM-49-4	115	5.5	6.0	03/17/11	11:30			X		X		X								X	X	X	X						03/06/11	03/21/11
185A	Field Dup (WM-49-2)			6.0	03/17/11	11:30						X																			
186	WM-50-1	106	0.0	0.5	03/17/11	14:30			X		X									X		X	X	X						03/07/11	03/21/11
187	WM-50-2	106	1.0	1.5	03/17/11	14:30			X		X										X	X	X	X						03/07/11	03/21/11
188	WM-50-3	106	2.5	3.0	03/17/11	14:30			X		X										X	X	X	X						03/07/11	03/21/11
189	WM-50-4	106	3.0	3.5	03/17/11	14:30			X		X										X	X	X	X						03/07/11	03/21/11
190	WM-51-1	113	0.0	0.5	03/18/11	8:30			X		X									X		X	X	X						03/07/11	03/21/11
191	WM-51-2	113	2.0	2.5	03/18/11	8:30			X		X										X	X	X	X						03/07/11	03/21/11
192	WM-51-3	113	4.0	4.5	03/18/11	8:30			X		X										X	X	X	X						03/07/11	03/21/11
193	WM-51-4	113	6.0	6.5	03/18/11	8:30			X		X										X	X	X	X						03/07/11	03/21/11
194	UC-52-1	104	0.0	0.5	03/18/11	10:00			X		X									X		X	X	X						03/07/11	03/21/11
195	UC-52-2	104	2.0	2.5	03/18/11	10:00			X		X										X	X	X	X						03/07/11	03/21/11
196	UC-52-3	104	4.0	4.5	03/18/11	10:00			X		X										X	X	X	X						03/07/11	03/21/11
197	UC-52-4	104	5.0	5.5	03/18/11	10:00			X		X										X	X	X	X						03/07/11	03/21/11
198	UC-53-1	170	0.0	0.5	03/18/11	11:30			X		X									X		X	X	X						03/07/11	03/21/11
199	UC-53-2	170	2.0	2.5	03/18/11	11:30			X		X										X	X	X	X						03/07/11	03/21/11
200	UC-53-3	170	3.0	3.5	03/18/11	11:30			X		X										X	X	X	X						03/07/11	03/21/11
201	UC-53-4	170	4.5	5.0	03/18/11	11:30			X		X										X	X	X	X						03/07/11	03/21/11
202	UC-54-1	190	0.0	0.5	03/18/11	15:00			X		X									X		X	X	X						03/07/11	03/21/11
203	UC-54-2	190	0.5	1.0	03/18/11	15:00			X		X										X	X	X	X						03/07/11	03/21/11
204	UC-54-3	190	1.0	1.5	03/18/11	15:00			X		X										X	X	X	X						03/07/11	03/21/11
205	UC-55-1	121	0.0	0.5	03/18/11	16:00			X		X									X		X	X	X						03/07/11	03/21/11

Table 3
Summary of Analysis
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

Barr Engineering Company
Field Log Data Sheet
Sediment Samples

Client: U. S. Steel

Location: Duluth, MN (Morgan Park)

Project #: 23/69 1125 300 001

Project Name: Spirit Lake

Sample Identification		Sample Location ID	Sample Collection Interval (ft)		Sample Collection		Matrix			Type				Number of Containers/ Analysis															Core Collection Date	Sample Ship Date
			Begin	End	Date	Time	Soil	Sludge	Sediment	Grab	Comp.	Field Dup	MS/MSD	2 oz. Pres.	2 oz. Unpres.	4 oz. Unpres.	8 oz. Unpres.	Moisture-plastic vial etc.	Other:	34 PAH	17 PAH	Total Metals	TOC	Black Carbon	PCB	Nutrients/TPH	AVS/SEM	Dioxin/Furan	Cyanide	Grain Size/Atterberg Limits		
206	UC-55-2	121	2.0	2.5	03/18/11	16:00			X		X										X	X	X	X						03/07/11	03/21/11
207	UC-55-3	121	3.0	3.5	03/18/11	16:00			X		X										X	X	X	X						03/07/11	03/21/11
208	UC-55-4	121	4.0	4.5	03/18/11	16:00			X		X		X								X	X	X	X						03/07/11	03/21/11
208A	Field Dup (UC-55-2)				03/18/11	16:00						X																			
209	UC-56-1	101	0.0	0.5	03/19/11	13:30			X		X									X		X	X	X						03/07/11	03/21/11
210	UC-56-2	101	1.0	1.5	03/19/11	13:30			X		X										X	X	X	X						03/07/11	03/21/11
211	UC-56-3	101	3.0	3.5	03/19/11	13:30			X		X										X	X	X	X						03/07/11	03/21/11
212	UC-56-4	101	3.9	4.4	03/19/11	13:30			X		X										X	X	X	X						03/07/11	03/21/11
213	UC-57-1	164	0.0	0.5	03/19/11	14:45			X		X									X		X	X	X						03/08/11	03/21/11
214	UC-57-2	164	0.5	1.0	03/19/11	14:45			X		X										X	X	X	X						03/08/11	03/21/11
215	UC-57-3	164	1.5	2.0	03/19/11	14:45			X		X										X	X	X	X						03/08/11	03/21/11
216	UC-57-4	164	2.0	2.5	03/19/11	14:45			X		X										X	X	X	X						03/08/11	03/21/11
217	WM-58-1	182	0.0	0.5	03/19/11	16:15			X		X									X		X	X	X						03/08/11	03/21/11
218	WM-58-2	182	0.5	1.0	03/19/11	16:15			X		X										X	X	X	X						03/08/11	03/21/11
219	WM-58-3	182	1.0	1.5	03/19/11	16:15			X		X										X	X	X	X						03/08/11	03/21/11
220	WM-58-4	182	2.0	2.5	03/19/11	16:15			X		X										X	X	X	X						03/08/11	03/21/11
221	WM-59-1	185	0.0	0.5	03/21/11	9:30			X		X									X		X	X	X						03/08/11	03/21/11
222	WM-59-2	185	0.5	1.0	03/21/11	9:30			X		X										X	X	X	X						03/08/11	03/21/11
223	WM-59-3	185	1.0	1.5	03/21/11	9:30			X		X										X	X	X	X						03/08/11	03/21/11
224	WM-59-4	185	1.5	2.0	03/21/11	9:30			X		X										X	X	X	X						03/08/11	03/21/11
224A	WC-1				03/21/11	15:30							TCLP FOR DISPOSAL																			
225	WM-60-1	152	0.0	0.5	03/21/11	11:45			X		X									X		X	X	X						03/08/11	03/24/11
226	WM-60-2	152	0.5	1.0	03/21/11	11:45			X		X										X	X	X	X						03/08/11	03/24/11
227	WM-60-3	152	1.0	1.4	03/21/11	11:45			X		X										X	X	X	X						03/08/11	03/24/11
228	WM-61-1	151	0.0	0.5	03/21/11	13:00			X		X									X		X	X	X						03/08/11	03/24/11
229	WM-61-2	151	1.0	1.5	03/21/11	13:00			X		X										X	X	X	X						03/08/11	03/24/11
230	WM-61-3	151	1.5	2.0	03/21/11	13:00			X		X										X	X	X	X						03/08/11	03/24/11

Table 3
Summary of Analysis
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

Barr Engineering Company
Field Log Data Sheet
Sediment Samples

Client: U. S. Steel

Location: Duluth, MN (Morgan Park)

Project #: 23/69 1125 300 001

Project Name: Spirit Lake

Sample Identification		Sample Location ID	Sample Collection Interval (ft)		Sample Collection		Matrix			Type				Number of Containers/ Analysis																Core Collection Date	Sample Ship Date
			Begin	End	Date	Time	Soil	Sludge	Sediment	Grab	Comp.	Field Dup	MS/MSD	2 oz. Pres.	2 oz. Unpres.	4 oz. Unpres.	8 oz. Unpres.	Moisture-plastic vial etc.	Other:	34 PAH	17 PAH	Total Metals	TOC	Black Carbon	PCB	Nutrients/TPH	AVS/SEM	Dioxin/Furan	Cyanide	Grain Size/Atterberg Limits		
231	WM-61-4	151	2.5	3.0	03/21/11	13:00			X		X		X								X	X	X	X						03/08/11	03/24/11
231A	Field Dup (WM-61-1)				03/21/11	13:00						X																			
232	WM-62-1	150	0.0	0.5	03/21/11	14:45			X		X									X		X	X	X							03/09/11	03/24/11
233	WM-62-2	150	0.5	1.0	03/21/11	14:45			X		X										X	X	X	X							03/09/11	03/24/11
234	WM-62-3	150	1.0	1.5	03/21/11	14:45			X		X										X	X	X	X							03/09/11	03/24/11
235	WM-62-4	150	1.5	2.0	03/21/11	14:45			X		X										X	X	X	X							03/09/11	03/24/11
236	WM-63-1	175	0.0	0.5	03/21/11	16:15			X		X									X		X	X	X							03/09/11	03/24/11
237	WM-63-2	175	0.5	1.0	03/21/11	16:15			X		X										X	X	X	X							03/09/11	03/24/11
238	WM-63-3	175	1.0	1.5	03/21/11	16:15			X		X										X	X	X	X							03/09/11	03/24/11
239	WM-63-4	175	1.8	2.2	03/21/11	16:15			X		X										X	X	X	X							03/09/11	03/24/11
240	WM-65-1	177	0.0	0.5	03/21/11	17:00			X		X									X		X	X	X							03/09/11	03/24/11
241	WM-65-2	177	1.0	1.5	03/21/11	17:00			X		X										X	X	X	X							03/09/11	03/24/11
242	WM-65-3	177	2.0	2.5	03/21/11	17:00			X		X										X	X	X	X							03/09/11	03/24/11
243	WM-65-4	177	3.0	3.5	03/21/11	17:00			X		X										X	X	X	X							03/09/11	03/24/11
244	WM-66-1	179	0.0	0.5	03/22/11	9:30			X		X									X		X	X	X							03/09/11	03/24/11
245	WM-66-2	179	1.0	1.5	03/22/11	9:30			X		X										X	X	X	X							03/09/11	03/24/11
246	WM-66-3	179	2.0	2.5	03/22/11	9:30			X		X										X	X	X	X							03/09/11	03/24/11
247	WM-66-4	179	3.0	3.5	03/22/11	9:30			X		X		X								X	X	X	X							03/09/11	03/24/11
247A	Field Dup (WM-66-2)				03/22/11	9:30						X																			
248	WM-67-1	148	0.0	0.5	03/22/11	11:30			X		X									X		X	X	X							03/10/11	03/24/11
249	WM-67-2	148	1.0	1.5	03/22/11	11:30			X		X										X	X	X	X							03/10/11	03/24/11
250	WM-67-3	148	2.5	3.0	03/22/11	11:30			X		X										X	X	X	X							03/10/11	03/24/11
251	WM-67-4	148	3.1	3.5	03/22/11	11:30			X		X										X	X	X	X							03/10/11	03/24/11
252	WM-68-1	147	0.0	0.5	03/23/11	12:00			X		X									X		X	X	X							03/10/11	03/24/11
253	WM-68-2	147	0.5	1.0	03/23/11	12:00			X		X										X	X	X	X							03/10/11	03/24/11
254	WM-68-3	147	1.0	1.4	03/23/11	12:00			X		X										X	X	X	X							03/10/11	03/24/11
255	WM-69-1	149	0.0	0.5	03/23/11	13:15			X		X									X		X	X	X							03/10/11	03/24/11
256	WM-69-2	149	0.5	1.0	03/23/11	13:15			X		X										X	X	X	X							03/10/11	03/24/11

Table 3
Summary of Analysis
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

Barr Engineering Company
Field Log Data Sheet
Sediment Samples

Client: U. S. Steel

Location: Duluth, MN (Morgan Park)

Project #: 23/69 1125 300 001

Project Name: Spirit Lake

	Sample Identification	Sample Location ID	Sample Collection Interval (ft)		Sample Collection		Matrix			Type				Number of Containers/ Analysis																Core Collection Date	Sample Ship Date
			Begin	End	Date	Time	Soil	Sludge	Sediment	Grab	Comp.	Field Dup	MS/MSD	2 oz. Pres.	2 oz. Unpres.	4 oz. Unpres.	8 oz. Unpres.	Moisture-plastic vial etc.	Other:	34 PAH	17 PAH	Total Metals	TOC	Black Carbon	PCB	Nutrients/TPH	AVS/SEM	Dioxin/Furan	Cyanide	Grain Size/Atterberg Limits		
257	WM-69-3	149	1.0	1.5	03/23/11	13:15			X		X										X	X	X	X							03/10/11	03/24/11
258	WM-69-4	149	1.5	2.0	03/23/11	13:15			X		X										X	X	X	X							03/10/11	03/24/11
259	WM-70-1	180	0.0	0.5	03/23/11	15:00			X		X									X		X	X	X							03/10/11	03/24/11
260	WM-70-2	180	2.0	2.5	03/23/11	15:00			X		X										X	X	X	X							03/10/11	03/24/11
261	WM-70-3	180	2.5	3.0	03/23/11	15:00			X		X										X	X	X	X							03/10/11	03/24/11
262	WM-70-4	180	3.0	3.5	03/23/11	15:00			X		X		X								X	X	X	X							03/10/11	03/24/11
262A	Field Dup (WM-70-2)				03/23/11	15:00						X																				
263	WM-71-1	141	0.0	0.5	03/23/11	17:30			X		X									X		X	X	X							03/10/11	03/24/11
264	WM-71-2	141	1.0	1.5	03/23/11	17:30			X		X										X	X	X	X							03/10/11	03/24/11
265	WM-71-3	141	2.0	2.5	03/23/11	17:30			X		X										X	X	X	X							03/10/11	03/24/11
266	WM-71-4	141	3.0	3.5	03/23/11	17:30			X		X										X	X	X	X							03/10/11	03/24/11
267	WM-72-1	142	0.0	0.5	03/23/11	19:00			X		X									X		X	X	X							03/10/11	03/24/11
268	WM-72-2	142	1.0	1.5	03/23/11	19:00			X		X										X	X	X	X							03/10/11	03/24/11
269	WM-72-3	142	2.0	2.5	03/23/11	19:00			X		X										X	X	X	X							03/10/11	03/24/11
270	WM-72-4	142	3.0	3.5	03/23/11	19:00			X		X										X	X	X	X							03/10/11	03/24/11
271	WM-73-1	134	0.0	0.5	03/24/11	9:30			X		X									X		X	X	X							03/10/11	03/24/11
272	WM-73-2	134	0.5	1.0	03/24/11	9:30			X		X										X	X	X	X							03/10/11	03/24/11
273	WM-73-3	134	1.0	1.5	03/24/11	9:30			X		X										X	X	X	X							03/10/11	03/24/11
274	WM-73-4	134	1.5	2.0	03/24/11	9:30			X		X										X	X	X	X							03/10/11	03/24/11
275	WM-74-1	143	0.0	0.5	03/24/11	12:00			X		X									X		X	X	X							03/11/11	03/24/11
276	WM-74-2	143	2.5	3.0	03/24/11	12:00			X		X										X	X	X	X							03/11/11	03/24/11
277	WM-74-3	143	3.0	3.5	03/24/11	12:00			X		X										X	X	X	X							03/11/11	03/24/11
278	WM-74-4	143	4.0	4.5	03/24/11	12:00			X		X										X	X	X	X							03/11/11	03/24/11
279	UC-75-1	165	0.0	0.5	06/08/11	12:00			X		X									X		X	X	X				X			06/07/11	06/09/11
280	UC-75-2	165	0.5	1.0	06/08/11	12:00			X		X									X		X	X	X				X			06/07/11	06/09/11
281	UC-75-3	165	1.0	1.5	06/08/11	12:00			X		X									X		X	X	X				X			06/07/11	06/09/11
282	UC-75-4	165	1.5	2.0	06/08/11	12:00			X		X									X		X	X	X				X			06/07/11	06/09/11

Table 3
Summary of Analysis
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

Barr Engineering Company
Field Log Data Sheet
Sediment Samples

Client: U. S. Steel

Location: Duluth, MN (Morgan Park)

Project #: 23/69 1125 300 001

Project Name: Spirit Lake

	Sample Identification	Sample Location ID	Sample Collection Interval (ft)		Sample Collection		Matrix			Type				Number of Containers/ Analysis																			Core Collection Date	Sample Ship Date
			Begin	End	Date	Time	Soil	Sludge	Sediment	Grab	Comp.	Field Dup	MS/MSD	2 oz. Pres.	2 oz. Unpres.	4 oz. Unpres.	8 oz. Unpres.	Moisture-plastic vial etc.	Other:	34 PAH	17 PAH	Total Metals	TOC	Black Carbon	PCB	Nutrients/TPH	AVS/SEM	Dioxin/Furan	Cyanide	Grain Size/Atterberg Limits				
283	UC-76-1	167	0.0	0.5	06/08/11	17:00			X		X									X		X	X	X								06/07/11	06/09/11
284	UC-76-2	167	0.5	1.0	06/08/11	17:00			X		X										X	X	X	X								06/07/11	06/09/11
285	UC-76-3	167	1.0	1.5	06/08/11	17:00			X		X										X	X	X	X								06/07/11	06/09/11
286	UC-77-1	168	0.0	0.5	06/09/11	10:00			X		X									X		X	X	X				X				06/07/11	06/09/11
287	UC-77-2	168	0.5	1.0	06/09/11	10:00			X		X									X		X	X	X				X				06/07/11	06/09/11
288	UC-77-3	168	1.0	1.5	06/09/11	10:00			X		X									X		X	X	X				X				06/07/11	06/09/11
289	UC-78-1	171	0.00	0.50	06/09/11	12:30			X		X									X		X	X	X								06/07/11	06/13/11
290	UC-78-2	171	0.5	1.0	06/09/11	12:30			X		X										X	X	X	X								06/07/11	06/13/11
291	UC-78-3	171	1.0	1.7	06/09/11	12:30			X		X										X	X	X	X								06/07/11	06/13/11
292	UC-79-1	172	0.0	0.5	06/09/11	14:00			X		X									X		X	X	X								06/08/11	06/13/11
293	UC-79-2	172	0.5	1.0	06/09/11	14:00			X		X										X	X	X	X								06/08/11	06/13/11
294	UC-80-1	169	0.0	0.5	06/10/11	10:00			X		X									X		X	X	X								06/08/11	06/13/11
295	UC-80-2	169	0.5	1.3	06/10/11	10:00			X		X		X								X	X	X	X								06/08/11	06/13/11
295A	Field Dup (UC-80-1)	169	0.0	0.5	06/10/11	10:00			X		X	X									X	X	X	X								06/08/11	06/13/11
296	UC-81-1	166	0.0	0.5	06/10/11	14:00			X		X									X		X	X	X				X				06/08/11	06/13/11
297	UC-81-2	166	0.5	1.0	06/10/11	14:00			X		X									X		X	X	X				X				06/08/11	06/13/11
298	UC-81-3	166	1.0	1.5	06/10/11	14:00			X		X									X		X	X	X				X				06/08/11	06/13/11
299	UC-82-1	162	0.00	0.50	06/10/11	15:00			X		X									X		X	X	X								06/08/11	06/15/11
300	UC-82-2	162	1.00	1.50	06/10/11	15:00			X		X										X	X	X	X								06/08/11	06/15/11
301	UC-82-3	162	2.0	2.5	06/10/11	15:00			X		X										X	X	X	X								06/08/11	06/15/11
302	UC-82-4	162	2.9	3.4	06/10/11	15:00			X		X										X	X	X	X								06/08/11	06/15/11
303	UC-83-1	163	0.0	0.5	06/13/11	11:00			X		X									X		X	X	X								06/08/11	06/15/11
304	UC-83-2	163	0.5	1.0	06/13/11	11:00			X		X										X	X	X	X								06/08/11	06/15/11
305	UC-83-3	163	1.0	1.5	06/13/11	11:00			X		X										X	X	X	X								06/08/11	06/15/11
306	UC-83-4	163	2.0	2.5	06/13/11	11:00			X		X										X	X	X	X								06/08/11	06/15/11

Table 3
Summary of Analysis
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

Barr Engineering Company
Field Log Data Sheet
Sediment Samples

Client: U. S. Steel

Location: Duluth, MN (Morgan Park)

Project #: 23/69 1125 300 001

Project Name: Spirit Lake

	Sample Identification	Sample Location ID	Sample Collection Interval (ft)		Sample Collection		Matrix			Type				Number of Containers/ Analysis																			Core Collection Date	Sample Ship Date
			Begin	End	Date	Time	Soil	Sludge	Sediment	Grab	Comp.	Field Dup	MS/MSD	2 oz. Pres.	2 oz. Unpres.	4 oz. Unpres.	8 oz. Unpres.	Moisture-plastic vial etc.	Other:	34 PAH	17 PAH	Total Metals	TOC	Black Carbon	PCB	Nutrients/TPH	AVS/SEM	Dioxin/Furan	Cyanide	Grain Size/Atterberg Limits				
307	WM-84-1	183	0.0	0.50	06/13/11	14:00			X		X		X							X		X	X	X				X				06/09/11	06/15/11
308	WM-84-2	183	0.50	1.00	06/13/11	14:00			X		X									X		X	X	X				X				06/09/11	06/15/11
309	WM-84-3	183	1.0	1.5	06/13/11	14:00			X		X									X		X	X	X				X				06/09/11	06/15/11
309A	Field Dup (WM-84-2)	183	0.5	1.0	06/13/11	14:00			X		X	X								X		X	X	X				X				06/09/11	06/15/11
310	WM-85-1	157	0.0	0.5	06/13/11	16:16			X		X									X		X	X	X								06/09/11	06/15/11
311	WM-85-2	157	1.0	1.5	06/13/11	16:16			X		X										X	X	X	X								06/09/11	06/15/11
312	WM-85-3	157	2.0	2.5	06/13/11	16:16			X		X										X	X	X	X								06/09/11	06/15/11
313	WM-85-4	157	2.9	3.4	06/13/11	16:16			X		X										X	X	X	X								06/09/11	06/15/11
314	WM-86-1	201	0.0	0.5	06/15/11	10:00			X		X									X		X	X	X								06/14/11	06/15/11
315	WM-86-2	201	0.5	1.0	06/15/11	10:00			X		X										X	X	X	X								06/14/11	06/15/11
316	WM-86-3	201	1.0	1.5	06/15/11	10:00			X		X										X	X	X	X								06/14/11	06/15/11
317	WM-87-1	202	0.0	0.5	06/15/11	11:00			X		X									X		X	X	X								06/14/11	06/15/11
318	WM-87-2	202	0.5	1.0	06/15/11	11:00			X		X										X	X	X	X								06/14/11	06/15/11

Table 3A
Summary of Analysis
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

Barr Engineering Company

Field Log Data Sheet

Sediment Samples

Client: U. S. Steel

Location: Duluth, MN (Morgan Park)

Project #: 23/69 1125 300 001

Project Name: Spirit Lake

	Sample Identification	Sample Location ID	Sample Collection Interval (ft)		Sample Collection		Matrix				Type				Analysis															Core Collection Date	Sample Ship Date
			Begin	End	Date	Time	Water	Soil	Sludge	Sediment	Grab	Comp.	Field Dup	MS/MSD	34 PAH	17 PAH	Total Metals	TOC	Black Carbon	Dioxin/Furan	Salinity, pH, Org. Content	Bulk Density	Triaxial Compression/Ext.	Grain Size	Atterberg Limits	Dry Weight	Suspended Sediment Conc. (SSC)	Zeta Potential		
1	UC-96-ST-1	305	5.0	7.5	11/01/11	14:00				X	X											X	X	X	X					
2	UC-96-ST-2	305	17.5	20.0	11/01/11	10:30				X	X											X	X	X	X					
3	UC-96-ST-3	305	22.5	25.0	11/01/11	11:45				X	X											X	X	X	X					
4	UC-94-ST-1	304	10.5	13.0	11/08/11	14:15				X	X											X	X	X	X					
5	WM-100-ST-1	311	3.0	5.5	11/09/11	11:45				X	X											X	X	X	X					
6	WM-100-ST-2	311	12.0	14.5	11/09/11	13:45				X	X											X	X	X	X					
7	WM-100-ST-3	311	34.0	36.5	11/09/11	10:30				X	X											X	X	X	X					
8	WM-101-ST-1	314	27.5	30.0	11/10/11	15:10				X	X											X	X	X	X					
9	UC-501-1	501	0	1	11/02/11	9:30				X	X										X	X		X	X			X		
10	UC-502-1	502	0	1	11/01/11	13:30				X	X										X	X		X	X			X		
11	UC-504-1	504	0	1	11/01/11	14:00				X	X										X	X		X	X			X		
12	WM-509-1	509	0	1	11/02/11	10:15				X	X										X	X		X	X			X		
13	WM-510-1	510	0	1	11/02/11	11:00				X	X										X	X		X	X			X		
14	WM-512-1	512	0	1	11/03/11	8:40				X	X										X	X		X	X			X		
15	WM-515-1	515	0	1	11/03/11	9:20				X	X										X	X		X	X			X		
16	WM-516-1	516	0	1	11/02/11	14:10				X	X										X	X		X	X			X		
17	WM-517-1	517	0	1	11/02/11	17:00				X	X										X	X		X	X			X		
18	UC-96-1	305	0.0	0.5	11/01/11	10:05				X	X				X		X	X	X										10/31/11	11/02/11
19	UC-96-2	305	5.0	7.5	11/02/11	9:27				X	X					X	X	X	X										11/01/11	11/02/11
20	UC-96-3	305	7.5	10.0	11/02/11	9:27				X	X					X	X	X	X										11/01/11	11/02/11
21	UC-96-4	305	10.0	12.5	11/02/11	9:27				X	X					X	X	X	X					X	X				11/01/11	11/02/11

Table 3A
Summary of Analysis
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

Barr Engineering Company

Field Log Data Sheet

Sediment Samples

Client: U. S. Steel

Location: Duluth, MN (Morgan Park)

Project #: 23/69 1125 300 001

Project Name: Spirit Lake

	Sample Identification	Sample Location ID	Sample Collection Interval (ft)		Sample Collection		Matrix				Type				Analysis																Core Collection Date	Sample Ship Date
			Begin	End	Date	Time	Water	Soil	Sludge	Sediment	Grab	Comp.	Field Dup	MS/MSD	34 PAH	17 PAH	Total Metals	TOC	Black Carbon	Dioxin/Furan	Salinity, pH, Org. Content	Bulk Density	Triaxial Compression/Ext.	Grain Size	Atterberg Limits	Dry Weight	Suspended Sediment Conc. (SSC)	Zeta Potential		
22	UC-97-1	309	0	0.5	11/02/11	16:00				X	X				X		X	X	X										11/01/11	11/02/11
23	UC-97-2	309	5.00	7.50	11/02/11	16:00				X	X				X		X	X	X										11/01/11	11/02/11
24	UC-97-3	309	7.5	10.0	11/02/11	16:00				X	X				X		X	X	X										11/01/11	11/02/11
25	UC-97-4	309	15.0	17.5	11/02/11	16:00				X	X				X		X	X	X										11/01/11	11/02/11
26	WM-101-1	314	0.0	1.0	11/16/11	15:10				X	X				X		X	X	X											11/17/11
27	WM-101-2	314	5.0	7.5	11/16/11	15:10				X	X				X		X	X	X											11/17/11
28	WM-101-3	314	15.0	17.5	11/16/11	15:11				X	X				X		X	X	X											11/17/11
29	WM-101-4	314	20.0	22.5	11/16/11	15:11				X	X				X		X	X	X											11/17/11
30	WM-102-1	315	0.0	2.5	11/16/11	16:22				X	X				X		X	X	X											11/17/11
31	WM-102-2	315	2.5	5.0	11/16/11	16:23				X	X		X	X		X	X	X	X											11/17/11
32	WM-102-3	315	15.0	17.5	11/16/11	16:23				X	X					X	X	X	X											11/17/11
32A	Field Dup (WM-102-3)	315	15.0	17.5	11/16/11	16:23				X	X		X			X	X													11/17/11
33	WM-102-4	315	27.5	30.0	11/16/11	16:23				X	X					X	X	X	X											11/17/11
34	WM-88-1	312	0.0	0.5	11/15/11	11:43				X	X				X		X	X	X	X									11/09/11	11/17/11
35	WM-88-2	312	2.0	2.5	11/15/11	11:43				X	X				X		X	X	X											11/17/11
35A	Field Dup (WM-88-2)	312	2.0	2.5	11/15/11	11:43				X	X		X		X		X													11/17/11
36	WM-88-3	312	3.25	3.75	11/15/11	11:43				X	X			X	X		X	X	X											11/17/11
37	WM-88-4	312	4.0	4.5	11/15/11	11:44				X	X				X		X	X	X											11/17/11
38	WM-89-1	313	0.0	0.5	11/15/11	15:34				X	X				X		X	X	X											11/17/11
39	WM-89-2	313	2.0	2.5	11/15/11	15:34				X	X					X	X	X	X											11/17/11
40	WM-89-3	313	3.5	4.0	11/15/11	15:35				X	X					X	X	X	X											11/17/11

Table 3A
Summary of Analysis
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

Barr Engineering Company

Field Log Data Sheet

Sediment Samples

Client: U. S. Steel

Location: Duluth, MN (Morgan Park)

Project #: 23/69 1125 300 001

Project Name: Spirit Lake

	Sample Identification	Sample Location ID	Sample Collection Interval (ft)		Sample Collection		Matrix				Type				Analysis															Core Collection Date	Sample Ship Date
			Begin	End	Date	Time	Water	Soil	Sludge	Sediment	Grab	Comp.	Field Dup	MS/MSD	34 PAH	17 PAH	Total Metals	TOC	Black Carbon	Dioxin/Furan	Salinity, pH, Org. Content	Bulk Density	Triaxial Compression/Ext.	Grain Size	Atterberg Limits	Dry Weight	Suspended Sediment Conc. (SSC)	Zeta Potential		
41	WM-89-4	313	5.0	5.5	11/15/11	15:35				X	X					X	X	X	X											11/17/11
42	UC-90-1	302	0.0	0.5	11/16/11	9:19				X	X				X		X	X	X	X											11/17/11
43	UC-90-2	302	0.5	1.0	11/16/11	9:19				X	X				X	X	X	X	X													11/17/11
44	UC-90-3	302	2.0	2.5	11/16/11	9:20				X	X				X	X	X	X	X													11/17/11
45	UC-90-4	302	3.0	3.5	11/16/11	9:28				X	X				X	X	X	X	X													11/17/11
46	UC-91-1	308	0.0	0.5	11/16/11	13:06				X	X				X		X	X	X													11/17/11
47	UC-91-2	308	2.5	3.0	11/16/11	13:07				X	X					X	X	X	X													11/17/11
48	UC-91-3	308	4.0	4.5	11/16/11	13:07				X	X					X	X	X	X													11/17/11
49	UC-91-4	308	5.0	5.5	11/16/11	13:07				X	X					X	X	X	X													11/17/11
50	DR1-2	702	0.0	5.2	11/15/11	10:50	X				X																X				
51	DR1-3	703	0.0	20.5	11/16/11	10:45	X				X																X				
52	DR1-4	704	0.0	10.9	11/16/11	12:57	X				X																X				
53	DR1-4	704	10.9	10.9	11/16/11	12:57		X			X													X		X					
54	DR1-5	705	0.0	16.3	11/16/11	14:58	X				X																X				
55	DR1-5	705	16.3	16.3	11/16/11	14:58		X			X													X		X					
56	DR1-6	706	0.0	9.0	11/17/11	8:47	X				X																X				
57	DR1-7	707	0.0	6.1	11/17/11	9:48	X				X																X				
58	DR1-7	707	6.1	6.1	11/17/11	9:48		X			X													X		X					
59	UR-1	901	0.0	1.9	11/17/11	12:49	X				X																X				
60	UR-1	901	1.9	1.9	11/17/11	12:49		X			X													X		X					
61	UR-2	902	0.0	10.6	11/17/11	13:38	X				X																X				

Table 3A
Summary of Analysis
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

Barr Engineering Company

Field Log Data Sheet

Sediment Samples

Client: U. S. Steel

Location: Duluth, MN (Morgan Park)

Project #: 23/69 1125 300 001

Project Name: Spirit Lake

	Sample Identification	Sample Location ID	Sample Collection Interval (ft)		Sample Collection		Matrix				Type				Analysis															Core Collection Date	Sample Ship Date
			Begin	End	Date	Time	Water	Soil	Sludge	Sediment	Grab	Comp.	Field Dup	MS/MSD	34 PAH	17 PAH	Total Metals	TOC	Black Carbon	Dioxin/Furan	Salinity, pH, Org. Content	Bulk Density	Triaxial Compression/Ext.	Grain Size	Atterberg Limits	Dry Weight	Suspended Sediment Conc. (SSC)	Zeta Potential		
62	UR-2	902	10.6	10.6	11/17/11	13:38		X			X													X		X				
63	UR-3	903	0.0	11.0	11/18/11	8:09	X				X																X			
64	UR-3	903	11.0	11.0	11/18/11	8:09		X			X													X		X				
65	UR-4	904	0.0	11.0	11/17/11	14:31	X				X																X			
66	UR-4	904	11.0	11.0	11/17/11	14:31		X			X													X		X				
67	UR-5	905	0.0	13.1	11/17/11	15:24	X				X																X			
68	UR-5	905	13.1	13.1	11/17/11	15:24		X			X													X		X				
69	UR-6	906	0.0	2.9	11/18/11	9:03	X				X																X			
70	UR-6	906	2.9	2.9	11/18/11	9:03		X			X													X		X				
71	DR2-1	801	0.0	7.4	11/18/11	12:00	X				X																X			
72	DR2-1	801	7.4	7.4	11/18/11	12:00		X			X													X		X				
73	DR2-2	802	0.0	24.5	11/18/11	10:01	X				X																X			
74	DR2-2	802	24.5	24.5	11/18/11	10:01		X			X													X		X				
75	DR2-3	803	0.0	16.7	11/18/11	11:05	X				X																X			
76	DR2-3	803	16.7	16.7	11/18/11	11:05		X			X													X		X				
77	UC-601	601	0.0	0.4	11/14/11	14:00	X				X																X			
78	UC-601	601	0.4	0.4	11/14/11	14:00		X			X													X		X				
79	UC-602	602	0.0	0.6	11/14/11	14:45	X				X																X			
80	UC-602	602	0.6	0.6	11/14/11	14:45		X			X													X		X				
81	UC-603	603	0.0	1.0	11/14/11	15:30	X				X																X			
82	UC-603	603	1.0	1.0	11/14/11	15:30		X			X													X		X				

Table 3A
Summary of Analysis
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

Barr Engineering Company

Field Log Data Sheet

Sediment Samples

Client: U. S. Steel

Location: Duluth, MN (Morgan Park)

Project #: 23/69 1125 300 001

Project Name: Spirit Lake

Sample Identification	Sample Location ID	Sample Collection Interval (ft)		Sample Collection		Matrix				Type				Analysis														Core Collection Date	Sample Ship Date
		Begin	End	Date	Time	Water	Soil	Sludge	Sediment	Grab	Comp.	Field Dup	MS/MSD	34 PAH	17 PAH	Total Metals	TOC	Black Carbon	Dioxin/Furan	Salinity, pH, Org. Content	Bulk Density	Triaxial Compression/Ext.	Grain Size	Atterberg Limits	Dry Weight	Suspended Sediment Conc. (SSC)	Zeta Potential		

UC=Unnamed Creek DR=Down River

WM = Wire Mill UR = Up River SS= Suspended Sediment Concentration

ST=Shelby Tube BL= Bed Load XX Samples were originally requested to be analyzed for only 17 PAHs, but EPA analyzed these samples for the 34 PAHs (extended).

Table 4
Summary of PAHs Measured for Three Different PAH Summing Protocols
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

List Name	MPCA-13 PAH	EPA-(16-17) PAH[1]	EPA-34 PAH
List Source	**MPCA-2007**	**USEPA-2003**	**USEPA-2003**
Acenaphthene	x	x	x
Acenaphthylene	x	x	x
Anthracene	x	x	x
Benzo(a)anthracene	x	x	x
Benzo(a)pyrene	x	x	x
Benzo(b)fluoranthene		x	x
Benzo(e)pyrene			x
Benzo(g,h,i)perylene		x	x
Benzo(k)fluoranthene		x	x
Chrysene	x	x	x
Dibenz(a,h)anthracene	x	x	x
2,6-dimethylnaphthalene			x
Fluoranthene	x	x	x
Fluorene	x	x	x
Indeno(1,2,3-cd)pyrene		x	x
2-Methylnaphthalene	x	x	x
1-Methylnaphthalene			x
Naphthalene	x	x	x
Perylene			x
Phenanthrene	x	x	x
1-methylphenanthrene			x
2,3,5-trimethylnaphthalene			x
Pyrene	x	x	x
C1-Chrysenes			x
C1-Fluoranthenes/Pyrenes			x
C1-Fluorenes			x
C1-Naphthalenes			x
C1-Phenanthrenes/Anthracenes			x
C2-Chrysenes			x
C2-Fluorenes			x
C2-Naphthalenes			x
C2-Phenanthrenes/Anthracenes			x
C3-Chrysenes			x
C3-Fluorenes			x
C3-Naphthalenes			x
C3-Phenanthrenes/Anthracenes			x
C4-Chrysenes			x
C4-Napthalenes			x
C4-Phenanthrenes/Anthracenes			x
Total Number of PAHs	**13**	**17**	**34**

[1]Benzo(b)fluoranthene and benzo(k)fluoranthene are commonly reported as their sum because of insufficient chromatographic separation.

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

					Sys Loc Code	**WM-1**	**WM-1**	**WM-1**	**WM-1**	**WM-2**	**WM-2**	**WM-2**	**WM-3**	**WM-3**
					Sample Date	**2/17/2011**	**2/17/2011**	**2/17/2011**	**2/17/2011**	**2/19/2011**	**2/19/2011**	**2/19/2011**	**2/20/2011**	**2/20/2011**
					Depth Interval	**0 - 0.7 ft**	**0.7 - 1.9 ft**	**1.9 - 2.1 ft**	**2.5 - 3 ft**	**0 - 0.5 ft**	**1.2 - 1.4 ft**	**1.4 - 1.9 ft**	**0 - 1 ft**	**2 - 4 ft**
					Sys Sample Code	**WM-1-1_0.0-0.7_02172011**	**WM-1-2_0.7-1.9_02172011**	**WM-1-3_1.9-2.1_02172011**	**WM-1-4_2.5-3.0_02172011**	**WM-2-1_0.0-0.5_02192011**	**WM-2-2_1.2-1.4_02192011**	**WM-2-3_1.4-1.9_02192011**	**WM-3-1_0.0-1.0_02202011**	**WM-3-2_2.0-4.0_02202011**
					Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II										
Effective Date			2/1/2007	2/1/2007										
Exceedance Key			**Bold**	Underline										
SVOCs														
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg		< 0.0054 mg/kg	< 0.0052 mg/kg	**4.1 mg/kg**	0.0065 j mg/kg	< 0.0044 mg/kg	**0.42 mg/kg**	**0.025 mg/kg**	< 0.0070 mg/kg	< 0.0049 mg/kg
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg		< 0.0054 mg/kg	< 0.0052 mg/kg	**0.65 mg/kg**	< 0.0049 mg/kg	< 0.0044 mg/kg	**0.31 mg/kg**	< 0.0053 mg/kg	< 0.0070 mg/kg	< 0.0049 mg/kg
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg		< 0.0054 mg/kg	0.0035 j mg/kg	**29 mg/kg**	0.028 mg/kg	0.0041 j mg/kg	**4.1 mg/kg**	0.032 mg/kg	< 0.0070 mg/kg	< 0.0049 mg/kg
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg		0.0091 mg/kg	0.014 mg/kg	**40 mg/kg**	0.046 mg/kg	0.013 mg/kg	**9.6 mg/kg**	0.058 j mg/kg	0.0049 j mg/kg	0.0029 j mg/kg
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg		0.0073 mg/kg	0.011 mg/kg	**29 mg/kg**	0.026 mg/kg	0.0098 mg/kg	**8.4 mg/kg**	0.04 mg/kg	< 0.0070 mg/kg	< 0.0049 mg/kg
Benzo(b)fluoranthene	NA	Lab				0.0065 mg/kg	0.0071 mg/kg	25 mg/kg	0.019 mg/kg	0.0062 mg/kg	6.6 mg/kg	0.046 mg/kg	< 0.0070 mg/kg	< 0.0049 mg/kg
Benzo(g,h,i)perylene	NA	Lab				0.0046 j mg/kg	0.0083 mg/kg	17 mg/kg	0.014 mg/kg	0.0065 mg/kg	5.3 mg/kg	0.023 j mg/kg	< 0.0070 mg/kg	< 0.0049 mg/kg
Benzo(k)fluoranthene	NA	Lab				0.0050 j mg/kg	0.0055 mg/kg	34 mg/kg	0.024 mg/kg	0.0079 mg/kg	8.5 mg/kg	0.028 mg/kg	< 0.0070 mg/kg	< 0.0049 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg		0.0066 mg/kg	0.0096 mg/kg	**30 mg/kg**	0.025 mg/kg	0.0085 mg/kg	**7.2 mg/kg**	0.026 mg/kg	< 0.0070 mg/kg	< 0.0049 mg/kg
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg		< 0.0054 mg/kg	< 0.0052 mg/kg	**5.3 mg/kg**	0.0046 j mg/kg	< 0.0044 mg/kg	**1.5 mg/kg**	0.011 mg/kg	< 0.0070 mg/kg	< 0.0049 mg/kg
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg		0.019 mg/kg	0.022 mg/kg	**78 mg/kg**	0.088 j mg/kg	0.022 mg/kg	**26 mg/kg**	0.22 j mg/kg	0.0096 mg/kg	0.0069 mg/kg
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg		< 0.0054 mg/kg	< 0.0052 mg/kg	**7.3 mg/kg**	0.0080 mg/kg	< 0.0044 mg/kg	**1.2 mg/kg**	0.042 mg/kg	< 0.0070 mg/kg	< 0.0049 mg/kg
Indeno(1,2,3-cd)pyrene	NA	Lab				< 0.0054 mg/kg	0.0062 mg/kg	22 mg/kg	0.018 mg/kg	0.0066 mg/kg	5.8 mg/kg	0.027 mg/kg	< 0.0070 mg/kg	< 0.0049 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg		< 0.0054 mg/kg	< 0.0052 mg/kg	**0.18 mg/kg**	< 0.0049 mg/kg	< 0.0044 mg/kg	**0.036 mg/kg**	< 0.0053 mg/kg	< 0.0070 mg/kg	< 0.0049 mg/kg
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg		0.0033 j mg/kg	0.0032 j mg/kg	**0.3 mg/kg**	0.0026 j mg/kg	0.0030 j mg/kg	0.071 mg/kg	0.0054 mg/kg	0.0040 j mg/kg	0.0027 j mg/kg
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg		0.0073 mg/kg	< 0.0052 mg/kg	**25 mg/kg**	0.023 mg/kg	0.0097 mg/kg	**4.9 mg/kg**	0.087 mg/kg	0.0092 mg/kg	0.0070 mg/kg
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg		0.011 j mg/kg	0.015 j mg/kg	**46 mg/kg**	0.053 j mg/kg	0.013 j mg/kg	**16 mg/kg**	0.11 j mg/kg	0.0064 j mg/kg	0.0041 j mg/kg
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg		0.0798 a mg/kg	0.0939 a mg/kg	**295 mg/kg**	0.316 a mg/kg	0.0941 a mg/kg	**79.7 mg/kg**	0.662 a mg/kg	0.0621 a mg/kg	0.0432 a mg/kg
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg		0.00347 mg/kg	0.00408 mg/kg	**12.8 mg/kg**	0.0137 mg/kg	0.00409 mg/kg	**3.47 mg/kg**	0.0288 mg/kg	0.0027 mg/kg	0.00188 mg/kg
1-Methylnaphthalene	NA	Lab				< 0.0054 mg/kg	< 0.0052 mg/kg	0.41 mg/kg	< 0.0049 mg/kg	< 0.0044 mg/kg	--	--	< 0.0070 mg/kg	< 0.0049 mg/kg
Benzo(e)pyrene	NA	Lab				0.0059 mg/kg	0.0074 mg/kg	41 j mg/kg	0.038 mg/kg	0.0057 mg/kg	--	--	< 0.0070 mg/kg	< 0.0049 mg/kg
Perylene	NA	Lab				0.022 mg/kg	0.019 mg/kg	6.5 j mg/kg	0.019 mg/kg	0.024 mg/kg	--	--	0.04 mg/kg	0.044 mg/kg
C1-Chrysenes	NA	Lab				0.0079 X mg/kg	0.0096 X mg/kg	12 X mg/kg	0.013 X mg/kg	< 0.0044 X mg/kg	--	--	< 0.0070 X mg/kg	< 0.0049 X mg/kg
C1-Fluoranthenes/Pyrenes	NA	Lab				< 0.0054 X mg/kg	0.014 X mg/kg	270 X mg/kg	0.044 X mg/kg	0.013 X mg/kg	--	--	0.0056 X mg/kg	0.0044 X mg/kg
C1-Fluorenes	NA	Lab				0.0093 X mg/kg	0.0083 X mg/kg	22 X mg/kg	0.01 X mg/kg	0.0028 X mg/kg	--	--	0.012 X mg/kg	0.0085 X mg/kg
C1-Naphthalenes	NA	Lab				< 0.0054 X mg/kg	< 0.0052 X mg/kg	0.42 X mg/kg	< 0.0049 X mg/kg	< 0.0044 X mg/kg	--	--	< 0.0070 X mg/kg	< 0.0049 X mg/kg
C1-Phenanthrenes/Anthracenes	NA	Lab				0.015 X mg/kg	0.0081 X mg/kg	64 X mg/kg	0.021 X mg/kg	0.0067 X mg/kg	--	--	0.0041 X mg/kg	0.0029 X mg/kg
C2-Chrysenes	NA	Lab				< 0.0054 X mg/kg	0.011 X mg/kg	7.3 X mg/kg	0.014 X mg/kg	< 0.0044 X mg/kg	--	--	< 0.0070 X mg/kg	< 0.0049 X mg/kg
C2-Fluorenes	NA	Lab				< 0.0054 X mg/kg	< 0.0052 X mg/kg	23 X mg/kg	0.0089 X mg/kg	< 0.0044 X mg/kg	--	--	0.0062 X mg/kg	0.0049 X mg/kg
C2-Naphthalenes	NA	Lab				0.0038 X mg/kg	< 0.0052 X mg/kg	4.9 X mg/kg	0.0039 X mg/kg	< 0.0044 X mg/kg	--	--	< 0.0070 X mg/kg	< 0.0049 X mg/kg
C2-Phenanthrenes/Anthracenes	NA	Lab				0.028 X mg/kg	0.0068 X mg/kg	44 X mg/kg	0.012 X mg/kg	0.0055 X mg/kg	--	--	0.0039 X mg/kg	< 0.0049 X mg/kg
C3-Chrysenes	NA	Lab				< 0.0054 X mg/kg	0.036 X mg/kg	3.5 X mg/kg	< 0.0049 X mg/kg	< 0.0044 X mg/kg	--	--	< 0.0070 X mg/kg	< 0.0049 X mg/kg
C3-Fluorenes	NA	Lab				< 0.0054 X mg/kg	< 0.0052 X mg/kg	16 X mg/kg	0.0074 X mg/kg	< 0.0044 X mg/kg	--	--	< 0.0070 X mg/kg	< 0.0049 X mg/kg
C3-Naphthalenes	NA	Lab				0.0031 X mg/kg	0.0035 X mg/kg	7.8 X mg/kg	0.0042 X mg/kg	0.0024 X mg/kg	--	--	< 0.0070 X mg/kg	< 0.0049 X mg/kg
C3-Phenanthrenes/Anthracenes	NA	Lab				0.064 X mg/kg	0.011 X mg/kg	39 X mg/kg	0.0069 X mg/kg	0.0058 X mg/kg	--	--	0.0041 X mg/kg	< 0.0049 X mg/kg
C4-Chrysenes	NA	Lab				< 0.0054 X mg/kg	0.032 X mg/kg	1.1 X mg/kg	< 0.0049 X mg/kg	< 0.0044 X mg/kg	--	--	< 0.0070 X mg/kg	< 0.0049 X mg/kg
C4-Napthalenes	NA	Lab				< 0.0054 X mg/kg	< 0.0052 X mg/kg	5.1 X mg/kg	< 0.0049 X mg/kg	< 0.0044 X mg/kg	--	--	< 0.0070 X mg/kg	< 0.0049 X mg/kg
C4-Phenanthrenes/Anthracenes	NA	Lab				0.16 X mg/kg	0.01 X mg/kg	26 X mg/kg	< 0.0049 X mg/kg	< 0.0044 X mg/kg	--	--	< 0.0070 X mg/kg	< 0.0049 X mg/kg
Sum of ESBPAH17@ 0.5DL	NA	Lab				0.099 mg/kg	0.121 mg/kg	393 mg/kg	0.391 a mg/kg	0.121 a mg/kg	106 mg/kg	0.786 a mg/kg	0.076 a mg/kg	0.054 a mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab				0.004 tu	0.010 tu	5 tu	0.018 a tu	0.011 a tu	2.8 tu	0.115 a tu	0.002 a tu	0.003 a tu
Sum of ESBPAH34@ 0.5DL	NA	Lab				0.437 a mg/kg	0.308 a mg/kg	986 a mg/kg	0.603 a mg/kg	0.207 a mg/kg	--	--	0.187 a mg/kg	0.147 a mg/kg
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [1]			0.016 a tu	0.022 a tu	**12.7 a tu**	0.027 a tu	0.0182 a tu	--	--	0.0052 a tu	0.0081 a tu
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [1]			--	--	--	--	--	**5.04 a tu**	0.454 a tu	--	--

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

					Sys Loc Code	**WM-3**	**WM-3**	**WM-4**	**WM-4**	**WM-5**	**WM-5**	**WM-6**		**WM-6**
					Sample Date	**2/20/2011**	**2/20/2011**	**2/21/2011**	**2/21/2011**	**2/22/2011**	**2/22/2011**	**2/22/2011**		**2/22/2011**
					Depth Interval	**4.2 - 4.75 ft**	**4.75 - 5.25 ft**	**0 - 0.5 ft**	**0.5 - 1 ft**	**0 - 0.5 ft**	**1 - 1.5 ft**	**0 - 1 ft**	**0 - 1 ft**	**1.4 - 1.8 ft**
					Sys Sample Code	**WM-3-3_4.2-4.75_02202011**	**WM-3-4_4.75-5.25_02202011**	**WM-4-1_0.0-0.5_02212011**	**WM-4-2_0.5-1.0_02212011**	**WM-5-1_0.0-0.5_02222011**	**WM-5-2_1.0-1.5_02222011**	**WM-6-1_0.0-1.0_02222011**	**WM-6-1_0.0-1.0_02222011_FD**	**WM-6-2_1.4-1.8_02222011**
					Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**FD**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II										
Effective Date			2/1/2007	2/1/2007										
Exceedance Key			**Bold**	Underline										
SVOCs														
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	< 0.0047 mg/kg	< 0.0042 mg/kg	**0.012 j mg/kg**	**0.046 j mg/kg**	< 0.0063 mg/kg	< 0.016 mg/kg	**0.013 mg/kg**	**0.02 mg/kg**	**0.03 mg/kg**
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	< 0.0047 mg/kg	< 0.0042 mg/kg	**0.061 mg/kg**	**0.093 mg/kg**	< 0.0063 mg/kg	< 0.016 mg/kg	**0.051 mg/kg**	**0.035 mg/kg**	**0.016 j mg/kg**
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	< 0.0047 mg/kg	< 0.0042 mg/kg	**0.11 j mg/kg**	**0.33 mg/kg**	0.0083 mg/kg	0.023 mg/kg	**0.18 mg/kg**	**0.099 mg/kg**	**0.078 mg/kg**
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	0.0034 j mg/kg	< 0.0042 mg/kg	**0.84 mg/kg**	**1.6 mg/kg**	0.033 mg/kg	< 0.016 mg/kg	**0.74 mg/kg**	**0.5 mg/kg**	**0.17 mg/kg**
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	0.041 j mg/kg	< 0.0042 mg/kg	**0.81 mg/kg**	**1.6 mg/kg**	0.036 mg/kg	< 0.016 mg/kg	**0.52 mg/kg**	**0.48 mg/kg**	**0.16 mg/kg**
Benzo(b)fluoranthene	NA	Lab			< 0.0047 mg/kg	< 0.0042 mg/kg	0.7 mg/kg	1.5 mg/kg	0.032 mg/kg	< 0.016 mg/kg	0.62 mg/kg	0.51 mg/kg	0.15 mg/kg
Benzo(g,h,i)perylene	NA	Lab			0.054 j mg/kg	< 0.0042 mg/kg	0.58 mg/kg	1.1 mg/kg	0.02 mg/kg	< 0.016 mg/kg	0.46 j mg/kg	0.21 mg/kg	0.077 mg/kg
Benzo(k)fluoranthene	NA	Lab			0.024 j mg/kg	< 0.0042 mg/kg	0.53 mg/kg	1.7 mg/kg	0.033 mg/kg	< 0.016 mg/kg	0.55 mg/kg	0.46 mg/kg	0.16 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	0.036 j mg/kg	< 0.0042 mg/kg	**0.53 mg/kg**	**1.5 mg/kg**	0.032 mg/kg	< 0.016 mg/kg	**0.68 mg/kg**	**0.48 mg/kg**	**0.32 mg/kg**
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	< 0.0047 mg/kg	< 0.0042 mg/kg	**0.1 j mg/kg**	**0.36 mg/kg**	0.011 mg/kg	< 0.016 mg/kg	**0.27 mg/kg**	**0.12 mg/kg**	**0.037 mg/kg**
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	0.0067 mg/kg	0.0050 mg/kg	**0.77 mg/kg**	**3.2 mg/kg**	0.059 mg/kg	0.046 j mg/kg	**0.71 mg/kg**	**0.55 mg/kg**	**0.43 mg/kg**
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	< 0.0047 mg/kg	< 0.0042 mg/kg	0.037 mg/kg	**0.14 mg/kg**	< 0.0063 mg/kg	0.027 mg/kg	0.047 mg/kg	0.048 mg/kg	0.029 mg/kg
Indeno(1,2,3-cd)pyrene	NA	Lab			0.063 j mg/kg	< 0.0042 mg/kg	0.81 mg/kg	1.2 mg/kg	0.02 mg/kg	< 0.016 mg/kg	0.48 j mg/kg	0.21 mg/kg	0.083 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	< 0.0047 mg/kg	< 0.0042 mg/kg	0.014 mg/kg	**0.051 mg/kg**	< 0.0063 mg/kg	**0.021 mg/kg**	0.015 mg/kg	0.017 mg/kg	0.017 j mg/kg
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	< 0.0047 mg/kg	< 0.0042 mg/kg	0.051 mg/kg	0.12 mg/kg	0.0059 j mg/kg	0.024 mg/kg	0.045 mg/kg	0.05 mg/kg	0.088 mg/kg
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	0.0069 mg/kg	0.0051 mg/kg	0.12 j mg/kg	**0.42 mg/kg**	0.02 mg/kg	0.085 mg/kg	**0.39 mg/kg**	0.16 mg/kg	0.095 mg/kg
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	0.0042 j mg/kg	< 0.0042 mg/kg	**0.59 mg/kg**	**2.3 mg/kg**	0.042 mg/kg	0.043 mg/kg	**0.67 mg/kg**	**0.5 mg/kg**	**0.31 mg/kg**
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	0.115 a mg/kg	0.0332 mg/kg	**4.05 a mg/kg**	**11.8 a mg/kg**	0.26 mg/kg	0.317 a mg/kg	**4.33 mg/kg**	**3.06 mg/kg**	**1.78 a mg/kg**
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	0.00498 mg/kg	0.00144 mg/kg	**0.176 mg/kg**	**0.511 mg/kg**	0.0113 mg/kg	0.0138 mg/kg	**0.188 mg/kg**	**0.133 mg/kg**	0.0774 mg/kg
1-Methylnaphthalene	NA	Lab			< 0.0047 mg/kg	< 0.0042 mg/kg	< 0.0099 mg/kg	0.028 mg/kg	< 0.0063 mg/kg	--	0.0071 j mg/kg	< 0.0097 mg/kg	< 0.017 mg/kg
Benzo(e)pyrene	NA	Lab			0.05 j mg/kg	< 0.0042 mg/kg	0.38 mg/kg	0.72 mg/kg	0.034 mg/kg	--	0.62 mg/kg	0.35 mg/kg	0.13 mg/kg
Perylene	NA	Lab			0.21 mg/kg	0.0090 mg/kg	0.11 j mg/kg	0.37 mg/kg	0.088 mg/kg	--	0.37 mg/kg	0.17 mg/kg	0.078 mg/kg
C1-Chrysenes	NA	Lab			< 0.0047 X mg/kg	< 0.0042 X mg/kg	0.6 X mg/kg	1.6 X mg/kg	< 0.0063 X mg/kg	--	0.39 X mg/kg	0.38 X mg/kg	< 0.017 X mg/kg
C1-Fluoranthenes/Pyrenes	NA	Lab			0.0031 X mg/kg	< 0.0042 X mg/kg	1.1 X mg/kg	3 X mg/kg	0.051 X mg/kg	--	0.64 X mg/kg	0.66 X mg/kg	0.34 X mg/kg
C1-Fluorenes	NA	Lab			0.0072 X mg/kg	0.0047 X mg/kg	0.077 X mg/kg	0.35 X mg/kg	0.0080 X mg/kg	--	0.048 X mg/kg	0.044 X mg/kg	0.056 X mg/kg
C1-Naphthalenes	NA	Lab			< 0.0047 X mg/kg	< 0.0042 X mg/kg	0.014 X mg/kg	0.049 X mg/kg	< 0.0063 X mg/kg	--	0.016 X mg/kg	0.018 X mg/kg	0.017 X mg/kg
C1-Phenanthrenes/Anthracenes	NA	Lab			0.0027 X mg/kg	< 0.0042 X mg/kg	0.23 X mg/kg	0.69 X mg/kg	0.02 X mg/kg	--	0.2 X mg/kg	0.2 X mg/kg	0.22 X mg/kg
C2-Chrysenes	NA	Lab			< 0.0047 X mg/kg	< 0.0042 X mg/kg	0.59 X mg/kg	1.1 X mg/kg	< 0.0063 X mg/kg	--	0.35 X mg/kg	0.29 X mg/kg	< 0.017 X mg/kg
C2-Fluorenes	NA	Lab			0.0072 X mg/kg	< 0.0042 X mg/kg	0.19 X mg/kg	0.23 X mg/kg	< 0.0063 X mg/kg	--	0.064 X mg/kg	0.066 X mg/kg	0.29 X mg/kg
C2-Naphthalenes	NA	Lab			< 0.0047 X mg/kg	< 0.0042 X mg/kg	0.022 X mg/kg	0.09 X mg/kg	0.0084 X mg/kg	--	0.035 X mg/kg	0.028 X mg/kg	0.046 X mg/kg
C2-Phenanthrenes/Anthracenes	NA	Lab			< 0.0047 X mg/kg	< 0.0042 X mg/kg	0.4 X mg/kg	0.69 X mg/kg	0.017 X mg/kg	--	0.21 X mg/kg	0.2 X mg/kg	0.22 X mg/kg
C3-Chrysenes	NA	Lab			< 0.0047 X mg/kg	< 0.0042 X mg/kg	0.64 X mg/kg	0.84 X mg/kg	0.044 X mg/kg	--	0.29 X mg/kg	0.25 X mg/kg	< 0.017 X mg/kg
C3-Fluorenes	NA	Lab			< 0.0047 X mg/kg	< 0.0042 X mg/kg	0.42 X mg/kg	0.33 X mg/kg	< 0.0063 X mg/kg	--	0.094 X mg/kg	0.1 X mg/kg	0.17 X mg/kg
C3-Naphthalenes	NA	Lab			< 0.0047 X mg/kg	< 0.0042 X mg/kg	0.036 X mg/kg	0.15 X mg/kg	0.015 X mg/kg	--	0.047 X mg/kg	0.04 X mg/kg	0.11 X mg/kg
C3-Phenanthrenes/Anthracenes	NA	Lab			< 0.0047 X mg/kg	< 0.0042 X mg/kg	0.96 X mg/kg	0.75 X mg/kg	0.033 X mg/kg	--	0.33 X mg/kg	0.32 X mg/kg	0.33 X mg/kg
C4-Chrysenes	NA	Lab			< 0.0047 X mg/kg	< 0.0042 X mg/kg	0.42 X mg/kg	0.4 X mg/kg	< 0.0063 X mg/kg	--	0.15 X mg/kg	0.12 X mg/kg	< 0.017 X mg/kg
C4-Napthalenes	NA	Lab			< 0.0047 X mg/kg	< 0.0042 X mg/kg	0.072 X mg/kg	0.17 X mg/kg	< 0.0063 X mg/kg	--	0.037 X mg/kg	0.038 X mg/kg	0.098 X mg/kg
C4-Phenanthrenes/Anthracenes	NA	Lab			< 0.0047 X mg/kg	< 0.0042 X mg/kg	0.79 X mg/kg	0.54 X mg/kg	< 0.0063 X mg/kg	--	0.26 X mg/kg	0.23 X mg/kg	0.2 X mg/kg
Sum of ESBPAH17@ 0.5DL	NA	Lab			0.258 a mg/kg	0.042 mg/kg	6.7 a mg/kg	17.3 a mg/kg	0.365 a mg/kg	0.349 a mg/kg	6.4 a mg/kg	4.5 mg/kg	2.3 a mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.016 a tu	0.015 tu	0.065 a BQX tu	0.176 a BQX tu	0.018 a tu	0.014 a tu	0.088 a tu	0.068 tu	0.025 a BQX tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			0.564 a mg/kg	0.087 a mg/kg	13.7 a mg/kg	29.3 a mg/kg	0.705 a mg/kg	--	10.6 a mg/kg	7.94 a mg/kg	4.57 a mg/kg
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		0.034 a tu	0.030 a tu	0.133 a BQX tu	0.296 a BQX tu	0.033 a tu	--	0.141 a tu	0.120 a tu	0.051 a BQX tu
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		--	--	--	--	--	0.281 a tu	--	--	--

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

					Sys Loc Code	**WM-7**	**WM-7**	**WM-8**	**WM-8**	**WM-8**	**WM-9**	**WM-9**	**WM-9**	**WM-9**
					Sample Date	**2/22/2011**	**2/22/2011**	**2/24/2011**	**2/24/2011**	**2/24/2011**	**3/7/2011**	**3/7/2011**	**3/7/2011**	**3/7/2011**
					Depth Interval	**0 - 0.5 ft**	**1.1 - 1.6 ft**	**0 - 0.5 ft**	**0.75 - 1.25 ft**	**1.25 - 1.75 ft**	**0 - 0.5 ft**	**0.5 - 1 ft**	**1.5 - 2 ft**	**2 - 2.5 ft**
					Sys Sample Code	**WM-7-1_0.0-0.5_02222011**	**WM-7-2_1.1-1.6_02222011**	**WM-8-1_0.0-0.5_02242011**	**WM-8-2_0.75-1.25_02242011**	**WM-8-3_1.25-1.75_02242011**	**WM-9-1_0.0-0.5_03072011**	**WM-9-2_0.5-1.0_03072011**	**WM-9-3_1.5-2.0_03072011**	**WM-9-4_2.0-2.5_03072011**
					Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II										
Effective Date			2/1/2007	2/1/2007										
Exceedance Key			**Bold**	Underline										
SVOCs														
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	< 0.0061 mg/kg	**0.06 mg/kg**	< 0.01 mg/kg	**0.052 mg/kg**	< 0.0096 mg/kg	< 0.017 mg/kg	**0.029 mg/kg**	**0.018 mg/kg**	< 0.016 mg/kg
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	< 0.0061 mg/kg	**0.027 mg/kg**	**0.039 mg/kg**	**0.13 mg/kg**	< 0.0096 mg/kg	**0.22 j mg/kg**	**0.23 mg/kg**	**0.11 mg/kg**	< 0.016 mg/kg
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	0.0092 mg/kg	0.053 mg/kg	0.044 mg/kg	**0.53 mg/kg**	< 0.0096 mg/kg	**0.11 mg/kg**	**0.63 mg/kg**	**0.12 mg/kg**	0.04 mg/kg
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	0.058 mg/kg	**0.4 mg/kg**	**0.19 mg/kg**	**1.8 mg/kg**	< 0.0096 mg/kg	**0.91 mg/kg**	**2.5 mg/kg**	**1.2 mg/kg**	**0.18 mg/kg**
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	0.049 mg/kg	**0.33 mg/kg**	**0.19 mg/kg**	**1.7 mg/kg**	< 0.0096 mg/kg	**1 mg/kg**	**2 mg/kg**	**0.69 mg/kg**	**0.24 mg/kg**
Benzo(b)fluoranthene	NA	Lab			0.053 mg/kg	0.22 mg/kg	0.22 mg/kg	1.8 mg/kg	< 0.0096 mg/kg	0.92 mg/kg	1.8 mg/kg	1.3 mg/kg	0.14 mg/kg
Benzo(g,h,i)perylene	NA	Lab			0.022 mg/kg	0.17 mg/kg	0.092 mg/kg	1.1 mg/kg	< 0.0096 mg/kg	0.63 mg/kg	1.4 mg/kg	0.69 j mg/kg	0.1 j mg/kg
Benzo(k)fluoranthene	NA	Lab			0.049 mg/kg	0.16 mg/kg	0.17 mg/kg	1.7 mg/kg	< 0.0096 mg/kg	0.7 mg/kg	1.8 mg/kg	0.92 j mg/kg	0.12 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	0.046 mg/kg	**0.4 mg/kg**	**0.18 mg/kg**	**1.8 mg/kg**	< 0.0096 mg/kg	**0.94 mg/kg**	**2.6 mg/kg**	**0.68 mg/kg**	0.14 mg/kg
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	0.012 mg/kg	**0.073 mg/kg**	**0.052 mg/kg**	**0.39 j mg/kg**	< 0.0096 mg/kg	**0.23 mg/kg**	**0.77 mg/kg**	**0.13 mg/kg**	0.032 mg/kg
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	0.12 mg/kg	**0.6 mg/kg**	0.28 mg/kg	**4.1 mg/kg**	0.019 mg/kg	**1.5 mg/kg**	**3.5 mg/kg**	**1.1 mg/kg**	0.29 mg/kg
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	0.0057 j mg/kg	0.062 mg/kg	0.019 mg/kg	**0.17 mg/kg**	< 0.0096 mg/kg	0.063 mg/kg	**0.13 mg/kg**	0.062 mg/kg	< 0.016 mg/kg
Indeno(1,2,3-cd)pyrene	NA	Lab			0.026 mg/kg	0.18 mg/kg	0.096 mg/kg	1.1 mg/kg	< 0.0096 mg/kg	0.65 mg/kg	1.4 mg/kg	0.81 mg/kg	0.092 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	< 0.0061 mg/kg	**0.042 mg/kg**	0.0096 j mg/kg	0.018 mg/kg	< 0.0096 mg/kg	**0.028 mg/kg**	**0.053 mg/kg**	**0.039 mg/kg**	< 0.016 mg/kg
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	< 0.0061 mg/kg	**0.3 mg/kg**	0.03 mg/kg	0.068 mg/kg	< 0.0096 mg/kg	0.12 mg/kg	**0.89 mg/kg**	**0.26 mg/kg**	0.021 mg/kg
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	0.018 mg/kg	**0.33 mg/kg**	0.087 mg/kg	**1 mg/kg**	0.016 mg/kg	**0.21 mg/kg**	**1.1 mg/kg**	**0.3 mg/kg**	0.11 mg/kg
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	0.087 mg/kg	**0.35 mg/kg**	0.19 mg/kg	**2.5 mg/kg**	0.013 mg/kg	**0.95 mg/kg**	**2.1 mg/kg**	**0.79 mg/kg**	**0.22 mg/kg**
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	0.417 a mg/kg	**3.03 mg/kg**	1.32 a mg/kg	**14.3 a mg/kg**	0.096 mg/kg	**6.29 a mg/kg**	**16.5 mg/kg**	**5.5 mg/kg**	1.3 mg/kg
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	0.0181 mg/kg	**0.132 mg/kg**	0.0572 mg/kg	**0.62 mg/kg**	0.00417 mg/kg	**0.273 mg/kg**	**0.719 mg/kg**	**0.239 mg/kg**	0.0567 mg/kg
1-Methylnaphthalene	NA	Lab			< 0.0061 mg/kg	--	< 0.01 mg/kg	0.0087 mg/kg	< 0.0096 mg/kg	< 0.017 mg/kg	--	--	--
Benzo(e)pyrene	NA	Lab			0.033 mg/kg	--	0.15 mg/kg	4.5 mg/kg	0.01 mg/kg	0.49 mg/kg	--	--	--
Perylene	NA	Lab			0.052 mg/kg	--	0.12 mg/kg	0.75 j mg/kg	0.082 mg/kg	0.35 mg/kg	--	--	--
C1-Chrysenes	NA	Lab			< 0.0061 X mg/kg	--	0.15 X mg/kg	1.2 X mg/kg	< 0.0096 X mg/kg	0.54 X mg/kg	--	--	--
C1-Fluoranthenes/Pyrenes	NA	Lab			0.087 X mg/kg	--	0.23 X mg/kg	2.2 X mg/kg	0.013 X mg/kg	0.67 X mg/kg	--	--	--
C1-Fluorenes	NA	Lab			0.01 X mg/kg	--	0.024 X mg/kg	0.16 X mg/kg	0.01 X mg/kg	0.074 X mg/kg	--	--	--
C1-Naphthalenes	NA	Lab			< 0.0061 X mg/kg	--	0.011 X mg/kg	0.02 X mg/kg	< 0.0096 X mg/kg	0.028 X mg/kg	--	--	--
C1-Phenanthrenes/Anthracenes	NA	Lab			0.022 X mg/kg	--	0.18 X mg/kg	0.72 X mg/kg	0.011 X mg/kg	0.13 X mg/kg	--	--	--
C2-Chrysenes	NA	Lab			< 0.0061 X mg/kg	--	0.17 X mg/kg	0.89 X mg/kg	< 0.0096 X mg/kg	0.49 X mg/kg	--	--	--
C2-Fluorenes	NA	Lab			0.025 X mg/kg	--	< 0.01 X mg/kg	0.31 X mg/kg	0.023 X mg/kg	0.072 X mg/kg	--	--	--
C2-Naphthalenes	NA	Lab			< 0.0061 X mg/kg	--	0.016 X mg/kg	0.062 X mg/kg	< 0.0096 X mg/kg	0.05 X mg/kg	--	--	--
C2-Phenanthrenes/Anthracenes	NA	Lab			0.024 X mg/kg	--	0.062 X mg/kg	0.94 X mg/kg	< 0.0096 X mg/kg	0.095 X mg/kg	--	--	--
C3-Chrysenes	NA	Lab			< 0.0061 X mg/kg	--	0.12 X mg/kg	0.71 X mg/kg	< 0.0096 X mg/kg	0.33 X mg/kg	--	--	--
C3-Fluorenes	NA	Lab			0.015 X mg/kg	--	0.065 X mg/kg	0.48 X mg/kg	0.01 X mg/kg	0.099 X mg/kg	--	--	--
C3-Naphthalenes	NA	Lab			0.016 X mg/kg	--	0.026 X mg/kg	0.17 X mg/kg	0.019 X mg/kg	0.079 X mg/kg	--	--	--
C3-Phenanthrenes/Anthracenes	NA	Lab			0.037 X mg/kg	--	0.14 X mg/kg	1.3 X mg/kg	0.015 X mg/kg	0.12 X mg/kg	--	--	--
C4-Chrysenes	NA	Lab			< 0.0061 X mg/kg	--	0.041 X mg/kg	0.32 X mg/kg	< 0.0096 X mg/kg	0.1 X mg/kg	--	--	--
C4-Napthalenes	NA	Lab			0.0092 X mg/kg	--	0.022 X mg/kg	0.2 X mg/kg	< 0.0096 X mg/kg	0.051 X mg/kg	--	--	--
C4-Phenanthrenes/Anthracenes	NA	Lab			< 0.0061 X mg/kg	--	< 0.01 X mg/kg	0.92 X mg/kg	< 0.0096 X mg/kg	< 0.017 X mg/kg	--	--	--
Sum of ESBPAH17@ 0.5DL	NA	Lab			0.567 a mg/kg	3.8 mg/kg	1.9 a mg/kg	20 a mg/kg	0.115 mg/kg	9.2 a mg/kg	22.9 mg/kg	9.2 a mg/kg	1.8 a mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.021 a tu	0.044 a BQX tu	0.048 a tu	0.381 a tu	0.002 tu	0.094 a BQX tu	0.243 a BQX tu	0.094 a BQX tu	0.018 a BQX tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			0.916 a mg/kg	--	3.42 a mg/kg	35.8 a mg/kg	0.347 a mg/kg	12.9 a mg/kg	--	--	--
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		0.034 a tu	--	0.085 a tu	0.662 a tu	0.006 a tu	0.130 a BQX tu	--	--	--
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		--	0.33 a BQX tu	--	--	--	--	0.67 a BQX tu	0.41 a BQX tu	0.29 a BQX tu

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II	Sys Loc Code: WM-10 / Sample Date: 2/25/2011 / Depth Interval: 0 - 1 ft / Sys Sample Code: WM-10-1_0.0-1.0_02252011 / Sample Type Code: N	Sys Loc Code: WM-10 / Sample Date: 2/25/2011 / Depth Interval: 1 - 2 ft / Sys Sample Code: WM-10-2_1.0-2.0_02252011 / Sample Type Code: N	Sys Loc Code: WM-10 / Sample Date: 2/25/2011 / Depth Interval: 2 - 2.8 ft / Sys Sample Code: WM-10-3_2.0-2.8_02252011 / Sample Type Code: N	Sys Loc Code: UC-11 / Sample Date: 2/26/2011 / Depth Interval: 0 - 1 ft / Sys Sample Code: UC-11-1_0.0-1.0_02262011 / Sample Type Code: N	Sys Loc Code: UC-11 / Sample Date: 2/26/2011 / Depth Interval: 1 - 2 ft / Sys Sample Code: UC-11-2_1.0-2.0_02262011 / Sample Type Code: N	Sys Loc Code: UC-11 / Sample Date: 2/26/2011 / Depth Interval: 2 - 3 ft / Sys Sample Code: UC-11-3_2.0-3.0_02262011 / Sample Type Code: N	Sys Loc Code: UC-11 / Sample Date: 2/26/2011 / Depth Interval: 3 - 3.5 ft / Sys Sample Code: UC-11-4_3.0-3.5_02262011 / Sample Type Code: N	Sys Loc Code: UC-12 / Sample Date: 2/27/2011 / Depth Interval: 0 - 0.5 ft / Sys Sample Code: UC-12-1_0.0-0.5_02272011 / Sample Type Code: N	Sys Loc Code: UC-12 / Sample Date: 2/27/2011 / Depth Interval: 1.5 - 2 ft / Sys Sample Code: UC-12-2_1.5-2.0_02272011 / Sample Type Code: N
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
SVOCs													
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	**0.42 mg/kg**	**9.6 mg/kg**	**0.22 mg/kg**	**0.7 mg/kg**	**0.12 mg/kg**	**0.16 mg/kg**	**0.023 mg/kg**	**0.022 mg/kg**	< 0.15 mg/kg
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	**0.34 mg/kg**	**0.67 mg/kg**	< 0.0094 mg/kg	**1.8 mg/kg**	**0.35 mg/kg**	**0.23 j mg/kg**	**0.07 mg/kg**	**0.21 mg/kg**	**0.43 mg/kg**
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	**0.41 mg/kg**	**21 mg/kg**	**0.23 mg/kg**	**6 mg/kg**	**2 mg/kg**	**0.82 mg/kg**	**0.15 mg/kg**	**0.38 mg/kg**	**1.7 mg/kg**
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	**0.5 mg/kg**	**24 mg/kg**	**0.15 mg/kg**	**14 mg/kg**	**3.1 mg/kg**	**1.4 mg/kg**	**0.48 mg/kg**	**1.3 mg/kg**	**2.9 mg/kg**
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	**0.44 mg/kg**	**19 mg/kg**	0.088 mg/kg	**13 mg/kg**	**2.7 mg/kg**	**1.2 mg/kg**	**0.39 mg/kg**	**1.3 mg/kg**	**2.5 mg/kg**
Benzo(b)fluoranthene	NA	Lab			0.4 mg/kg	15 mg/kg	0.069 mg/kg	14 mg/kg	1.9 mg/kg	1.3 mg/kg	0.46 mg/kg	1.1 mg/kg	2 mg/kg
Benzo(g,h,i)perylene	NA	Lab			0.24 mg/kg	11 mg/kg	0.033 mg/kg	10 mg/kg	1.5 mg/kg	0.84 mg/kg	0.14 mg/kg	0.86 mg/kg	1.4 mg/kg
Benzo(k)fluoranthene	NA	Lab			0.36 mg/kg	20 mg/kg	0.12 mg/kg	11 mg/kg	2.6 mg/kg	0.82 mg/kg	0.48 mg/kg	1.1 mg/kg	2.6 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	**0.66 mg/kg**	**19 mg/kg**	0.12 mg/kg	**14 mg/kg**	**3.5 mg/kg**	**1.7 mg/kg**	**0.48 mg/kg**	**1.3 mg/kg**	**3.1 mg/kg**
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	**0.085 mg/kg**	**2 mg/kg**	0.019 mg/kg	**2.5 mg/kg**	**0.4 mg/kg**	**0.24 j mg/kg**	**0.066 mg/kg**	**0.25 j mg/kg**	**0.64 mg/kg**
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	**1.7 mg/kg**	**75 mg/kg**	**0.56 j mg/kg**	**29 mg/kg**	**8.3 mg/kg**	**3.9 mg/kg**	**1 mg/kg**	**2.6 mg/kg**	**9.2 mg/kg**
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	**0.44 mg/kg**	**14 mg/kg**	**0.18 mg/kg**	**3.3 mg/kg**	**0.8 mg/kg**	**0.55 mg/kg**	**0.096 mg/kg**	**0.14 mg/kg**	**0.86 mg/kg**
Indeno(1,2,3-cd)pyrene	NA	Lab			0.26 mg/kg	12 mg/kg	0.042 mg/kg	10 mg/kg	1.2 mg/kg	0.73 mg/kg	0.17 mg/kg	0.84 mg/kg	1.4 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	**0.079 j mg/kg**	**2.6 mg/kg**	0.0093 j mg/kg	**0.4 mg/kg**	**0.22 mg/kg**	**0.26 mg/kg**	**0.031 mg/kg**	**0.027 mg/kg**	**0.17 mg/kg**
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	**1.1 mg/kg**	**2 mg/kg**	0.011 mg/kg	**1.1 mg/kg**	**0.75 mg/kg**	**3.9 mg/kg**	**0.37 mg/kg**	0.13 mg/kg	**0.79 mg/kg**
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	**1 mg/kg**	**36 mg/kg**	**0.38 mg/kg**	**17 mg/kg**	**6.2 mg/kg**	**2.4 mg/kg**	**0.3 mg/kg**	**0.93 mg/kg**	**5.1 mg/kg**
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	**1 mg/kg**	**38 mg/kg**	**0.3 mg/kg**	**19 mg/kg**	**4.8 mg/kg**	**2.4 mg/kg**	**0.84 mg/kg**	**1.6 mg/kg**	**4.8 mg/kg**
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	**8.17 a mg/kg**	**263 mg/kg**	**2.27 a mg/kg**	**122 mg/kg**	**33.2 mg/kg**	**19.2 a mg/kg**	**4.3 mg/kg**	**10.2 a mg/kg**	**32.3 mg/kg**
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	**0.355 mg/kg**	**11.4 mg/kg**	0.0988 mg/kg	**5.3 mg/kg**	**1.45 mg/kg**	**0.833 mg/kg**	**0.187 mg/kg**	**0.443 mg/kg**	**1.4 mg/kg**
1-Methylnaphthalene	NA	Lab			0.11 j mg/kg	0.64 j mg/kg	0.014 mg/kg	0.88 j mg/kg	0.11 mg/kg	0.1 mg/kg	< 0.018 mg/kg	0.0097 mg/kg	--
Benzo(e)pyrene	NA	Lab			0.99 mg/kg	20 mg/kg	0.047 mg/kg	79 mg/kg	2.8 mg/kg	1.4 mg/kg	0.28 mg/kg	0.77 mg/kg	--
Perylene	NA	Lab			0.13 mg/kg	14 mg/kg	0.045 mg/kg	52 mg/kg	0.6 mg/kg	0.28 j mg/kg	0.27 mg/kg	0.33 mg/kg	--
C1-Chrysenes	NA	Lab			0.55 X mg/kg	20 X mg/kg	0.092 X mg/kg	14 X mg/kg	1.8 X mg/kg	1.2 X mg/kg	0.31 X mg/kg	0.51 X mg/kg	--
C1-Fluoranthenes/Pyrenes	NA	Lab			1.3 X mg/kg	31 X mg/kg	0.26 X mg/kg	48 X mg/kg	5.7 X mg/kg	3.2 X mg/kg	0.73 X mg/kg	1.3 X mg/kg	--
C1-Fluorenes	NA	Lab			0.3 X mg/kg	4.7 X mg/kg	0.071 X mg/kg	5.7 X mg/kg	0.58 X mg/kg	0.52 X mg/kg	0.26 X mg/kg	0.084 X mg/kg	--
C1-Naphthalenes	NA	Lab			0.14 X mg/kg	1.2 X mg/kg	0.016 X mg/kg	1.6 X mg/kg	0.31 X mg/kg	0.29 X mg/kg	0.031 X mg/kg	0.025 X mg/kg	--
C1-Phenanthrenes/Anthracenes	NA	Lab			1.5 X mg/kg	14 X mg/kg	0.18 X mg/kg	20 X mg/kg	2.8 X mg/kg	2.7 X mg/kg	0.36 X mg/kg	0.36 X mg/kg	--
C2-Chrysenes	NA	Lab			0.74 X mg/kg	13 X mg/kg	0.083 X mg/kg	10 X mg/kg	1.1 X mg/kg	1.2 X mg/kg	0.22 X mg/kg	0.35 X mg/kg	--
C2-Fluorenes	NA	Lab			1.1 X mg/kg	5.4 X mg/kg	0.045 X mg/kg	4.7 X mg/kg	0.47 X mg/kg	1.2 X mg/kg	0.19 X mg/kg	0.043 X mg/kg	--
C2-Naphthalenes	NA	Lab			0.27 X mg/kg	3.4 X mg/kg	0.07 X mg/kg	4.3 X mg/kg	0.39 X mg/kg	0.37 X mg/kg	0.056 X mg/kg	0.03 X mg/kg	--
C2-Phenanthrenes/Anthracenes	NA	Lab			2.8 X mg/kg	12 X mg/kg	0.1 X mg/kg	16 X mg/kg	1.6 X mg/kg	3.6 X mg/kg	0.4 X mg/kg	0.21 X mg/kg	--
C3-Chrysenes	NA	Lab			0.65 X mg/kg	8.6 X mg/kg	0.06 X mg/kg	4.3 X mg/kg	0.61 X mg/kg	0.75 X mg/kg	0.21 X mg/kg	0.18 X mg/kg	--
C3-Fluorenes	NA	Lab			2.1 X mg/kg	5 X mg/kg	0.041 X mg/kg	6.2 X mg/kg	0.38 X mg/kg	1.9 X mg/kg	0.27 X mg/kg	0.04 X mg/kg	--
C3-Naphthalenes	NA	Lab			0.78 X mg/kg	4.3 X mg/kg	0.058 X mg/kg	4.9 X mg/kg	0.45 X mg/kg	1.1 X mg/kg	0.17 X mg/kg	0.036 X mg/kg	--
C3-Phenanthrenes/Anthracenes	NA	Lab			3.7 X mg/kg	10 X mg/kg	0.3 X mg/kg	13 X mg/kg	1.1 X mg/kg	3.6 X mg/kg	0.52 X mg/kg	0.13 X mg/kg	--
C4-Chrysenes	NA	Lab			0.36 X mg/kg	3.3 X mg/kg	< 0.0094 X mg/kg	1.8 X mg/kg	0.22 X mg/kg	0.36 X mg/kg	< 0.018 X mg/kg	0.056 X mg/kg	--
C4-Napthalenes	NA	Lab			1.4 X mg/kg	3.3 X mg/kg	0.032 X mg/kg	3.7 X mg/kg	0.31 X mg/kg	1.7 X mg/kg	0.26 X mg/kg	< 0.0089 X mg/kg	--
C4-Phenanthrenes/Anthracenes	NA	Lab			2.6 X mg/kg	5 X mg/kg	< 0.0094 X mg/kg	7 X mg/kg	0.25 X mg/kg	2.6 X mg/kg	< 0.018 X mg/kg	< 0.0089 X mg/kg	--
Sum of ESBPAH17@ 0.5DL	NA	Lab			9.4 a mg/kg	321 mg/kg	2.5 a mg/kg	167 mg/kg	40.4 mg/kg	22.9 a mg/kg	5.6 mg/kg	14.1 a mg/kg	39.7 mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.383 a tu	5.6 tu	0.031 a BQX tu	3.7 tu	1.2 tu	0.524 a tu	0.064 a BQX tu	0.27 a tu	1.1 tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			30.8 a mg/kg	496 a mg/kg	4.04 a mg/kg	463 a mg/kg	61.7 a mg/kg	50.6 a mg/kg	10.1 a mg/kg	18.5 a mg/kg	--
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		**1.09 a tu**	**8.22 a tu**	0.050 a BQX tu	**9.81 a tu**	**1.74 a tu**	**1.05 a tu**	0.110 a BQX tu	0.350 a tu	--
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		--	--	--	--	--	--	--	--	**2.14 a tu**

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

					Sys Loc Code	**UC-12**	**UC-12**	**WM-13**	**WM-13**	**WM-13**	**WM-13**	**WM-14**	**WM-14**	**WM-14**
					Sample Date	**2/27/2011**	**2/27/2011**	**3/4/2011**	**3/4/2011**	**3/4/2011**	**3/4/2011**	**2/27/2011**	**2/27/2011**	**2/27/2011**
					Depth Interval	**2.5 - 3.1 ft**	**3.1 - 3.6 ft**	**0 - 0.5 ft**	**1.5 - 2 ft**	**3.25 - 3.75 ft**	**3.75 - 4.25 ft**	**0 - 0.5 ft**	**0.5 - 1 ft**	**1 - 1.5 ft**
					Sys Sample Code	**UC-12-3_2.5-3.1_02272011**	**UC-12-4_3.1-3.6_02272011**	**WM-13-1_0.0-0.5_03042011**	**WM-13-2_1.5-2.0_03042011**	**WM-13-3_3.25-3.75_03042011**	**WM-13-4_3.75-4.25_03042011**	**WM-14-1_0.0-0.5_02272011**	**WM-14-2_0.5-1.0_02272011**	**WM-14-3_1.0-1.5_02272011**
					Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II										
Effective Date			2/1/2007	2/1/2007										
Exceedance Key			**Bold**	Underline										
SVOCs														
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	**0.099 mg/kg**	**0.0091 mg/kg**	< 0.0051 mg/kg	0.0061 mg/kg	< 0.0047 mg/kg	< 0.0042 mg/kg	< 0.0056 mg/kg	**0.011 mg/kg**	**6.9 mg/kg**
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	**0.18 mg/kg**	< 0.0076 mg/kg	< 0.0051 mg/kg	< 0.0044 mg/kg	< 0.0047 mg/kg	< 0.0042 mg/kg	< 0.0056 mg/kg	< 0.0056 mg/kg	**0.45 mg/kg**
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	**0.64 mg/kg**	0.026 mg/kg	< 0.0051 mg/kg	0.0075 mg/kg	< 0.0047 mg/kg	< 0.0042 mg/kg	< 0.0056 mg/kg	0.054 mg/kg	**29 mg/kg**
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	**2.2 mg/kg**	0.048 mg/kg	< 0.0051 mg/kg	0.0047 mg/kg	< 0.0047 mg/kg	< 0.0042 mg/kg	0.015 mg/kg	**0.12 mg/kg**	**34 mg/kg**
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	**2.5 mg/kg**	0.032 mg/kg	0.0087 mg/kg	< 0.0044 mg/kg	< 0.0047 mg/kg	< 0.0042 mg/kg	0.0084 mg/kg	0.14 mg/kg	**28 mg/kg**
Benzo(b)fluoranthene	NA	Lab			2.1 mg/kg	0.028 mg/kg	0.0049 j mg/kg	< 0.0044 mg/kg	< 0.0047 mg/kg	< 0.0042 mg/kg	0.0071 mg/kg	0.11 mg/kg	15 mg/kg
Benzo(g,h,i)perylene	NA	Lab			1.6 mg/kg	0.018 mg/kg	0.0099 mg/kg	0.0053 j mg/kg	< 0.0047 mg/kg	< 0.0042 mg/kg	0.0080 mg/kg	0.054 mg/kg	16 mg/kg
Benzo(k)fluoranthene	NA	Lab			2.3 mg/kg	0.027 mg/kg	0.0049 j mg/kg	< 0.0044 mg/kg	< 0.0047 mg/kg	< 0.0042 mg/kg	0.0069 mg/kg	0.097 mg/kg	31 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	**2.2 mg/kg**	0.039 mg/kg	< 0.0051 mg/kg	< 0.0044 mg/kg	< 0.0047 mg/kg	< 0.0042 mg/kg	0.015 mg/kg	0.082 mg/kg	**26 mg/kg**
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	**0.47 mg/kg**	< 0.0076 mg/kg	< 0.0051 mg/kg	< 0.0044 mg/kg	< 0.0047 mg/kg	< 0.0042 mg/kg	< 0.0056 mg/kg	0.016 mg/kg	**4.1 mg/kg**
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	**5.2 mg/kg**	0.18 j mg/kg	0.0073 mg/kg	0.018 mg/kg	0.011 mg/kg	< 0.0042 mg/kg	0.015 mg/kg	0.17 j mg/kg	**96 mg/kg**
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	**0.29 mg/kg**	0.019 mg/kg	< 0.0051 mg/kg	0.014 mg/kg	0.0076 mg/kg	< 0.0042 mg/kg	< 0.0056 mg/kg	0.024 mg/kg	**13 mg/kg**
Indeno(1,2,3-cd)pyrene	NA	Lab			1.7 mg/kg	0.02 mg/kg	0.011 mg/kg	< 0.0044 mg/kg	< 0.0047 mg/kg	< 0.0042 mg/kg	0.0071 mg/kg	0.083 mg/kg	19 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	**0.057 mg/kg**	< 0.0076 mg/kg	< 0.0051 mg/kg	0.0087 mg/kg	0.0054 mg/kg	< 0.0042 mg/kg	< 0.0056 mg/kg	< 0.0056 mg/kg	**0.12 mg/kg**
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	**0.61 mg/kg**	0.033 mg/kg	< 0.0051 mg/kg	0.0098 mg/kg	0.0060 mg/kg	< 0.0042 mg/kg	< 0.0056 mg/kg	0.0070 mg/kg	**0.35 mg/kg**
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	**1.2 mg/kg**	0.059 mg/kg	0.0065 mg/kg	0.052 mg/kg	0.031 mg/kg	< 0.0042 mg/kg	0.0075 mg/kg	0.09 j mg/kg	**37 mg/kg**
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	**3.2 mg/kg**	0.12 j mg/kg	0.0076 mg/kg	0.015 mg/kg	0.0088 mg/kg	< 0.0042 mg/kg	0.014 mg/kg	0.13 j mg/kg	**53 mg/kg**
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	**18.8 mg/kg**	0.576 a mg/kg	0.0531 a mg/kg	0.145 a mg/kg	0.0862 mg/kg	0.0273 mg/kg	0.0945 mg/kg	0.85 a mg/kg	**328 mg/kg**
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	**0.819 mg/kg**	0.0251 mg/kg	0.00231 mg/kg	0.00629 mg/kg	0.00375 mg/kg	0.00119 mg/kg	0.00411 mg/kg	0.0369 mg/kg	**14.3 mg/kg**
1-Methylnaphthalene	NA	Lab			--	--	< 0.0051 mg/kg	--	--	--	< 0.0056 mg/kg	--	--
Benzo(e)pyrene	NA	Lab			--	--	0.0045 j mg/kg	--	--	--	0.0078 mg/kg	--	--
Perylene	NA	Lab			--	--	0.017 mg/kg	--	--	--	0.019 mg/kg	--	--
C1-Chrysenes	NA	Lab			--	--	< 0.0051 X mg/kg	--	--	--	0.018 X mg/kg	--	--
C1-Fluoranthenes/Pyrenes	NA	Lab			--	--	0.0049 X mg/kg	--	--	--	0.024 X mg/kg	--	--
C1-Fluorenes	NA	Lab			--	--	< 0.0051 X mg/kg	--	--	--	< 0.0056 X mg/kg	--	--
C1-Naphthalenes	NA	Lab			--	--	< 0.0051 X mg/kg	--	--	--	< 0.0056 X mg/kg	--	--
C1-Phenanthrenes/Anthracenes	NA	Lab			--	--	< 0.0051 X mg/kg	--	--	--	0.0098 X mg/kg	--	--
C2-Chrysenes	NA	Lab			--	--	< 0.0051 X mg/kg	--	--	--	0.014 X mg/kg	--	--
C2-Fluorenes	NA	Lab			--	--	< 0.0051 X mg/kg	--	--	--	< 0.0056 X mg/kg	--	--
C2-Naphthalenes	NA	Lab			--	--	< 0.0051 X mg/kg	--	--	--	< 0.0056 X mg/kg	--	--
C2-Phenanthrenes/Anthracenes	NA	Lab			--	--	< 0.0051 X mg/kg	--	--	--	0.0098 X mg/kg	--	--
C3-Chrysenes	NA	Lab			--	--	< 0.0051 X mg/kg	--	--	--	0.038 X mg/kg	--	--
C3-Fluorenes	NA	Lab			--	--	< 0.0051 X mg/kg	--	--	--	< 0.0056 X mg/kg	--	--
C3-Naphthalenes	NA	Lab			--	--	< 0.0051 X mg/kg	--	--	--	0.012 X mg/kg	--	--
C3-Phenanthrenes/Anthracenes	NA	Lab			--	--	< 0.0051 X mg/kg	--	--	--	0.028 X mg/kg	--	--
C4-Chrysenes	NA	Lab			--	--	< 0.0051 X mg/kg	--	--	--	< 0.0056 X mg/kg	--	--
C4-Napthalenes	NA	Lab			--	--	< 0.0051 X mg/kg	--	--	--	< 0.0056 X mg/kg	--	--
C4-Phenanthrenes/Anthracenes	NA	Lab			--	--	< 0.0051 X mg/kg	--	--	--	< 0.0056 X mg/kg	--	--
Sum of ESBPAH17@ 0.5DL	NA	Lab			26.5 mg/kg	0.669 a mg/kg	0.084 a mg/kg	0.156 a mg/kg	0.096 mg/kg	0.036 mg/kg	0.124 mg/kg	1.2 a mg/kg	409 mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.582 tu	0.018 a tu	0.007 a tu	0.030 a tu	0.008 tu	0.015 tu	0.007 tu	0.056 a tu	6.3 tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			--	--	0.146 a mg/kg	--	--	--	0.324 a mg/kg	--	--
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		--	--	0.011 a tu	--	--	--	0.017 a tu	--	--
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		**1.25 a tu**	0.288 a tu	--	0.308 a tu	0.271 a tu	0.283 a tu	--	0.353 a tu	**11 a tu**

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

					Sys Loc Code	**WM-14**	**UC-15**	**UC-15**	**UC-15**		**UC-15**		**UC-16**	**UC-16**
					Sample Date	**2/27/2011**	**2/27/2011**	**2/27/2011**	**2/27/2011**		**2/27/2011**		**2/28/2011**	**2/28/2011**
					Depth Interval	**1.5 - 2 ft**	**0 - 1 ft**	**1 - 2 ft**	**2 - 3 ft**	**2 - 3 ft**	**3 - 4 ft**	**3 - 4 ft**	**0 - 0.5 ft**	**2 - 2.5 ft**
					Sys Sample Code	**WM-14-4_1.5-2.0_02272011**	**UC-15-1_0.0-1.0_02272011**	**UC-15-2_1.0-2.0_02272011**	**UC-15-3_2.0-3.0_02272011**	**UC-15-3_2.0-3.0_02272011_FD**	**UC-15-4_3.0-4.0_02272011**	**UC-15-4_3.0-4.0_02272011_FD**	**UC-16-1_0.0-0.5_02282011**	**UC-16-2_2.0-2.5_02282011**
					Sample Type Code	**N**	**N**	**N**	**N**	**FD**	**N**	**FD**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II										
Effective Date			2/1/2007	2/1/2007										
Exceedance Key			**Bold**	Underline										
SVOCs														
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	**0.094 mg/kg**	< 0.0066 mg/kg	< 0.0059 mg/kg	**0.037 mg/kg**	**0.16 mg/kg**	**0.03 mg/kg**	**0.039 mg/kg**	**0.025 mg/kg**	**0.17 mg/kg**
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	< 0.0072 mg/kg	< 0.0066 mg/kg	**0.015 mg/kg**	**0.075 j mg/kg**	**0.3 mg/kg**	**0.015 mg/kg**	**0.019 mg/kg**	**0.1 mg/kg**	**0.16 mg/kg**
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	0.028 mg/kg	0.011 mg/kg	0.027 mg/kg	**0.13 mg/kg**	**0.38 mg/kg**	**0.18 mg/kg**	**0.15 mg/kg**	**0.21 mg/kg**	**0.78 mg/kg**
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	0.039 mg/kg	0.046 mg/kg	**0.11 mg/kg**	**0.53 mg/kg**	**1.5 mg/kg**	**0.91 mg/kg**	**2.3 mg/kg**	**0.8 mg/kg**	**1.8 mg/kg**
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	< 0.0072 mg/kg	0.046 mg/kg	0.11 mg/kg	**0.47 mg/kg**	**1.5 mg/kg**	**0.55 mg/kg**	**0.19 j mg/kg**	**0.7 mg/kg**	**1.5 mg/kg**
Benzo(b)fluoranthene	NA	Lab			0.027 mg/kg	0.043 mg/kg	0.12 mg/kg	0.37 mg/kg	1.4 mg/kg	0.5 mg/kg	2.9 mg/kg	0.86 mg/kg	1.3 mg/kg
Benzo(g,h,i)perylene	NA	Lab			0.014 mg/kg	0.024 mg/kg	0.051 mg/kg	0.22 mg/kg	1.2 mg/kg	0.19 mg/kg	0.12 mg/kg	0.21 mg/kg	1 mg/kg
Benzo(k)fluoranthene	NA	Lab			0.022 mg/kg	0.045 mg/kg	0.11 mg/kg	0.45 mg/kg	1.7 mg/kg	0.54 mg/kg	3.3 j mg/kg	0.68 mg/kg	1.3 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	0.021 mg/kg	0.044 mg/kg	0.12 mg/kg	**0.51 mg/kg**	**1.3 mg/kg**	**0.76 mg/kg**	**1.7 mg/kg**	**0.71 mg/kg**	**1.9 mg/kg**
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	< 0.0072 mg/kg	0.014 mg/kg	0.031 mg/kg	**0.11 j mg/kg**	**6.1 j mg/kg**	**0.12 j mg/kg**	**0.079 j mg/kg**	**0.14 j mg/kg**	**0.43 mg/kg**
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	0.057 j mg/kg	0.14 j mg/kg	0.21 mg/kg	0.34 mg/kg	**3.1 mg/kg**	**0.6 mg/kg**	0.4 mg/kg	**0.9 mg/kg**	**4.7 mg/kg**
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	0.025 mg/kg	0.0065 j mg/kg	0.011 mg/kg	0.069 mg/kg	**0.35 mg/kg**	0.064 mg/kg	**0.094 mg/kg**	**0.1 mg/kg**	**0.35 mg/kg**
Indeno(1,2,3-cd)pyrene	NA	Lab			0.017 mg/kg	0.023 mg/kg	0.05 mg/kg	0.21 mg/kg	1.2 mg/kg	0.23 mg/kg	0.15 mg/kg	0.22 mg/kg	0.9 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	< 0.0072 mg/kg	< 0.0066 mg/kg	< 0.0059 mg/kg	**0.032 mg/kg**	**0.078 mg/kg**	0.0078 mg/kg	0.0085 mg/kg	**0.031 mg/kg**	**0.05 mg/kg**
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	< 0.0072 mg/kg	0.0089 mg/kg	0.011 mg/kg	0.17 mg/kg	**0.35 mg/kg**	0.019 mg/kg	0.026 mg/kg	0.14 mg/kg	**0.27 mg/kg**
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	0.041 mg/kg	0.027 mg/kg	0.051 mg/kg	**0.26 mg/kg**	**0.69 mg/kg**	**0.42 mg/kg**	**0.56 mg/kg**	**1.6 mg/kg**	**2 mg/kg**
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	0.045 mg/kg	0.055 mg/kg	0.14 mg/kg	**0.92 mg/kg**	**2.1 mg/kg**	**0.35 mg/kg**	**0.94 mg/kg**	**0.63 mg/kg**	**2.5 mg/kg**
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	0.368 a mg/kg	0.408 a mg/kg	0.842 mg/kg	**3.65 a mg/kg**	**17.9 a mg/kg**	**4.03 a mg/kg**	**6.505 a mg/kg**	**6.09 mg/kg**	**16.6 mg/kg**
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	0.016 mg/kg	0.0178 mg/kg	0.0366 mg/kg	**0.159 mg/kg**	**0.779 mg/kg**	**0.175 mg/kg**	**0.2828 mg/kg**	**0.265 mg/kg**	**0.722 mg/kg**
1-Methylnaphthalene	NA	Lab			--	< 0.0066 mg/kg	< 0.0059 mg/kg	0.012 mg/kg	0.044 mg/kg	< 0.0067 mg/kg	< 0.0067 mg/kg	0.011 mg/kg	--
Benzo(e)pyrene	NA	Lab			--	0.041 mg/kg	0.086 mg/kg	0.35 mg/kg	14 mg/kg	0.36 mg/kg	0.23 mg/kg	0.44 mg/kg	--
Perylene	NA	Lab			--	0.07 j mg/kg	0.064 mg/kg	0.18 mg/kg	9.4 mg/kg	0.33 mg/kg	0.33 mg/kg	0.34 mg/kg	--
C1-Chrysenes	NA	Lab			--	0.038 X mg/kg	0.086 X mg/kg	0.57 X mg/kg	3 X mg/kg	0.3 X mg/kg	0.26 X mg/kg	0.3 X mg/kg	--
C1-Fluoranthenes/Pyrenes	NA	Lab			--	0.05 X mg/kg	0.13 X mg/kg	1.1 X mg/kg	6 X mg/kg	0.72 X mg/kg	0.57 X mg/kg	0.67 X mg/kg	--
C1-Fluorenes	NA	Lab			--	0.0079 X mg/kg	0.0076 X mg/kg	0.088 X mg/kg	0.22 X mg/kg	0.07 X mg/kg	0.056 X mg/kg	0.056 X mg/kg	--
C1-Naphthalenes	NA	Lab			--	< 0.0066 X mg/kg	< 0.0059 X mg/kg	0.031 X mg/kg	0.1 X mg/kg	0.0086 X mg/kg	0.0096 X mg/kg	0.029 X mg/kg	--
C1-Phenanthrenes/Anthracenes	NA	Lab			--	0.019 X mg/kg	0.04 X mg/kg	0.41 X mg/kg	1.1 X mg/kg	0.27 X mg/kg	0.23 X mg/kg	0.22 X mg/kg	--
C2-Chrysenes	NA	Lab			--	0.028 X mg/kg	0.085 X mg/kg	0.67 X mg/kg	3 X mg/kg	0.27 X mg/kg	0.26 X mg/kg	0.26 X mg/kg	--
C2-Fluorenes	NA	Lab			--	< 0.0066 X mg/kg	< 0.0059 X mg/kg	0.23 X mg/kg	0.37 X mg/kg	0.059 X mg/kg	0.069 X mg/kg	< 0.01 X mg/kg	--
C2-Naphthalenes	NA	Lab			--	< 0.0066 X mg/kg	0.0071 X mg/kg	0.058 X mg/kg	0.23 X mg/kg	0.023 X mg/kg	0.028 X mg/kg	0.042 X mg/kg	--
C2-Phenanthrenes/Anthracenes	NA	Lab			--	0.018 X mg/kg	0.041 X mg/kg	0.52 X mg/kg	1.2 X mg/kg	0.23 X mg/kg	0.19 X mg/kg	0.13 X mg/kg	--
C3-Chrysenes	NA	Lab			--	0.035 X mg/kg	0.064 X mg/kg	0.53 X mg/kg	1.8 X mg/kg	0.16 X mg/kg	0.14 X mg/kg	0.15 X mg/kg	--
C3-Fluorenes	NA	Lab			--	< 0.0066 X mg/kg	0.021 X mg/kg	0.15 X mg/kg	0.57 X mg/kg	0.071 X mg/kg	0.075 X mg/kg	0.023 X mg/kg	--
C3-Naphthalenes	NA	Lab			--	0.015 X mg/kg	0.017 X mg/kg	0.14 X mg/kg	0.45 X mg/kg	0.051 X mg/kg	0.061 X mg/kg	0.051 X mg/kg	--
C3-Phenanthrenes/Anthracenes	NA	Lab			--	0.027 X mg/kg	0.055 X mg/kg	0.86 X mg/kg	1.3 X mg/kg	0.22 X mg/kg	0.21 X mg/kg	0.16 X mg/kg	--
C4-Chrysenes	NA	Lab			--	< 0.0066 X mg/kg	0.028 X mg/kg	0.24 X mg/kg	0.95 X mg/kg	0.053 X mg/kg	0.055 X mg/kg	0.034 X mg/kg	--
C4-Napthalenes	NA	Lab			--	< 0.0066 X mg/kg	0.012 X mg/kg	0.22 X mg/kg	0.48 X mg/kg	0.04 X mg/kg	0.044 X mg/kg	0.022 X mg/kg	--
C4-Phenanthrenes/Anthracenes	NA	Lab			--	< 0.0066 X mg/kg	< 0.0059 X mg/kg	0.68 X mg/kg	1.2 X mg/kg	< 0.0067 X mg/kg	< 0.0067 X mg/kg	< 0.01 X mg/kg	--
Sum of ESBPAH17@ 0.5DL	NA	Lab			0.448 a mg/kg	0.543 a mg/kg	1.2 mg/kg	4.9 a mg/kg	23.4 a mg/kg	5.5 a mg/kg	13 a mg/kg	8.1 a mg/kg	21.1 mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.007 a tu	0.035 a tu	0.052 tu	0.149 a tu	0.604 a tu	0.188 a tu	0.421 a tu	0.240 a tu	0.571 tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			--	0.912 a mg/kg	1.92 a mg/kg	11.9 a mg/kg	68.7 a mg/kg	8.72 a mg/kg	--	11 a mg/kg	--
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		--	0.056 a tu	0.082 a tu	0.344 a tu	**1.71 a tu**	0.297 a tu	--	0.317 a tu	--
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		0.269 a tu	--	--	--	--	--	0.976 a tu	--	**1.23 a tu**

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II	UC-16 2/28/2011 3 - 3.5 ft UC-16-3_3.0-3.5_02282011 N	UC-16 2/28/2011 4 - 4.5 ft UC-16-4_4.0-4.5_02282011 N	UC-17 3/1/2011 0 - 0.5 ft UC-17-1_0.0-0.5_03012011 N	UC-17 3/1/2011 1 - 1.5 ft UC-17-2_1.0-1.5_03012011 N	UC-17 3/1/2011 2 - 2.5 ft UC-17-3_2.0-2.5_03012011 N	UC-17 3/1/2011 2.5 - 3 ft UC-17-4_2.5-3.0_03012011 N	WM-18 3/1/2011 0 - 0.7 ft WM-18-1_0.0-0.7_03012011 N	WM-18 3/1/2011 0.7 - 1.7 ft WM-18-2_0.7-1.7_03012011 N	WM-18 3/1/2011 1.7 - 2.7 ft WM-18-3_1.7-2.7_03012011 N
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
SVOCs													
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	**0.067 mg/kg**	**0.017 mg/kg**	**0.022 mg/kg**	**0.17 mg/kg**	**0.2 mg/kg**	**0.13 mg/kg**	0.0065 mg/kg	**11 mg/kg**	**0.31 mg/kg**
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	**0.094 mg/kg**	< 0.0068 mg/kg	**0.13 mg/kg**	**0.4 mg/kg**	**0.24 mg/kg**	**0.15 mg/kg**	**0.016 mg/kg**	**1.4 mg/kg**	**0.019 mg/kg**
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	**0.43 mg/kg**	0.011 mg/kg	**0.28 mg/kg**	**0.56 mg/kg**	**0.47 mg/kg**	**0.39 mg/kg**	0.017 mg/kg	**33 mg/kg**	**0.43 mg/kg**
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	**1.7 mg/kg**	0.014 mg/kg	**0.46 mg/kg**	**1.8 mg/kg**	**1.2 mg/kg**	**0.52 mg/kg**	0.088 mg/kg	**38 mg/kg**	**0.47 mg/kg**
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	**1.8 mg/kg**	0.0084 mg/kg	**0.72 mg/kg**	**1.7 mg/kg**	**1 mg/kg**	**0.63 mg/kg**	0.088 mg/kg	**23 mg/kg**	**0.34 mg/kg**
Benzo(b)fluoranthene	NA	Lab			1.9 mg/kg	0.0099 mg/kg	0.71 mg/kg	1.5 mg/kg	1 mg/kg	0.53 mg/kg	0.091 mg/kg	13 mg/kg	0.35 mg/kg
Benzo(g,h,i)perylene	NA	Lab			1.4 mg/kg	< 0.0068 mg/kg	0.26 mg/kg	1.2 mg/kg	0.76 mg/kg	0.53 mg/kg	0.024 mg/kg	15 mg/kg	0.35 mg/kg
Benzo(k)fluoranthene	NA	Lab			1.7 mg/kg	< 0.0068 mg/kg	0.59 mg/kg	1.4 mg/kg	0.93 mg/kg	0.58 mg/kg	0.054 mg/kg	25 mg/kg	0.36 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	**1.6 mg/kg**	0.0088 mg/kg	**0.46 mg/kg**	**1.9 mg/kg**	**1.4 mg/kg**	**0.56 mg/kg**	0.092 mg/kg	**30 mg/kg**	**0.38 mg/kg**
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	**0.39 mg/kg**	< 0.0068 mg/kg	**0.17 j mg/kg**	**0.39 mg/kg**	**0.28 j mg/kg**	**0.27 j mg/kg**	0.012 j mg/kg	**2.2 mg/kg**	**0.13 mg/kg**
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	**4 mg/kg**	0.024 j mg/kg	**0.92 mg/kg**	**4 mg/kg**	**2.9 mg/kg**	**1.1 mg/kg**	0.15 mg/kg	**89 mg/kg**	**1.3 mg/kg**
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	**0.25 mg/kg**	0.023 mg/kg	**0.19 mg/kg**	**0.44 mg/kg**	**0.41 mg/kg**	**0.26 mg/kg**	0.0089 mg/kg	**17 mg/kg**	**0.36 mg/kg**
Indeno(1,2,3-cd)pyrene	NA	Lab			1.4 mg/kg	0.0086 mg/kg	0.28 mg/kg	1.1 mg/kg	0.68 mg/kg	0.5 mg/kg	0.022 mg/kg	17 mg/kg	0.46 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	**0.034 mg/kg**	0.017 mg/kg	**0.038 mg/kg**	**0.064 mg/kg**	**0.15 mg/kg**	**0.11 mg/kg**	< 0.0061 mg/kg	**1.9 mg/kg**	**0.029 mg/kg**
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	**0.3 mg/kg**	0.047 mg/kg	**0.2 mg/kg**	**0.25 mg/kg**	**1.3 mg/kg**	**0.58 mg/kg**	0.012 mg/kg	**4.8 mg/kg**	0.11 mg/kg
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	**0.77 mg/kg**	0.043 mg/kg	**0.79 mg/kg**	**0.91 mg/kg**	**1.2 mg/kg**	**1.4 mg/kg**	0.026 mg/kg	**52 mg/kg**	**0.8 mg/kg**
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	**2.1 mg/kg**	0.02 mg/kg	**0.79 mg/kg**	**2.4 mg/kg**	**1.9 mg/kg**	**0.79 mg/kg**	0.13 mg/kg	**61 mg/kg**	**0.68 mg/kg**
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	**13.5 mg/kg**	0.24 a mg/kg	**5.17 a mg/kg**	**15 mg/kg**	**12.6 a mg/kg**	**6.89 a mg/kg**	0.649 a mg/kg	**364 mg/kg**	**5.36 mg/kg**
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	**0.588 mg/kg**	0.0104 mg/kg	**0.225 mg/kg**	**0.651 mg/kg**	**0.55 mg/kg**	**0.3 mg/kg**	0.0282 mg/kg	**15.8 mg/kg**	**0.233 mg/kg**
1-Methylnaphthalene	NA	Lab			--	--	0.013 mg/kg	0.018 mg/kg	0.044 mg/kg	0.036 mg/kg	< 0.0061 mg/kg	2 mg/kg	0.024 mg/kg
Benzo(e)pyrene	NA	Lab			--	--	0.54 mg/kg	6 mg/kg	1.6 mg/kg	1.5 mg/kg	0.055 mg/kg	240 mg/kg	0.29 mg/kg
Perylene	NA	Lab			--	--	0.33 mg/kg	5.9 mg/kg	0.43 mg/kg	0.43 mg/kg	0.044 mg/kg	110 mg/kg	0.31 mg/kg
C1-Chrysenes	NA	Lab			--	--	0.36 X mg/kg	1.7 X mg/kg	1.1 X mg/kg	1 X mg/kg	0.14 X mg/kg	18 X mg/kg	0.47 X mg/kg
C1-Fluoranthenes/Pyrenes	NA	Lab			--	--	0.82 X mg/kg	4.3 X mg/kg	3 X mg/kg	2.3 X mg/kg	0.13 X mg/kg	42 X mg/kg	1.1 X mg/kg
C1-Fluorenes	NA	Lab			--	--	0.059 X mg/kg	0.21 X mg/kg	0.27 X mg/kg	0.2 X mg/kg	0.017 X mg/kg	5.1 X mg/kg	0.13 X mg/kg
C1-Naphthalenes	NA	Lab			--	--	0.036 X mg/kg	0.059 X mg/kg	0.13 X mg/kg	0.091 X mg/kg	< 0.0061 X mg/kg	2 X mg/kg	0.037 X mg/kg
C1-Phenanthrenes/Anthracenes	NA	Lab			--	--	0.24 X mg/kg	1.2 X mg/kg	1.4 X mg/kg	0.88 X mg/kg	0.055 X mg/kg	16 X mg/kg	0.5 X mg/kg
C2-Chrysenes	NA	Lab			--	--	0.31 X mg/kg	1.2 X mg/kg	1.1 X mg/kg	1 X mg/kg	0.11 X mg/kg	17 X mg/kg	0.35 X mg/kg
C2-Fluorenes	NA	Lab			--	--	< 0.0087 X mg/kg	0.27 X mg/kg	0.67 X mg/kg	0.5 X mg/kg	< 0.0061 X mg/kg	3.5 X mg/kg	0.055 X mg/kg
C2-Naphthalenes	NA	Lab			--	--	0.039 X mg/kg	0.086 X mg/kg	0.17 X mg/kg	0.15 X mg/kg	0.011 X mg/kg	7 X mg/kg	0.099 X mg/kg
C2-Phenanthrenes/Anthracenes	NA	Lab			--	--	0.15 X mg/kg	0.74 X mg/kg	2.1 X mg/kg	1.3 X mg/kg	0.08 X mg/kg	12 X mg/kg	0.33 X mg/kg
C3-Chrysenes	NA	Lab			--	--	0.21 X mg/kg	0.75 X mg/kg	0.61 X mg/kg	0.86 X mg/kg	0.19 X mg/kg	8.7 X mg/kg	0.19 X mg/kg
C3-Fluorenes	NA	Lab			--	--	0.049 X mg/kg	0.25 X mg/kg	1.1 X mg/kg	0.35 X mg/kg	0.0060 X mg/kg	0.2 X mg/kg	0.073 X mg/kg
C3-Naphthalenes	NA	Lab			--	--	0.047 X mg/kg	0.12 X mg/kg	0.43 X mg/kg	0.29 X mg/kg	0.022 X mg/kg	8.7 X mg/kg	0.086 X mg/kg
C3-Phenanthrenes/Anthracenes	NA	Lab			--	--	0.15 X mg/kg	0.79 X mg/kg	2.6 X mg/kg	1.9 X mg/kg	0.17 X mg/kg	8 X mg/kg	0.28 X mg/kg
C4-Chrysenes	NA	Lab			--	--	0.049 X mg/kg	0.27 X mg/kg	0.32 X mg/kg	0.46 X mg/kg	0.1 X mg/kg	3.7 X mg/kg	0.058 X mg/kg
C4-Napthalenes	NA	Lab			--	--	0.021 X mg/kg	0.077 X mg/kg	0.79 X mg/kg	0.44 X mg/kg	0.038 X mg/kg	5.5 X mg/kg	0.039 X mg/kg
C4-Phenanthrenes/Anthracenes	NA	Lab			--	--	< 0.0087 X mg/kg	< 0.0066 X mg/kg	1.7 X mg/kg	1.5 X mg/kg	0.051 X mg/kg	4.2 X mg/kg	0.15 X mg/kg
Sum of ESBPAH17@ 0.5DL	NA	Lab			19.9 mg/kg	0.265 a mg/kg	7 a mg/kg	20.2 mg/kg	16 a mg/kg	9 a mg/kg	0.84 a mg/kg	434 mg/kg	6.9 mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.429 tu	0.012 a tu	0.209 a tu	0.602 tu	0.516 a tu	0.238 a tu	0.029 a tu	7.4 tu	0.226 tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			--	--	10.4 a mg/kg	44 a mg/kg	35.4 a mg/kg	24.1 a mg/kg	2.06 a mg/kg	944 a mg/kg	11.4 a mg/kg
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** (1)		--	--	0.298 a tu	**1.23 a tu**	**1.06 a tu**	0.576 a tu	0.065 a tu	**14.4 a tu**	0.360 a tu
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** (1)		0.99 a tu	0.278 a tu	--	--	--	--	--	--	--

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II	Sys Loc Code: WM-19 / Sample Date: 3/2/2011 / Depth Interval: 0 - 0.5 ft / Sys Sample Code: WM-19-1_0.0-0.5_03022011 / Sample Type Code: N	Sys Loc Code: WM-19 / Sample Date: 3/2/2011 / Depth Interval: 0.75 - 1.25 ft / Sys Sample Code: WM-19-2_0.75-1.25_03022011 / Sample Type Code: N	Sys Loc Code: WM-19 / Sample Date: 3/2/2011 / Depth Interval: 1.25 - 1.75 ft / Sys Sample Code: WM-19-3_1.25-1.75_03022011 / Sample Type Code: N	Sys Loc Code: UC-20 / Sample Date: 3/2/2011 / Depth Interval: 0 - 0.5 ft / Sys Sample Code: UC-20-1_0.0-0.5_03022011 / Sample Type Code: N	Sys Loc Code: UC-20 / Sample Date: 3/2/2011 / Depth Interval: 1.5 - 2 ft / Sys Sample Code: UC-20-2_1.5-2.0_03022011 / Sample Type Code: N	Sys Loc Code: UC-20 / Sample Date: 3/2/2011 / Depth Interval: 2.5 - 3 ft / Sys Sample Code: UC-20-3_2.5-3.0_03022011 / Sample Type Code: N	Sys Loc Code: UC-20 / Sample Date: 3/2/2011 / Depth Interval: 3.5 - 4 ft / Sys Sample Code: UC-20-4_3.5-4.0_03022011 / Sample Type Code: N	Sys Loc Code: WM-21 / Sample Date: 3/4/2011 / Depth Interval: 0 - 0.5 ft / Sys Sample Code: WM-21-1_0.0-0.5_03042011 / Sample Type Code: N	Sys Loc Code: WM-21 / Sample Date: 3/4/2011 / Depth Interval: 2 - 2.5 ft / Sys Sample Code: WM-21-2_2.0-2.5_03042011 / Sample Type Code: N
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
SVOCs													
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	**0.086 mg/kg**	**4.1 mg/kg**	**0.0097 mg/kg**	**0.038 mg/kg**	**0.3 mg/kg**	**0.034 mg/kg**	**0.18 mg/kg**	< 0.0077 mg/kg	**0.0073 j mg/kg**
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	< 0.0062 mg/kg	**0.38 mg/kg**	< 0.0053 mg/kg	**0.36 mg/kg**	**0.99 mg/kg**	< 0.074 mg/kg	**0.0078 mg/kg**	< 0.0077 mg/kg	**0.011 mg/kg**
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	0.028 mg/kg	**14 mg/kg**	0.0086 mg/kg	**0.36 mg/kg**	**2.6 mg/kg**	**0.18 mg/kg**	**0.32 mg/kg**	0.0080 mg/kg	0.015 mg/kg
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	0.028 mg/kg	**15 mg/kg**	0.016 mg/kg	**1.4 mg/kg**	**5.8 mg/kg**	**0.52 mg/kg**	**0.3 mg/kg**	0.027 mg/kg	0.1 mg/kg
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	0.023 mg/kg	**11 mg/kg**	0.011 mg/kg	**0.88 mg/kg**	**4.4 mg/kg**	**0.67 mg/kg**	0.14 mg/kg	0.026 mg/kg	0.1 mg/kg
Benzo(b)fluoranthene	NA	Lab			0.02 mg/kg	11 mg/kg	0.013 mg/kg	1.3 mg/kg	3.7 mg/kg	0.67 mg/kg	0.23 mg/kg	0.022 mg/kg	0.13 mg/kg
Benzo(g,h,i)perylene	NA	Lab			0.0082 mg/kg	8.8 mg/kg	0.0061 mg/kg	0.96 mg/kg	2.7 mg/kg	0.64 mg/kg	0.031 mg/kg	0.026 mg/kg	0.1 mg/kg
Benzo(k)fluoranthene	NA	Lab			0.028 mg/kg	11 mg/kg	0.007 mg/kg	1.3 mg/kg	3.4 mg/kg	0.61 mg/kg	0.13 mg/kg	0.018 mg/kg	0.07 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	0.026 mg/kg	**11 mg/kg**	0.0062 mg/kg	**1.4 mg/kg**	**5.8 mg/kg**	**0.55 mg/kg**	**0.27 mg/kg**	0.027 mg/kg	0.097 mg/kg
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	< 0.32 mg/kg	**1.4 mg/kg**	< 0.0053 mg/kg	**0.81 mg/kg**	**0.88 mg/kg**	**0.18 mg/kg**	0.02 mg/kg	0.0091 mg/kg	0.026 mg/kg
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	0.055 mg/kg	**45 mg/kg**	0.02 j mg/kg	**3 mg/kg**	**13 mg/kg**	**1.2 mg/kg**	**1.5 mg/kg**	0.036 mg/kg	0.13 mg/kg
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	0.051 mg/kg	**7.9 mg/kg**	0.015 mg/kg	**0.24 mg/kg**	**0.82 mg/kg**	0.065 mg/kg	**0.42 mg/kg**	< 0.0077 mg/kg	0.011 mg/kg
Indeno(1,2,3-cd)pyrene	NA	Lab			0.0094 mg/kg	7.9 mg/kg	0.007 mg/kg	0.95 mg/kg	2.6 mg/kg	0.6 mg/kg	0.042 mg/kg	0.024 mg/kg	0.096 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	< 0.32 mg/kg	**0.29 mg/kg**	0.007 mg/kg	**0.071 mg/kg**	**0.063 mg/kg**	0.019 mg/kg	0.015 mg/kg	< 0.0077 mg/kg	< 0.0061 mg/kg
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	0.0073 mg/kg	**0.5 mg/kg**	0.012 mg/kg	**0.35 mg/kg**	**0.32 mg/kg**	**0.35 mg/kg**	0.025 mg/kg	< 0.0077 mg/kg	0.0067 mg/kg
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	0.17 mg/kg	**21 mg/kg**	0.03 mg/kg	**1.2 mg/kg**	**5.5 mg/kg**	**0.5 mg/kg**	**2 mg/kg**	0.018 mg/kg	< 0.31 mg/kg
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	0.036 mg/kg	**21 mg/kg**	0.017 mg/kg	**1.8 mg/kg**	**6.1 mg/kg**	**0.68 mg/kg**	**0.69 mg/kg**	0.04 mg/kg	0.16 mg/kg
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	0.833 mg/kg	**153 mg/kg**	0.158 a mg/kg	**11.9 mg/kg**	**46.6 mg/kg**	**4.99 mg/kg**	**5.89 mg/kg**	0.21 mg/kg	0.822 a mg/kg
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	0.0362 mg/kg	**6.63 mg/kg**	0.00686 mg/kg	**0.518 mg/kg**	**2.02 mg/kg**	**0.217 mg/kg**	**0.256 mg/kg**	0.00915 mg/kg	0.0357 mg/kg
1-Methylnaphthalene	NA	Lab			< 0.0062 mg/kg	--	--	0.022 mg/kg	--	--	--	< 0.0077 mg/kg	< 0.0061 mg/kg
Benzo(e)pyrene	NA	Lab			0.055 mg/kg	--	--	11 mg/kg	--	--	--	0.018 mg/kg	0.07 mg/kg
Perylene	NA	Lab			0.13 mg/kg	--	--	7.7 mg/kg	--	--	--	0.036 mg/kg	0.071 mg/kg
C1-Chrysenes	NA	Lab			0.021 X mg/kg	--	--	0.68 X mg/kg	--	--	--	0.025 X mg/kg	0.12 X mg/kg
C1-Fluoranthenes/Pyrenes	NA	Lab			0.04 X mg/kg	--	--	1.2 X mg/kg	--	--	--	0.02 X mg/kg	0.086 X mg/kg
C1-Fluorenes	NA	Lab			0.014 X mg/kg	--	--	0.06 X mg/kg	--	--	--	< 0.0077 X mg/kg	0.0074 X mg/kg
C1-Naphthalenes	NA	Lab			< 0.0062 X mg/kg	--	--	0.063 X mg/kg	--	--	--	< 0.0077 X mg/kg	< 0.0061 X mg/kg
C1-Phenanthrenes/Anthracenes	NA	Lab			0.026 X mg/kg	--	--	0.26 X mg/kg	--	--	--	< 0.0077 X mg/kg	0.029 X mg/kg
C2-Chrysenes	NA	Lab			0.023 X mg/kg	--	--	0.51 X mg/kg	--	--	--	0.015 X mg/kg	0.13 X mg/kg
C2-Fluorenes	NA	Lab			0.014 X mg/kg	--	--	0.013 X mg/kg	--	--	--	< 0.0077 X mg/kg	0.019 X mg/kg
C2-Naphthalenes	NA	Lab			0.019 X mg/kg	--	--	0.059 X mg/kg	--	--	--	< 0.0077 X mg/kg	0.01 X mg/kg
C2-Phenanthrenes/Anthracenes	NA	Lab			0.015 X mg/kg	--	--	0.15 X mg/kg	--	--	--	< 0.0077 X mg/kg	0.042 X mg/kg
C3-Chrysenes	NA	Lab			< 0.0062 X mg/kg	--	--	0.28 X mg/kg	--	--	--	< 0.0077 X mg/kg	0.095 X mg/kg
C3-Fluorenes	NA	Lab			< 0.0062 X mg/kg	--	--	< 0.01 X mg/kg	--	--	--	< 0.0077 X mg/kg	0.029 X mg/kg
C3-Naphthalenes	NA	Lab			0.021 X mg/kg	--	--	0.059 X mg/kg	--	--	--	< 0.0077 X mg/kg	0.015 X mg/kg
C3-Phenanthrenes/Anthracenes	NA	Lab			0.029 X mg/kg	--	--	0.14 X mg/kg	--	--	--	< 0.0077 X mg/kg	0.063 X mg/kg
C4-Chrysenes	NA	Lab			< 0.0062 X mg/kg	--	--	0.0080 X mg/kg	--	--	--	< 0.0077 X mg/kg	0.053 X mg/kg
C4-Napthalenes	NA	Lab			< 0.0062 X mg/kg	--	--	< 0.01 X mg/kg	--	--	--	< 0.0077 X mg/kg	0.015 X mg/kg
C4-Phenanthrenes/Anthracenes	NA	Lab			< 0.0062 X mg/kg	--	--	< 0.01 X mg/kg	--	--	--	< 0.0077 X mg/kg	< 0.0061 X mg/kg
Sum of ESBPAH17@ 0.5DL	NA	Lab			0.899 mg/kg	191 mg/kg	0.191 a mg/kg	16.4 mg/kg	59 mg/kg	7.5 mg/kg	6.3 mg/kg	0.301 mg/kg	1.2 a mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.038 tu	3.1 tu	0.011 a tu	0.415 tu	1.6 tu	0.157 tu	0.434 tu	0.014 tu	0.043 a tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			1.16 a mg/kg	--	--	38.5 a mg/kg	--	--	--	0.461 a mg/kg	2.08 a mg/kg
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [1]		0.0427 a tu	--	--	0.876 a tu	--	--	--	0.021 a tu	0.070 a tu
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [1]		--	**5.55 a tu**	0.276 a tu	--	**2.99 a tu**	0.525 a tu	0.999 a tu	--	--

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II	WM-21 3/4/2011 4 - 4.5 ft WM-21-3_4.0-4.5_03042011 N	WM-21 3/4/2011 5 - 5.5 ft WM-21-4_5.0-5.5_03042011 N	WM-22 3/6/2011 0 - 0.5 ft WM-22-1_0.0-0.5_03062011 N	WM-22 3/6/2011 1.5 - 2 ft WM-22-2_1.5-2.0_03062011 N	WM-22 3/6/2011 4 - 4.5 ft WM-22-3_4.0-4.5_03062011 N	WM-22 3/6/2011 5.5 - 6 ft WM-22-4_5.5-6.0_03062011 N	UC-23 3/2/2011 0 - 0.5 ft UC-23-1_0.0-0.5_03022011 N	UC-23 3/2/2011 1.5 - 2 ft UC-23-2_1.5-2.0_03022011 N	UC-23 3/2/2011 2.5 - 3 ft UC-23-3_2.5-3.0_03022011 N
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
SVOCs													
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	**37 mg/kg**	**0.06 j mg/kg**	< 0.0046 mg/kg	< 0.0055 mg/kg	< 0.0042 mg/kg	< 0.0049 mg/kg	**0.15 mg/kg**	**1.3 mg/kg**	**0.37 mg/kg**
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	**3.7 mg/kg**	< 0.0063 mg/kg	< 0.0046 mg/kg	< 0.0055 mg/kg	< 0.0042 mg/kg	0.0052 mg/kg	**0.99 mg/kg**	**1.5 mg/kg**	**0.51 mg/kg**
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	**100 mg/kg**	0.024 mg/kg	< 0.0046 mg/kg	0.0052 j mg/kg	< 0.0042 mg/kg	0.0071 mg/kg	**1.2 mg/kg**	**8.5 mg/kg**	**0.81 mg/kg**
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	**110 mg/kg**	0.055 mg/kg	0.0055 mg/kg	0.043 mg/kg	0.0049 mg/kg	0.022 mg/kg	**3.3 mg/kg**	**13 mg/kg**	**1.4 mg/kg**
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	**86 mg/kg**	0.042 mg/kg	0.0099 mg/kg	0.048 mg/kg	0.0077 mg/kg	0.026 mg/kg	**3 mg/kg**	**5.5 mg/kg**	**1.3 mg/kg**
Benzo(b)fluoranthene	NA	Lab			64 mg/kg	0.039 mg/kg	0.0062 j mg/kg	0.038 j mg/kg	< 0.22 mg/kg	0.022 j mg/kg	3.1 mg/kg	8 mg/kg	1 mg/kg
Benzo(g,h,i)perylene	NA	Lab			48 mg/kg	0.032 mg/kg	0.011 mg/kg	0.044 mg/kg	0.0077 mg/kg	0.023 mg/kg	2.2 mg/kg	5.5 mg/kg	1 mg/kg
Benzo(k)fluoranthene	NA	Lab			94 mg/kg	0.039 mg/kg	0.0067 mg/kg	0.026 mg/kg	0.0053 mg/kg	0.017 mg/kg	2.7 mg/kg	5.4 mg/kg	0.99 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	**83 mg/kg**	0.041 mg/kg	0.0056 mg/kg	0.047 mg/kg	< 0.0042 mg/kg	0.031 mg/kg	**3.2 mg/kg**	**12 mg/kg**	**1.5 mg/kg**
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	**12 mg/kg**	0.011 mg/kg	< 0.0046 mg/kg	0.013 mg/kg	< 0.0042 mg/kg	0.0086 mg/kg	**0.7 mg/kg**	**2 mg/kg**	**0.41 mg/kg**
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	**300 mg/kg**	0.11 mg/kg	0.011 mg/kg	0.039 mg/kg	0.0081 mg/kg	0.039 mg/kg	**7.5 mg/kg**	**29 mg/kg**	**4.2 mg/kg**
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	**57 mg/kg**	0.035 mg/kg	< 0.0046 mg/kg	< 0.0055 mg/kg	< 0.0042 mg/kg	0.0080 mg/kg	**0.56 mg/kg**	**3.7 mg/kg**	**0.56 mg/kg**
Indeno(1,2,3-cd)pyrene	NA	Lab			56 mg/kg	0.037 mg/kg	0.011 mg/kg	0.027 mg/kg	0.0088 mg/kg	0.022 mg/kg	2.1 mg/kg	5.6 mg/kg	0.86 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	**5.1 mg/kg**	< 0.0063 mg/kg	< 0.0046 mg/kg	< 0.0055 mg/kg	< 0.0042 mg/kg	0.012 mg/kg	**0.18 mg/kg**	**0.49 mg/kg**	**0.57 mg/kg**
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	**4 mg/kg**	< 0.0063 mg/kg	< 0.0046 mg/kg	< 0.0055 mg/kg	< 0.0042 mg/kg	0.023 mg/kg	**0.83 mg/kg**	**1.2 mg/kg**	**6.3 mg/kg**
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	**160 mg/kg**	0.05 mg/kg	0.0073 mg/kg	0.016 mg/kg	0.0063 mg/kg	0.023 mg/kg	**2.9 mg/kg**	**21 mg/kg**	**2.1 mg/kg**
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	**190 mg/kg**	0.096 mg/kg	0.012 mg/kg	0.043 mg/kg	0.0089 mg/kg	0.042 mg/kg	**4.2 mg/kg**	**20 mg/kg**	**1.9 mg/kg**
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	**1150 mg/kg**	0.533 a mg/kg	0.0674 mg/kg	0.268 a mg/kg	0.0527 mg/kg	0.249 mg/kg	**28.7 mg/kg**	**119 mg/kg**	**21.9 mg/kg**
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	**49.9 mg/kg**	0.0232 mg/kg	0.00293 mg/kg	0.0116 mg/kg	0.00229 mg/kg	0.0108 mg/kg	**1.25 mg/kg**	**5.18 mg/kg**	**0.953 mg/kg**
1-Methylnaphthalene	NA	Lab			3.3 mg/kg	< 0.0063 mg/kg	< 0.0046 mg/kg	< 0.0055 mg/kg	< 0.0042 mg/kg	0.0072 mg/kg	0.05 mg/kg	0.57 mg/kg	0.2 mg/kg
Benzo(e)pyrene	NA	Lab			93 mg/kg	0.071 j mg/kg	0.0065 mg/kg	0.046 mg/kg	0.0040 j mg/kg	0.023 mg/kg	25 mg/kg	56 mg/kg	1.5 mg/kg
Perylene	NA	Lab			87 mg/kg	0.11 mg/kg	0.045 mg/kg	0.03 mg/kg	0.012 mg/kg	0.02 mg/kg	12 mg/kg	41 mg/kg	0.77 mg/kg
C1-Chrysenes	NA	Lab			20 X mg/kg	0.027 X mg/kg	0.0077 X mg/kg	0.1 X mg/kg	< 0.0042 X mg/kg	0.049 X mg/kg	1.5 X mg/kg	12 X mg/kg	1.9 X mg/kg
C1-Fluoranthenes/Pyrenes	NA	Lab			100 X mg/kg	0.046 X mg/kg	0.0071 X mg/kg	0.043 X mg/kg	0.0053 X mg/kg	0.092 X mg/kg	3.2 X mg/kg	34 X mg/kg	4.4 X mg/kg
C1-Fluorenes	NA	Lab			13 X mg/kg	0.015 X mg/kg	< 0.0046 X mg/kg	0.0060 X mg/kg	< 0.0042 X mg/kg	0.01 X mg/kg	0.25 X mg/kg	1.3 X mg/kg	0.63 X mg/kg
C1-Naphthalenes	NA	Lab			3.5 X mg/kg	< 0.0063 X mg/kg	< 0.0046 X mg/kg	< 0.0055 X mg/kg	< 0.0042 X mg/kg	0.014 X mg/kg	0.15 X mg/kg	0.96 X mg/kg	0.47 X mg/kg
C1-Phenanthrenes/Anthracenes	NA	Lab			26 X mg/kg	0.022 X mg/kg	< 0.0046 X mg/kg	0.019 X mg/kg	0.0041 X mg/kg	0.059 X mg/kg	0.73 X mg/kg	8.5 X mg/kg	2.8 X mg/kg
C2-Chrysenes	NA	Lab			19 X mg/kg	0.031 X mg/kg	0.0058 X mg/kg	0.088 X mg/kg	< 0.0042 X mg/kg	0.074 X mg/kg	0.97 X mg/kg	7.4 X mg/kg	1.9 X mg/kg
C2-Fluorenes	NA	Lab			7.6 X mg/kg	0.0082 X mg/kg	< 0.0046 X mg/kg	0.01 X mg/kg	< 0.0042 X mg/kg	0.047 X mg/kg	0.021 X mg/kg	0.21 X mg/kg	1.4 X mg/kg
C2-Naphthalenes	NA	Lab			10 X mg/kg	0.015 X mg/kg	< 0.0046 X mg/kg	0.0062 X mg/kg	< 0.0042 X mg/kg	0.032 X mg/kg	0.13 X mg/kg	1.4 X mg/kg	0.49 X mg/kg
C2-Phenanthrenes/Anthracenes	NA	Lab			17 X mg/kg	0.012 X mg/kg	< 0.0046 X mg/kg	0.024 X mg/kg	< 0.0042 X mg/kg	0.11 X mg/kg	0.38 X mg/kg	3.7 X mg/kg	4.3 X mg/kg
C3-Chrysenes	NA	Lab			10 X mg/kg	< 0.0063 X mg/kg	< 0.0046 X mg/kg	0.061 X mg/kg	< 0.0042 X mg/kg	0.065 X mg/kg	0.57 X mg/kg	3.6 X mg/kg	1.5 X mg/kg
C3-Fluorenes	NA	Lab			5.5 X mg/kg	< 0.0063 X mg/kg	< 0.0046 X mg/kg	< 0.0055 X mg/kg	< 0.0042 X mg/kg	0.0081 X mg/kg	< 0.0092 X mg/kg	0.057 X mg/kg	2.4 X mg/kg
C3-Naphthalenes	NA	Lab			9.9 X mg/kg	0.012 X mg/kg	< 0.0046 X mg/kg	0.012 X mg/kg	< 0.0042 X mg/kg	0.068 X mg/kg	0.11 X mg/kg	1.1 X mg/kg	1.1 X mg/kg
C3-Phenanthrenes/Anthracenes	NA	Lab			12 X mg/kg	0.0087 X mg/kg	< 0.0046 X mg/kg	0.033 X mg/kg	< 0.0042 X mg/kg	0.18 X mg/kg	0.23 X mg/kg	2.1 X mg/kg	5.3 X mg/kg
C4-Chrysenes	NA	Lab			4.3 X mg/kg	< 0.0063 X mg/kg	< 0.0046 X mg/kg	0.024 X mg/kg	< 0.0042 X mg/kg	0.06 X mg/kg	0.18 X mg/kg	1 X mg/kg	0.75 X mg/kg
C4-Napthalenes	NA	Lab			4.2 X mg/kg	< 0.0063 X mg/kg	< 0.0046 X mg/kg	0.013 X mg/kg	< 0.0042 X mg/kg	0.097 X mg/kg	0.0094 X mg/kg	0.051 X mg/kg	1.2 X mg/kg
C4-Phenanthrenes/Anthracenes	NA	Lab			5.9 X mg/kg	< 0.0063 X mg/kg	< 0.0046 X mg/kg	< 0.0055 X mg/kg	< 0.0042 X mg/kg	0.17 X mg/kg	< 0.0092 X mg/kg	0.11 X mg/kg	4 X mg/kg
Sum of ESBPAH17@ 0.5DL	NA	Lab			1410 mg/kg	0.681 a mg/kg	0.102 a mg/kg	0.403 a mg/kg	0.184 mg/kg	0.333 a mg/kg	38.8 mg/kg	144 mg/kg	25.8 mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			16.1 a BQX tu	0.021 a tu	0.008 a tu	0.015 a tu	0.131 tu	0.016 a tu	1.0 tu	3.7 tu	0.694 tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			1850 a mg/kg	1.07 a mg/kg	0.202 a mg/kg	0.924 a mg/kg	0.237 a mg/kg	1.5 a mg/kg	84.1 a mg/kg	318 a mg/kg	62 a mg/kg
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** (1)		**20.5 a BQX tu**	0.032 a tu	0.014 a tu	0.034 a tu	0.171 a tu	0.066 a tu	**2.03 a tu**	**7.33 a tu**	**1.43 a tu**
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** (1)		--	--	--	--	--	--	--	--	--

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

					Sys Loc Code	**UC-23**	**WM-24**	**WM-24**		**WM-24**	**WM-24**	**WM-25**	**WM-25**	**WM-25**
					Sample Date	**3/2/2011**	**3/7/2011**	**3/7/2011**		**3/7/2011**	**3/7/2011**	**3/7/2011**	**3/7/2011**	**3/7/2011**
					Depth Interval	**3.75 - 4.25 ft**	**0 - 0.5 ft**	**1 - 1.5 ft**	**1 - 1.5 ft**	**2 - 2.5 ft**	**3 - 3.5 ft**	**0 - 0.5 ft**	**2.5 - 3 ft**	**5.5 - 6 ft**
					Sys Sample Code	**UC-23-4_3.75-4.25_03022011**	**WM-24-1_0.0-0.5_03072011**	**WM-24-2_1.0-1.5_03072011**	**WM-24-2_1.0-1.5_03072011_FD**	**WM-24-3_2.0-2.5_03072011**	**WM-24-4_3.0-3.5_03072011**	**WM-25-1_0.0-0.5_03072011**	**WM-25-2_2.5-3.0_03072011**	**WM-25-3_5.5-6.0_03072011**
					Sample Type Code	**N**	**N**	**N**	**FD**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II										
Effective Date			2/1/2007	2/1/2007										
Exceedance Key			**Bold**	Underline										
SVOCs														
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	0.0044 mg/kg	**0.12 j mg/kg**	**8.8 j mg/kg**	**7.6 mg/kg**		**0.013 mg/kg**	**0.019 mg/kg**	< 0.0082 mg/kg	**0.023 mg/kg**	**14 mg/kg**
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	0.0043 j mg/kg	**0.049 mg/kg**	**2.3 mg/kg**	**1.4 mg/kg**		< 0.0071 mg/kg	< 0.0073 mg/kg	**0.011 mg/kg**	**0.022 mg/kg**	**1.4 mg/kg**
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	0.01 mg/kg	**0.34 mg/kg**	**38 j mg/kg**	**27 mg/kg**		**0.063 mg/kg**	**0.12 mg/kg**	0.011 mg/kg	**0.09 mg/kg**	**37 mg/kg**
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	0.029 mg/kg	**0.8 mg/kg**	**39 mg/kg**	**32 mg/kg**		**0.79 mg/kg**	**0.6 mg/kg**	0.065 mg/kg	**0.32 mg/kg**	**41 mg/kg**
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	0.023 mg/kg	**0.57 mg/kg**	**30 mg/kg**	**25 mg/kg**		0.12 mg/kg	**0.17 mg/kg**	0.063 mg/kg	**0.42 mg/kg**	**33 mg/kg**
Benzo(b)fluoranthene	NA	Lab			0.021 mg/kg	0.53 mg/kg	20 mg/kg	19 mg/kg		0.2 j mg/kg	0.16 mg/kg	0.047 mg/kg	0.43 j mg/kg	25 mg/kg
Benzo(g,h,i)perylene	NA	Lab			0.0089 mg/kg	0.44 mg/kg	18 mg/kg	14 mg/kg		0.047 j mg/kg	0.059 j mg/kg	0.047 mg/kg	0.24 j mg/kg	19 mg/kg
Benzo(k)fluoranthene	NA	Lab			0.024 mg/kg	0.49 mg/kg	29 mg/kg	27 mg/kg		0.12 mg/kg	0.14 j mg/kg	0.054 mg/kg	0.28 mg/kg	33 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	0.028 mg/kg	**0.57 mg/kg**	**32 mg/kg**	**25 mg/kg**		**0.67 mg/kg**	**0.49 mg/kg**	0.053 mg/kg	**0.31 mg/kg**	**32 mg/kg**
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	0.0051 j mg/kg	**0.15 mg/kg**	**5.5 mg/kg**	**2.9 mg/kg**		0.016 mg/kg	0.02 mg/kg	0.017 mg/kg	**0.089 mg/kg**	**5.9 mg/kg**
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	0.097 mg/kg	**0.86 mg/kg**	**130 mg/kg**	**85 mg/kg**		**2.5 mg/kg**	**0.78 mg/kg**	0.076 mg/kg	0.38 mg/kg	**110 mg/kg**
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	0.0067 mg/kg	**0.23 mg/kg**	**16 j mg/kg**	**13 mg/kg**		0.029 mg/kg	0.047 mg/kg	< 0.0082 mg/kg	0.039 mg/kg	**20 mg/kg**
Indeno(1,2,3-cd)pyrene	NA	Lab			0.0091 mg/kg	0.5 mg/kg	22 mg/kg	17 mg/kg		0.063 mg/kg	0.1 mg/kg	0.05 mg/kg	0.28 mg/kg	22 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	< 0.0043 mg/kg	**0.02 mg/kg**	**0.93 j mg/kg**	**0.69 mg/kg**		< 0.0071 mg/kg	< 0.0073 mg/kg	< 0.0082 mg/kg	0.016 mg/kg	**2.1 mg/kg**
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	0.0099 mg/kg	0.026 mg/kg	**0.51 j mg/kg**	**0.37 j mg/kg**		< 0.0071 mg/kg	< 0.0073 mg/kg	< 0.0082 mg/kg	0.082 mg/kg	**1.1 mg/kg**
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	0.032 mg/kg	**0.53 mg/kg**	**56 j mg/kg**	**42 mg/kg**		0.14 mg/kg	0.19 mg/kg	0.022 j mg/kg	**0.25 mg/kg**	**60 mg/kg**
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	0.044 mg/kg	**0.51 mg/kg**	**55 mg/kg**	**52 mg/kg**		**1.5 mg/kg**	**0.62 mg/kg**	0.069 j mg/kg	**0.36 mg/kg**	**69 mg/kg**
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	0.296 mg/kg	**4.78 a mg/kg**	**414 a mg/kg**	**314 mg/kg**		**5.85 mg/kg**	**3.07 mg/kg**	0.403 a mg/kg	**2.4 mg/kg**	**427 mg/kg**
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	0.0128 mg/kg	**0.208 mg/kg**	**18 mg/kg**	**13.7 mg/kg**		**0.254 mg/kg**	**0.133 mg/kg**	0.0175 mg/kg	**0.104 mg/kg**	**18.5 mg/kg**
1-Methylnaphthalene	NA	Lab			< 0.0043 mg/kg	0.017 mg/kg	--	--		--	--	< 0.0082 mg/kg	--	--
Benzo(e)pyrene	NA	Lab			0.016 mg/kg	0.29 mg/kg	--	--		--	--	0.034 j mg/kg	--	--
Perylene	NA	Lab			0.056 mg/kg	0.29 mg/kg	--	--		--	--	0.059 mg/kg	--	--
C1-Chrysenes	NA	Lab			0.019 X mg/kg	0.58 X mg/kg	--	--		--	--	0.043 X mg/kg	--	--
C1-Fluoranthenes/Pyrenes	NA	Lab			0.035 X mg/kg	1.1 X mg/kg	--	--		--	--	0.065 X mg/kg	--	--
C1-Fluorenes	NA	Lab			0.0083 X mg/kg	0.18 X mg/kg	--	--		--	--	< 0.0082 X mg/kg	--	--
C1-Naphthalenes	NA	Lab			< 0.0043 X mg/kg	0.026 X mg/kg	--	--		--	--	< 0.0082 X mg/kg	--	--
C1-Phenanthrenes/Anthracenes	NA	Lab			0.018 X mg/kg	0.41 X mg/kg	--	--		--	--	0.019 X mg/kg	--	--
C2-Chrysenes	NA	Lab			< 0.0043 X mg/kg	0.42 X mg/kg	--	--		--	--	0.044 X mg/kg	--	--
C2-Fluorenes	NA	Lab			0.016 X mg/kg	0.16 X mg/kg	--	--		--	--	< 0.0082 X mg/kg	--	--
C2-Naphthalenes	NA	Lab			0.0050 X mg/kg	0.13 X mg/kg	--	--		--	--	0.011 X mg/kg	--	--
C2-Phenanthrenes/Anthracenes	NA	Lab			0.016 X mg/kg	0.32 X mg/kg	--	--		--	--	0.017 X mg/kg	--	--
C3-Chrysenes	NA	Lab			< 0.0043 X mg/kg	0.39 X mg/kg	--	--		--	--	0.025 X mg/kg	--	--
C3-Fluorenes	NA	Lab			0.0041 X mg/kg	0.2 X mg/kg	--	--		--	--	< 0.0082 X mg/kg	--	--
C3-Naphthalenes	NA	Lab			0.014 X mg/kg	0.17 X mg/kg	--	--		--	--	0.017 X mg/kg	--	--
C3-Phenanthrenes/Anthracenes	NA	Lab			0.024 X mg/kg	0.29 X mg/kg	--	--		--	--	0.014 X mg/kg	--	--
C4-Chrysenes	NA	Lab			< 0.0043 X mg/kg	0.14 X mg/kg	--	--		--	--	< 0.0082 X mg/kg	--	--
C4-Napthalenes	NA	Lab			0.01 X mg/kg	0.13 X mg/kg	--	--		--	--	0.011 X mg/kg	--	--
C4-Phenanthrenes/Anthracenes	NA	Lab			< 0.0043 X mg/kg	0.19 X mg/kg	--	--		--	--	< 0.0082 X mg/kg	--	--
Sum of ESBPAH17@ 0.5DL	NA	Lab			0.359 a mg/kg	6.7 a mg/kg	503 a mg/kg	391 a mg/kg		6.3 a mg/kg	3.5 a mg/kg	0.601 a mg/kg	3.6 a mg/kg	526 mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.072 a tu	0.223 a tu	7.9 a tu	6.1 a tu		0.12 a tu	0.053 a tu	0.024 a tu	0.174 a tu	5.97 a BQX tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			0.609 a mg/kg	12.1 a mg/kg	--	--		--	--	0.981 a mg/kg	--	--
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		0.119 a tu	0.397 a tu	--	--		--	--	0.039 a tu	--	--
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		--	--	**13.8 a tu**	**10.7 a tu**		0.462 a tu	0.348 a tu	--	0.554 a tu	**10.4 a BQX tu**

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

					Sys Loc Code	**WM-25**	**WM-26**	**WM-26**	**WM-26**	**WM-26**	**WM-27**	**WM-27**	**WM-27**	**WM-28**
					Sample Date	**3/7/2011**	**3/11/2011**	**3/11/2011**	**3/11/2011**	**3/11/2011**	**3/13/2011**	**3/13/2011**	**3/13/2011**	**3/13/2011**
					Depth Interval	**6 - 6.5 ft**	**0 - 0.5 ft**	**0.5 - 1 ft**	**1.3 - 1.8 ft**	**1.8 - 2.1 ft**	**0 - 0.5 ft**	**0.5 - 1 ft**	**1.4 - 1.9 ft**	**0 - 0.5 ft**
					Sys Sample Code	**WM-25-4_6.0-6.5_03072011**	**WM-26-1_0.0-0.5_03112011**	**WM-26-2_0.5-1.0_03112011**	**WM-26-3_1.3-1.8_03112011**	**WM-26-4_1.8-2.1_03112011**	**WM-27-1_0.0-0.5_03132011**	**WM-27-2_0.5-1.0_03132011**	**WM-27-3_1.4-1.9_03132011**	**WM-28-1_0.0-0.5_03132011**
					Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II										
Effective Date			2/1/2007	2/1/2007										
Exceedance Key			**Bold**	Underline										
SVOCs														
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	**0.11 mg/kg**	< 0.008 mg/kg	0.0062 j mg/kg	**9.2 mg/kg**	**0.36 mg/kg**	< 0.0077 mg/kg	< 0.0075 mg/kg	**2.4 mg/kg**	< 0.01 mg/kg
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	< 0.0059 mg/kg	< 0.008 mg/kg	**0.016 mg/kg**	**0.97 mg/kg**	< 0.0060 mg/kg	< 0.0077 mg/kg	< 0.0075 mg/kg	**0.12 mg/kg**	< 0.01 mg/kg
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	0.012 mg/kg	< 0.008 mg/kg	0.023 mg/kg	**5.1 mg/kg**	**0.06 mg/kg**	< 0.0077 mg/kg	0.0090 mg/kg	**2.4 mg/kg**	< 0.01 mg/kg
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	0.018 mg/kg	0.017 mg/kg	**0.12 mg/kg**	**20 mg/kg**	0.054 mg/kg	0.035 mg/kg	0.04 mg/kg	**3 mg/kg**	0.041 mg/kg
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	< 0.0059 mg/kg	0.014 mg/kg	**0.29 mg/kg**	**16 mg/kg**	0.042 mg/kg	0.032 mg/kg	0.039 mg/kg	**3.1 mg/kg**	0.039 mg/kg
Benzo(b)fluoranthene	NA	Lab			0.049 mg/kg	0.014 mg/kg	0.3 j mg/kg	12 mg/kg	0.029 mg/kg	0.031 mg/kg	0.026 mg/kg	2.6 mg/kg	0.058 mg/kg
Benzo(g,h,i)perylene	NA	Lab			0.014 j mg/kg	0.014 mg/kg	0.071 j mg/kg	8.6 mg/kg	0.019 j mg/kg	0.027 mg/kg	0.024 j mg/kg	1.8 mg/kg	0.033 mg/kg
Benzo(k)fluoranthene	NA	Lab			0.019 mg/kg	0.011 mg/kg	0.16 mg/kg	16 mg/kg	0.039 mg/kg	0.024 mg/kg	0.031 mg/kg	2.5 mg/kg	0.04 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	0.015 mg/kg	0.016 mg/kg	0.12 mg/kg	**16 mg/kg**	0.036 mg/kg	0.034 mg/kg	0.034 mg/kg	**2.7 mg/kg**	0.039 mg/kg
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	0.0064 mg/kg	< 0.008 mg/kg	0.026 mg/kg	**4.6 mg/kg**	0.0065 mg/kg	0.0087 mg/kg	0.0077 mg/kg	**0.49 mg/kg**	0.011 mg/kg
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	0.035 mg/kg	0.024 mg/kg	0.16 mg/kg	**29 mg/kg**	0.35 mg/kg	0.042 mg/kg	0.054 mg/kg	**3.6 mg/kg**	0.046 mg/kg
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	0.04 mg/kg	< 0.008 mg/kg	0.011 mg/kg	**13 mg/kg**	**0.24 mg/kg**	< 0.0077 mg/kg	< 0.0075 mg/kg	**2.6 mg/kg**	< 0.01 mg/kg
Indeno(1,2,3-cd)pyrene	NA	Lab			0.014 mg/kg	0.013 mg/kg	0.18 mg/kg	11 mg/kg	0.025 mg/kg	0.026 mg/kg	0.023 mg/kg	2.1 mg/kg	0.032 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	< 0.0059 mg/kg	< 0.008 mg/kg	0.0068 j mg/kg	**1.1 mg/kg**	0.0082 mg/kg	< 0.0077 mg/kg	< 0.0075 mg/kg	**0.24 mg/kg**	< 0.01 mg/kg
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	< 0.0059 mg/kg	< 0.008 mg/kg	0.016 mg/kg	**0.59 mg/kg**	0.0078 mg/kg	< 0.0077 mg/kg	0.011 mg/kg	**0.18 mg/kg**	< 0.01 mg/kg
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	0.041 mg/kg	0.0081 mg/kg	0.039 mg/kg	**27 mg/kg**	**0.33 mg/kg**	0.012 mg/kg	0.024 mg/kg	**3 mg/kg**	0.013 mg/kg
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	0.031 mg/kg	0.025 mg/kg	0.15 mg/kg	**21 mg/kg**	**0.25 mg/kg**	0.045 mg/kg	0.051 mg/kg	**2.9 mg/kg**	0.05 mg/kg
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	0.32 mg/kg	0.132 mg/kg	0.984 a mg/kg	**164 mg/kg**	**1.75 mg/kg**	0.232 mg/kg	0.285 mg/kg	**26.7 mg/kg**	0.269 mg/kg
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	0.0139 mg/kg	0.00574 mg/kg	0.0428 mg/kg	**7.11 mg/kg**	0.076 mg/kg	0.0101 mg/kg	0.0124 mg/kg	**1.16 mg/kg**	0.0117 mg/kg
1-Methylnaphthalene	NA	Lab			--	< 0.008 mg/kg	--	--	--	< 0.0077 mg/kg	--	--	< 0.01 mg/kg
Benzo(e)pyrene	NA	Lab			--	0.01 j mg/kg	--	--	--	0.023 j mg/kg	--	--	0.027 j mg/kg
Perylene	NA	Lab			--	0.025 mg/kg	--	--	--	0.067 mg/kg	--	--	0.054 mg/kg
C1-Chrysenes	NA	Lab			--	0.016 X mg/kg	--	--	--	0.034 X mg/kg	--	--	0.042 X mg/kg
C1-Fluoranthenes/Pyrenes	NA	Lab			--	0.017 X mg/kg	--	--	--	0.03 X mg/kg	--	--	0.034 X mg/kg
C1-Fluorenes	NA	Lab			--	< 0.008 X mg/kg	--	--	--	< 0.0077 X mg/kg	--	--	0.015 X mg/kg
C1-Naphthalenes	NA	Lab			--	< 0.008 X mg/kg	--	--	--	< 0.0077 X mg/kg	--	--	< 0.01 X mg/kg
C1-Phenanthrenes/Anthracenes	NA	Lab			--	< 0.008 X mg/kg	--	--	--	0.0095 X mg/kg	--	--	0.012 X mg/kg
C2-Chrysenes	NA	Lab			--	0.013 X mg/kg	--	--	--	0.036 X mg/kg	--	--	0.037 X mg/kg
C2-Fluorenes	NA	Lab			--	0.01 X mg/kg	--	--	--	< 0.0077 X mg/kg	--	--	0.017 X mg/kg
C2-Naphthalenes	NA	Lab			--	< 0.008 X mg/kg	--	--	--	0.0091 X mg/kg	--	--	0.012 X mg/kg
C2-Phenanthrenes/Anthracenes	NA	Lab			--	< 0.008 X mg/kg	--	--	--	0.008 X mg/kg	--	--	0.01 X mg/kg
C3-Chrysenes	NA	Lab			--	0.014 X mg/kg	--	--	--	< 0.0077 X mg/kg	--	--	0.031 X mg/kg
C3-Fluorenes	NA	Lab			--	< 0.008 X mg/kg	--	--	--	< 0.0077 X mg/kg	--	--	0.019 X mg/kg
C3-Naphthalenes	NA	Lab			--	< 0.008 X mg/kg	--	--	--	0.011 X mg/kg	--	--	0.017 X mg/kg
C3-Phenanthrenes/Anthracenes	NA	Lab			--	< 0.008 X mg/kg	--	--	--	0.012 X mg/kg	--	--	0.015 X mg/kg
C4-Chrysenes	NA	Lab			--	< 0.008 X mg/kg	--	--	--	< 0.0077 X mg/kg	--	--	0.024 X mg/kg
C4-Napthalenes	NA	Lab			--	< 0.008 X mg/kg	--	--	--	< 0.0077 X mg/kg	--	--	< 0.01 X mg/kg
C4-Phenanthrenes/Anthracenes	NA	Lab			--	< 0.008 X mg/kg	--	--	--	< 0.0077 X mg/kg	--	--	< 0.01 X mg/kg
Sum of ESBPAH17@ 0.5DL	NA	Lab			0.416 a mg/kg	0.184 mg/kg	1.7 a mg/kg	211 mg/kg	1.9 a mg/kg	0.340 mg/kg	0.389 a mg/kg	35.7 mg/kg	0.432 mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.017 a tu	0.007 tu	0.045 a tu	3.2 tu	0.075 a tu	0.013 tu	0.014 a tu	0.772 tu	0.013 tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			--	0.329 a mg/kg	--	--	--	0.606 a mg/kg	--	--	0.808 a mg/kg
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		--	0.011 a tu	--	--	--	0.023 a tu	--	--	0.024 a tu
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		0.286 a tu	--	0.334 a tu	**5.73 a tu**	0.385 a tu	--	0.281 a tu	**1.58 a tu**	--

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

					Sys Loc Code	**WM-28**		**WM-28**	**WM-28**	**UC-29**	**UC-29**		**UC-29**	**UC-29**
					Sample Date	**3/13/2011**		**3/13/2011**	**3/13/2011**	**3/3/2011**	**3/3/2011**		**3/3/2011**	**3/3/2011**
					Depth Interval	**2 - 2.5 ft**	**2 - 2.5 ft**	**2.5 - 3 ft**	**3 - 3.5 ft**	**0 - 0.5 ft**	**1 - 1.5 ft**	**1 - 1.5 ft**	**2 - 2.5 ft**	**2.5 - 3 ft**
					Sys Sample Code	**WM-28-2_2.0-2.5_03132011**	**WM-28-2_2.0-2.5_03132011_FD**	**WM-28-3_2.5-3.0_03132011**	**WM-28-4_3.0-3.5_03132011**	**UC-29-1_0.0-0.5_03032011**	**UC-29-2_1.0-1.5_03032011**	**UC-29-2_1.0-1.5_03032011_FD**	**UC-29-3_2.0-2.5_03032011**	**UC-29-4_2.5-3.0_03032011**
					Sample Type Code	**N**	**FD**	**N**	**N**	**N**	**N**	**FD**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II										
Effective Date			2/1/2007	2/1/2007										
Exceedance Key			**Bold**	Underline										
SVOCs														
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	**0.83 mg/kg**	**0.77 mg/kg**	**2.8 mg/kg**	**0.019 mg/kg**	**0.066 j mg/kg**	**1.5 mg/kg**	**1.3 mg/kg**	**0.055 j mg/kg**	< 0.0045 mg/kg
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	**0.46 mg/kg**	**0.063 mg/kg**	**0.61 mg/kg**	< 0.0064 mg/kg	**0.5 mg/kg**	**1.2 mg/kg**	**1.1 mg/kg**	**0.21 mg/kg**	< 0.0045 mg/kg
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	**2.4 mg/kg**	**1.8 mg/kg**	**4.2 mg/kg**	0.032 mg/kg	**0.87 mg/kg**	**8.8 mg/kg**	**8 mg/kg**	**0.44 mg/kg**	0.0044 j mg/kg
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	**3.9 mg/kg**	**3.2 mg/kg**	**16 mg/kg**	0.064 mg/kg	**2.9 mg/kg**	**14 mg/kg**	**11 mg/kg**	**1.5 mg/kg**	0.0096 mg/kg
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	**4 mg/kg**	**2.6 mg/kg**	**12 mg/kg**	0.11 mg/kg	**3 mg/kg**	**11 mg/kg**	**8.9 mg/kg**	**1.7 mg/kg**	0.013 mg/kg
Benzo(b)fluoranthene	NA	Lab			3.7 mg/kg	2.8 mg/kg	4.9 mg/kg	0.058 mg/kg	2.1 mg/kg	11 mg/kg	8.7 mg/kg	1.4 mg/kg	0.011 j mg/kg
Benzo(g,h,i)perylene	NA	Lab			2.8 mg/kg	1.7 mg/kg	7.3 mg/kg	0.048 j mg/kg	2 mg/kg	4.7 mg/kg	5.1 mg/kg	1.3 mg/kg	0.012 mg/kg
Benzo(k)fluoranthene	NA	Lab			3.8 mg/kg	2.4 mg/kg	4.7 mg/kg	0.11 mg/kg	2.8 mg/kg	9.3 mg/kg	3.8 mg/kg	1.4 mg/kg	0.01 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	**3.8 mg/kg**	**2.7 mg/kg**	**4.4 mg/kg**	0.085 mg/kg	**3 mg/kg**	**14 mg/kg**	**11 mg/kg**	**1.4 mg/kg**	0.0080 mg/kg
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	**0.99 mg/kg**	**0.55 mg/kg**	**3.7 mg/kg**	0.015 mg/kg	**0.66 mg/kg**	**1.6 mg/kg**	**1.8 mg/kg**	**0.39 mg/kg**	0.0048 mg/kg
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	**4.2 mg/kg**	**3.6 mg/kg**	**33 mg/kg**	0.14 mg/kg	**6.1 mg/kg**	**35 mg/kg**	**26 mg/kg**	**2.7 mg/kg**	0.02 mg/kg
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	**1.4 mg/kg**	**1.3 mg/kg**	**5.5 mg/kg**	0.02 mg/kg	**0.32 mg/kg**	**3.5 mg/kg**	**3.2 mg/kg**	**0.19 mg/kg**	< 0.0045 mg/kg
Indeno(1,2,3-cd)pyrene	NA	Lab			3 mg/kg	1.7 mg/kg	8.5 mg/kg	0.06 mg/kg	2 mg/kg	4.6 mg/kg	5.1 mg/kg	1.3 mg/kg	0.013 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	**0.072 j mg/kg**	**0.062 j mg/kg**	**0.11 mg/kg**	< 0.0064 mg/kg	**0.066 mg/kg**	**0.5 mg/kg**	**0.42 mg/kg**	**0.036 mg/kg**	< 0.0045 mg/kg
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	**0.23 mg/kg**	**0.2 mg/kg**	**0.24 mg/kg**	0.0069 mg/kg	**0.31 mg/kg**	**1.2 mg/kg**	**0.96 mg/kg**	**0.44 mg/kg**	< 0.0045 mg/kg
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	**3 mg/kg**	**2.7 mg/kg**	**5.3 mg/kg**	< 0.064 mg/kg	**2.3 mg/kg**	**24 mg/kg**	**21 mg/kg**	**0.89 mg/kg**	0.011 mg/kg
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	**3.4 mg/kg**	**3.2 mg/kg**	**23 mg/kg**	0.1 j mg/kg	**4 mg/kg**	**21 mg/kg**	**18 mg/kg**	**1.9 mg/kg**	0.018 mg/kg
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	**28.7 a mg/kg**	**22.7 a mg/kg**	**111 mg/kg**	0.63 a mg/kg	**24.1 a mg/kg**	**137 mg/kg**	**113 mg/kg**	**11.9 mg/kg**	0.1 a mg/kg
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	**1.25 mg/kg**	**0.989 mg/kg**	**4.82 mg/kg**	0.0274 mg/kg	**1.05 mg/kg**	**5.97 mg/kg**	**4.9 mg/kg**	**0.515 mg/kg**	0.00435 mg/kg
1-Methylnaphthalene	NA	Lab			--	--	--	--	0.023 mg/kg	0.28 mg/kg	0.22 mg/kg	0.017 mg/kg	< 0.0045 mg/kg
Benzo(e)pyrene	NA	Lab			--	--	--	--	5.6 j mg/kg	22 j mg/kg	12 j mg/kg	1.9 mg/kg	0.0087 mg/kg
Perylene	NA	Lab			--	--	--	--	8.9 mg/kg	28 mg/kg	13 mg/kg	0.51 mg/kg	0.057 mg/kg
C1-Chrysenes	NA	Lab			--	--	--	--	1.1 X mg/kg	4.9 X mg/kg	3 X mg/kg	0.78 X mg/kg	0.0045 X mg/kg
C1-Fluoranthenes/Pyrenes	NA	Lab			--	--	--	--	2.1 X mg/kg	12 X mg/kg	14 X mg/kg	1.4 X mg/kg	0.0083 X mg/kg
C1-Fluorenes	NA	Lab			--	--	--	--	0.13 X mg/kg	0.63 X mg/kg	0.62 X mg/kg	0.084 X mg/kg	0.0047 X mg/kg
C1-Naphthalenes	NA	Lab			--	--	--	--	0.059 X mg/kg	0.49 X mg/kg	0.36 X mg/kg	0.036 X mg/kg	< 0.0045 X mg/kg
C1-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	--	0.44 X mg/kg	2.9 X mg/kg	3.2 X mg/kg	0.33 X mg/kg	0.0047 X mg/kg
C2-Chrysenes	NA	Lab			--	--	--	--	0.68 X mg/kg	3 X mg/kg	1.8 X mg/kg	0.75 X mg/kg	< 0.0045 X mg/kg
C2-Fluorenes	NA	Lab			--	--	--	--	< 0.0086 X mg/kg	0.4 X mg/kg	0.034 X mg/kg	0.13 X mg/kg	0.0051 X mg/kg
C2-Naphthalenes	NA	Lab			--	--	--	--	0.061 X mg/kg	0.59 X mg/kg	0.5 X mg/kg	0.062 X mg/kg	< 0.0045 X mg/kg
C2-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	--	0.22 X mg/kg	1.4 X mg/kg	1.4 X mg/kg	0.33 X mg/kg	< 0.0045 X mg/kg
C3-Chrysenes	NA	Lab			--	--	--	--	0.36 X mg/kg	1.5 X mg/kg	0.87 X mg/kg	0.5 X mg/kg	< 0.0045 X mg/kg
C3-Fluorenes	NA	Lab			--	--	--	--	< 0.0086 X mg/kg	0.36 X mg/kg	0.24 X mg/kg	0.15 X mg/kg	< 0.0045 X mg/kg
C3-Naphthalenes	NA	Lab			--	--	--	--	0.06 X mg/kg	0.46 X mg/kg	0.38 X mg/kg	0.11 X mg/kg	< 0.0045 X mg/kg
C3-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	--	0.12 X mg/kg	0.91 X mg/kg	0.85 X mg/kg	0.36 X mg/kg	< 0.0045 X mg/kg
C4-Chrysenes	NA	Lab			--	--	--	--	0.12 X mg/kg	0.56 X mg/kg	0.24 X mg/kg	0.18 X mg/kg	< 0.0045 X mg/kg
C4-Napthalenes	NA	Lab			--	--	--	--	< 0.0086 X mg/kg	0.22 X mg/kg	0.2 X mg/kg	0.095 X mg/kg	< 0.0045 X mg/kg
C4-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	--	< 0.0086 X mg/kg	< 0.0072 X mg/kg	0.021 X mg/kg	0.26 X mg/kg	< 0.0045 X mg/kg
Sum of ESBPAH17@ 0.5DL	NA	Lab			42 a mg/kg	31.3 a mg/kg	136 mg/kg	0.906 a mg/kg	33 a mg/kg	167 mg/kg	135 mg/kg	17.3 a mg/kg	0.146 a mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.694 a tu	0.538 a tu	3.1 tu	0.033 a tu	0.771 a tu	3.9 tu	3.3 tu	0.351 a tu	0.009 a tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			--	--	--	--	52.9 a mg/kg	247 a mg/kg	188 a mg/kg	25.2 a mg/kg	0.262 a mg/kg
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		--	--	--	--	**1.17 a tu**	**5.48 a tu**	**2.85 a tu**	0.499 a tu	0.016 a tu
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		**1.44 a tu**	**1.18 a tu**	**5.55 a tu**	0.313 a tu	--	--	--	--	--

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

					Sys Loc Code	**WM-30**	**WM-30**	**WM-30**	**WM-30**	**UC-31**	**UC-31**	**UC-31**	**UC**
					Sample Date	**3/8/2011**	**3/8/2011**	**3/8/2011**	**3/8/2011**	**3/9/2011**	**3/9/2011**	**3/9/2011**	**3/9/2**
					Depth Interval	**0 - 0.5 ft**	**1 - 1.5 ft**	**2 - 2.5 ft**	**3.5 - 4 ft**	**0 - 0.5 ft**	**0.5 - 1 ft**	**1 - 1.5 ft**	**1 - 1.5 ft**	**2 - 2.5 ft**
					Sys Sample Code	**WM-30-1_0.0-0.5_03082011**	**WM-30-2_1.0-1.5_03082011**	**WM-30-3_2.0-2.5_03082011**	**WM-30-4_3.5-4.0_03082011**	**UC-31-1_0.0-0.5_03092011**	**UC-31-2_0.5-1.0_03092011**	**UC-31-3_1.0-1.5_03092011**	**UC-31-3_1.0-1.5_03092011_FD**	**UC-31-4_2.0-2.5_03092011**
					Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**FD**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II										
Effective Date			2/1/2007	2/1/2007										
Exceedance Key			**Bold**	Underline										
SVOCs														
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	< 0.0055 mg/kg	< 0.0042 mg/kg	< 0.0047 mg/kg	**3 j mg/kg**	**0.067 j mg/kg**	**0.28 mg/kg**	**0.023 mg/kg**	**0.0087 mg/kg**	< 0.0041 mg/kg
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	**0.017 mg/kg**	< 0.0042 mg/kg	< 0.0047 mg/kg	**0.08 mg/kg**	**1.8 mg/kg**	**0.55 mg/kg**	**0.097 mg/kg**	**0.084 mg/kg**	0.0051 mg/kg
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	0.0073 mg/kg	< 0.0042 mg/kg	< 0.0047 mg/kg	**0.33 j mg/kg**	**4 mg/kg**	**1.1 mg/kg**	**0.14 mg/kg**	**0.13 mg/kg**	0.0046 mg/kg
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	0.024 mg/kg	< 0.0042 mg/kg	< 0.0047 mg/kg	**1.1 mg/kg**	**15 mg/kg**	**3.7 mg/kg**	**0.97 mg/kg**	**0.66 mg/kg**	0.02 mg/kg
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	0.032 mg/kg	< 0.0042 mg/kg	0.017 mg/kg	**0.15 mg/kg**	**13 mg/kg**	**3 mg/kg**	**1.1 mg/kg**	**0.64 mg/kg**	0.024 mg/kg
Benzo(b)fluoranthene	NA	Lab			0.023 mg/kg	< 0.21 mg/kg	0.015 mg/kg	0.15 mg/kg	13 mg/kg	2.9 mg/kg	1.1 mg/kg	0.6 mg/kg	0.022 mg/kg
Benzo(g,h,i)perylene	NA	Lab			0.037 mg/kg	0.0047 mg/kg	0.017 mg/kg	0.059 mg/kg	8.5 mg/kg	1.9 mg/kg	0.75 mg/kg	0.43 mg/kg	0.019 mg/kg
Benzo(k)fluoranthene	NA	Lab			0.027 mg/kg	< 0.0042 mg/kg	0.011 mg/kg	0.16 mg/kg	10 mg/kg	2.4 mg/kg	0.99 mg/kg	0.61 mg/kg	0.019 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	0.022 mg/kg	< 0.0042 mg/kg	< 0.0047 mg/kg	**0.82 j mg/kg**	**15 mg/kg**	**4 mg/kg**	**1 mg/kg**	**0.67 mg/kg**	0.018 mg/kg
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	0.01 mg/kg	< 0.0042 mg/kg	0.0061 mg/kg	**0.039 mg/kg**	**2.7 mg/kg**	**0.67 mg/kg**	**0.26 mg/kg**	**0.2 mg/kg**	0.0068 mg/kg
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	0.024 mg/kg	< 0.0042 mg/kg	0.0057 mg/kg	**3.9 mg/kg**	**24 mg/kg**	**6.6 mg/kg**	**1.7 mg/kg**	**0.87 mg/kg**	0.029 mg/kg
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	< 0.0055 mg/kg	< 0.0042 mg/kg	< 0.0047 mg/kg	**3.1 mg/kg**	**1.3 mg/kg**	**0.68 mg/kg**	< 0.064 mg/kg	0.033 mg/kg	< 0.0041 mg/kg
Indeno(1,2,3-cd)pyrene	NA	Lab			0.035 mg/kg	0.0053 mg/kg	0.017 mg/kg	0.069 mg/kg	8.4 mg/kg	1.9 mg/kg	0.81 mg/kg	0.45 mg/kg	0.02 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	< 0.0055 mg/kg	< 0.0042 mg/kg	< 0.0047 mg/kg	**0.81 mg/kg**	**0.043 mg/kg**	**0.16 mg/kg**	**0.041 mg/kg**	0.012 mg/kg	< 0.0041 mg/kg
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	0.0075 mg/kg	< 0.0042 mg/kg	< 0.0047 mg/kg	**0.9 mg/kg**	**0.93 mg/kg**	**1.2 mg/kg**	**0.33 mg/kg**	0.099 mg/kg	0.0046 mg/kg
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	0.012 j mg/kg	0.0050 mg/kg	0.0050 j mg/kg	**3.6 mg/kg**	**6.3 mg/kg**	**3 mg/kg**	**0.36 mg/kg**	0.18 mg/kg	0.01 j mg/kg
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	0.028 mg/kg	< 0.0042 mg/kg	0.0047 j mg/kg	**2.6 mg/kg**	**18 mg/kg**	**4.5 mg/kg**	**1.1 mg/kg**	**0.63 mg/kg**	0.026 j mg/kg
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	0.192 a mg/kg	0.0302 mg/kg	0.0573 a mg/kg	**20.4 a mg/kg**	**102 a mg/kg**	**29.4 mg/kg**	**7.15 mg/kg**	**4.22 mg/kg**	0.154 mg/kg
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	0.00835 mg/kg	0.00131 mg/kg	0.00249 mg/kg	**0.888 mg/kg**	**4.44 mg/kg**	**1.28 mg/kg**	**0.311 mg/kg**	**0.183 mg/kg**	0.00671 mg/kg
1-Methylnaphthalene	NA	Lab			< 0.0055 mg/kg	< 0.0042 mg/kg	< 0.0047 mg/kg	0.99 mg/kg	0.013 mg/kg	--	--	--	< 0.0041 mg/kg
Benzo(e)pyrene	NA	Lab			0.023 j mg/kg	< 0.0042 mg/kg	0.0092 j mg/kg	0.1 mg/kg	2.9 mg/kg	--	--	--	0.014 j mg/kg
Perylene	NA	Lab			0.071 mg/kg	0.013 mg/kg	0.13 mg/kg	0.044 mg/kg	1.9 mg/kg	--	--	--	0.76 mg/kg
C1-Chrysenes	NA	Lab			0.062 X mg/kg	< 0.0042 X mg/kg	0.0051 X mg/kg	0.28 X mg/kg	1.2 X mg/kg	--	--	--	0.01 X mg/kg
C1-Fluoranthenes/Pyrenes	NA	Lab			0.054 X mg/kg	< 0.0042 X mg/kg	0.0090 X mg/kg	0.85 X mg/kg	2.4 X mg/kg	--	--	--	0.016 X mg/kg
C1-Fluorenes	NA	Lab			< 0.0055 X mg/kg	< 0.0042 X mg/kg	< 0.0047 X mg/kg	0.12 X mg/kg	0.13 X mg/kg	--	--	--	< 0.0041 X mg/kg
C1-Naphthalenes	NA	Lab			< 0.0055 X mg/kg	< 0.0042 X mg/kg	< 0.0047 X mg/kg	1.2 X mg/kg	0.039 X mg/kg	--	--	--	< 0.0041 X mg/kg
C1-Phenanthrenes/Anthracenes	NA	Lab			0.012 X mg/kg	< 0.0042 X mg/kg	< 0.0047 X mg/kg	0.43 X mg/kg	0.44 X mg/kg	--	--	--	0.0070 X mg/kg
C2-Chrysenes	NA	Lab			0.087 X mg/kg	< 0.0042 X mg/kg	< 0.0047 X mg/kg	0.14 X mg/kg	0.72 X mg/kg	--	--	--	0.013 X mg/kg
C2-Fluorenes	NA	Lab			< 0.0055 X mg/kg	< 0.0042 X mg/kg	< 0.0047 X mg/kg	0.085 X mg/kg	0.12 X mg/kg	--	--	--	< 0.0041 X mg/kg
C2-Naphthalenes	NA	Lab			0.0067 X mg/kg	< 0.0042 X mg/kg	< 0.0047 X mg/kg	1.3 X mg/kg	0.047 X mg/kg	--	--	--	< 0.0041 X mg/kg
C2-Phenanthrenes/Anthracenes	NA	Lab			0.016 X mg/kg	< 0.0042 X mg/kg	< 0.0047 X mg/kg	0.3 X mg/kg	0.25 X mg/kg	--	--	--	0.0070 X mg/kg
C3-Chrysenes	NA	Lab			< 0.0055 X mg/kg	< 0.0042 X mg/kg	< 0.0047 X mg/kg	0.074 X mg/kg	0.41 X mg/kg	--	--	--	< 0.0041 X mg/kg
C3-Fluorenes	NA	Lab			< 0.0055 X mg/kg	< 0.0042 X mg/kg	< 0.0047 X mg/kg	< 0.0042 X mg/kg	0.07 X mg/kg	--	--	--	0.0063 X mg/kg
C3-Naphthalenes	NA	Lab			0.015 X mg/kg	< 0.0042 X mg/kg	< 0.0047 X mg/kg	0.24 X mg/kg	0.071 X mg/kg	--	--	--	0.0044 X mg/kg
C3-Phenanthrenes/Anthracenes	NA	Lab			0.038 X mg/kg	< 0.0042 X mg/kg	< 0.0047 X mg/kg	0.11 X mg/kg	0.16 X mg/kg	--	--	--	< 0.0041 X mg/kg
C4-Chrysenes	NA	Lab			< 0.0055 X mg/kg	< 0.0042 X mg/kg	< 0.0047 X mg/kg	< 0.0042 X mg/kg	0.0090 X mg/kg	--	--	--	< 0.0041 X mg/kg
C4-Napthalenes	NA	Lab			< 0.0055 X mg/kg	< 0.0042 X mg/kg	< 0.0047 X mg/kg	0.13 X mg/kg	< 0.0084 X mg/kg	--	--	--	0.0043 X mg/kg
C4-Phenanthrenes/Anthracenes	NA	Lab			0.033 X mg/kg	< 0.0042 X mg/kg	< 0.0047 X mg/kg	0.032 X mg/kg	< 0.0084 X mg/kg	--	--	--	< 0.0041 X mg/kg
Sum of ESBPAH17@ 0.5DL	NA	Lab			0.314 a mg/kg	0.152 mg/kg	0.118 a mg/kg	20.9 a mg/kg	142 a mg/kg	38.5 mg/kg	10.8 mg/kg	6.3 mg/kg	0.234 a mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.011 a tu	0.040 tu	0.009 a tu	2.9 a tu	3.5 a tu	0.848 tu	0.386 tu	0.174 tu	0.099 a tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			0.748 a mg/kg	0.194 a mg/kg	0.301 a mg/kg	25.5 a mg/kg	153 a mg/kg	--	--	--	1.091 a mg/kg
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		0.025 a tu	0.052 a tu	0.021 a tu	**3.52 a tu**	**3.71 a tu**	--	--	--	0.406 a tu
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		--	--	--	--	--	**1.71 a tu**	0.917 a tu	0.554 a tu	--

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

					Sys Loc Code	-31	WM-32	WM-32	WM-32	WM-32	WM-33	WM-33	WM-33	WM-33
					Sample Date	2011	3/13/2011	3/13/2011	3/13/2011	3/13/2011	3/8/2011	3/8/2011	3/8/2011	3/8/2011
					Depth Interval	2 - 2.5 ft	0 - 0.5 ft	0.5 - 1 ft	1 - 1.5 ft	3.5 - 4 ft	0 - 0.5 ft	0.5 - 1 ft	1.5 - 2 ft	2.5 - 3 ft
					Sys Sample Code	UC-31-4_2.0-2.5_03092011_FD	WM-32-1_0.0-0.5_03132011	WM-32-2_0.5-1.0_03132011	WM-32-3_1.0-1.5_03132011	WM-32-4_3.5-4.0_03132011	WM-33-1_0.0-0.5_03082011	WM-33-2_0.5-1.0_03082011	WM-33-3_1.5-2.0_03082011	WM-33-4_2.5-3.0_03082011
					Sample Type Code	FD	N	N	N	N	N	N	N	N
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II										
Effective Date			2/1/2007	2/1/2007										
Exceedance Key			**Bold**	Underline										
SVOCs														
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	< 0.0040 mg/kg	< 0.0055 mg/kg	< 0.0048 mg/kg	< 0.004 mg/kg	< 0.0037 mg/kg	**0.044 mg/kg**	< 0.013 mg/kg	< 0.0061 mg/kg	< 0.0056 mg/kg	
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	< 0.0040 mg/kg	< 0.0055 mg/kg	< 0.0048 mg/kg	< 0.004 mg/kg	< 0.0037 mg/kg	**0.19 mg/kg**	< 0.013 mg/kg	< 0.0061 mg/kg	< 0.0056 mg/kg	
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	0.0061 mg/kg	< 0.0055 mg/kg	0.0058 mg/kg	< 0.004 mg/kg	< 0.0037 mg/kg	**0.092 mg/kg**	< 0.013 mg/kg	< 0.0061 mg/kg	< 0.0056 mg/kg	
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	0.03 mg/kg	0.014 mg/kg	0.051 mg/kg	0.0055 mg/kg	0.0035 j mg/kg	**0.58 mg/kg**	0.041 mg/kg	**0.5 mg/kg**	0.023 mg/kg	
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	0.04 mg/kg	0.017 mg/kg	0.039 mg/kg	< 0.004 mg/kg	< 0.0037 mg/kg	**0.5 mg/kg**	< 0.013 mg/kg	< 0.0061 mg/kg	< 0.0056 mg/kg	
Benzo(b)fluoranthene	NA	Lab			0.038 mg/kg	0.011 mg/kg	0.034 mg/kg	< 0.004 mg/kg	< 0.0037 mg/kg	0.45 mg/kg	0.059 j mg/kg	0.017 j mg/kg	< 0.0056 mg/kg	
Benzo(g,h,i)perylene	NA	Lab			0.022 j mg/kg	0.011 mg/kg	0.028 mg/kg	< 0.004 mg/kg	< 0.0037 mg/kg	0.5 mg/kg	0.033 j mg/kg	0.0094 j mg/kg	0.0063 j mg/kg	
Benzo(k)fluoranthene	NA	Lab			0.031 mg/kg	0.012 mg/kg	0.038 mg/kg	< 0.004 mg/kg	< 0.0037 mg/kg	0.44 mg/kg	0.041 mg/kg	0.0094 mg/kg	< 0.0056 mg/kg	
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	0.022 mg/kg	0.012 mg/kg	0.042 mg/kg	0.0047 mg/kg	0.0034 j mg/kg	**0.87 mg/kg**	0.035 mg/kg	**0.41 mg/kg**	0.0069 mg/kg	
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	0.0087 mg/kg	< 0.0055 mg/kg	0.0096 mg/kg	< 0.004 mg/kg	< 0.0037 mg/kg	**0.11 mg/kg**	0.016 mg/kg	0.0065 mg/kg	< 0.0056 mg/kg	
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	0.04 mg/kg	**0.45 mg/kg**	0.064 mg/kg	0.0072 mg/kg	< 0.0037 mg/kg	**1.1 mg/kg**	0.052 mg/kg	**0.82 mg/kg**	0.0062 mg/kg	
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	< 0.0040 mg/kg	< 0.0055 mg/kg	< 0.0048 mg/kg	< 0.004 mg/kg	< 0.0037 mg/kg	0.075 mg/kg	< 0.013 mg/kg	< 0.0061 mg/kg	< 0.0056 mg/kg	
Indeno(1,2,3-cd)pyrene	NA	Lab			0.023 mg/kg	0.012 mg/kg	0.032 mg/kg	< 0.004 mg/kg	< 0.0037 mg/kg	0.46 mg/kg	0.032 mg/kg	0.01 mg/kg	< 0.0056 mg/kg	
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	< 0.0040 mg/kg	< 0.0055 mg/kg	< 0.0048 mg/kg	< 0.004 mg/kg	< 0.0037 mg/kg	0.019 mg/kg	< 0.013 mg/kg	< 0.0061 mg/kg	< 0.0056 mg/kg	
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	0.0056 mg/kg	< 0.0055 mg/kg	< 0.0048 mg/kg	< 0.004 mg/kg	< 0.0037 mg/kg	0.13 mg/kg	0.019 mg/kg	< 0.0061 mg/kg	< 0.0056 mg/kg	
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	0.015 mg/kg	< 0.0055 mg/kg	0.0091 mg/kg	< 0.004 mg/kg	< 0.0037 mg/kg	0.11 mg/kg	0.041 mg/kg	0.0071 mg/kg	0.0067 mg/kg	
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	0.034 mg/kg	**0.31 mg/kg**	0.07 mg/kg	0.0069 mg/kg	< 0.0037 mg/kg	**1.1 mg/kg**	0.052 mg/kg	**0.51 mg/kg**	0.0069 mg/kg	
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	0.2094 mg/kg	0.825 mg/kg	0.303 mg/kg	0.0423 mg/kg	0.0272 a mg/kg	**4.92 mg/kg**	0.295 mg/kg	**2.27 mg/kg**	0.0721 mg/kg	
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	0.009104 mg/kg	0.0359 mg/kg	0.0132 mg/kg	0.00184 mg/kg	0.00118 mg/kg	**0.214 mg/kg**	0.0128 mg/kg	0.0989 mg/kg	0.00313 mg/kg	
1-Methylnaphthalene	NA	Lab			--	< 0.0055 mg/kg	< 0.0048 mg/kg	< 0.004 mg/kg	< 0.0037 mg/kg	0.011 mg/kg	--	--	--	
Benzo(e)pyrene	NA	Lab			--	0.011 mg/kg	0.022 j mg/kg	< 0.004 j mg/kg	< 0.0037 j mg/kg	0.39 mg/kg	--	--	--	
Perylene	NA	Lab			--	0.075 mg/kg	0.091 mg/kg	0.014 mg/kg	0.0037 j mg/kg	0.13 mg/kg	--	--	--	
C1-Chrysenes	NA	Lab			--	0.014 X mg/kg	0.037 X mg/kg	0.0045 X mg/kg	< 0.0037 X mg/kg	1.1 X mg/kg	--	--	--	
C1-Fluoranthenes/Pyrenes	NA	Lab			--	0.01 X mg/kg	0.043 X mg/kg	< 0.004 X mg/kg	< 0.0037 X mg/kg	1.8 X mg/kg	--	--	--	
C1-Fluorenes	NA	Lab			--	< 0.0055 X mg/kg	< 0.0048 X mg/kg	< 0.004 X mg/kg	< 0.0037 X mg/kg	0.16 X mg/kg	--	--	--	
C1-Naphthalenes	NA	Lab			--	< 0.0055 X mg/kg	< 0.0048 X mg/kg	< 0.004 X mg/kg	< 0.0037 X mg/kg	0.023 X mg/kg	--	--	--	
C1-Phenanthrenes/Anthracenes	NA	Lab			--	< 0.0055 X mg/kg	0.011 X mg/kg	< 0.004 X mg/kg	< 0.0037 X mg/kg	0.24 X mg/kg	--	--	--	
C2-Chrysenes	NA	Lab			--	0.011 X mg/kg	0.042 X mg/kg	< 0.004 X mg/kg	< 0.0037 X mg/kg	1.1 X mg/kg	--	--	--	
C2-Fluorenes	NA	Lab			--	< 0.0055 X mg/kg	< 0.0048 X mg/kg	< 0.004 X mg/kg	< 0.0037 X mg/kg	1 X mg/kg	--	--	--	
C2-Naphthalenes	NA	Lab			--	< 0.0055 X mg/kg	< 0.0048 X mg/kg	< 0.004 X mg/kg	< 0.0037 X mg/kg	0.074 X mg/kg	--	--	--	
C2-Phenanthrenes/Anthracenes	NA	Lab			--	< 0.0055 X mg/kg	0.01 X mg/kg	< 0.004 X mg/kg	< 0.0037 X mg/kg	1.4 X mg/kg	--	--	--	
C3-Chrysenes	NA	Lab			--	< 0.0055 X mg/kg	0.027 X mg/kg	< 0.004 X mg/kg	< 0.0037 X mg/kg	1 X mg/kg	--	--	--	
C3-Fluorenes	NA	Lab			--	< 0.0055 X mg/kg	< 0.0048 X mg/kg	< 0.004 X mg/kg	< 0.0037 X mg/kg	2.6 X mg/kg	--	--	--	
C3-Naphthalenes	NA	Lab			--	0.0071 X mg/kg	0.0065 X mg/kg	< 0.004 X mg/kg	< 0.0037 X mg/kg	0.28 X mg/kg	--	--	--	
C3-Phenanthrenes/Anthracenes	NA	Lab			--	< 0.0055 X mg/kg	0.01 X mg/kg	< 0.004 X mg/kg	< 0.0037 X mg/kg	3.2 X mg/kg	--	--	--	
C4-Chrysenes	NA	Lab			--	< 0.0055 X mg/kg	< 0.0048 X mg/kg	< 0.004 X mg/kg	< 0.0037 X mg/kg	0.74 X mg/kg	--	--	--	
C4-Napthalenes	NA	Lab			--	< 0.0055 X mg/kg	< 0.0048 X mg/kg	< 0.004 X mg/kg	< 0.0037 X mg/kg	0.96 X mg/kg	--	--	--	
C4-Phenanthrenes/Anthracenes	NA	Lab			--	< 0.0055 X mg/kg	< 0.0048 X mg/kg	< 0.004 X mg/kg	< 0.0037 X mg/kg	3 X mg/kg	--	--	--	
Sum of ESBPAH17@ 0.5DL	NA	Lab			0.323 a mg/kg	0.871 mg/kg	0.435 mg/kg	0.050 mg/kg	0.035 a mg/kg	6.8 mg/kg	0.460 a mg/kg	2.3 a mg/kg	0.087 a mg/kg	
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.134 a tu	0.056 tu	0.022 tu	0.004 tu	0.104 a tu	0.196 tu	0.005 a BQX tu	0.046 a tu	0.002 a tu	
Sum of ESBPAH34@ 0.5DL	NA	Lab			--	1.03 a mg/kg	0.751 a mg/kg	0.099 a mg/kg	0.068 a mg/kg	25.9 a mg/kg	--	--	--	
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		--	0.064 a tu	0.036 a tu	0.0065 a tu	0.186 a tu	0.724 a tu	--	--	--	
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		0.486 a tu	--	--	--	--	--	0.260 a BQX tu	0.336 a tu	0.260 a tu	

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

					Sys Loc Code	**WM-34**	**WM-34**	**WM-34**	**UC-35**	**UC-35**	**UC-35**	**UC-35**	**UC-36**	**UC-36**
					Sample Date	**3/14/2011**	**3/14/2011**	**3/14/2011**	**3/9/2011**	**3/9/2011**	**3/9/2011**	**3/9/2011**	**3/9/2011**	**3/9/2011**
					Depth Interval	**0 - 0.5 ft**	**0.5 - 1 ft**	**1 - 1.5 ft**	**0 - 0.5 ft**	**0.5 - 1 ft**	**2 - 2.5 ft**	**4 - 4.5 ft**	**0 - 0.5 ft**	**1 - 1.5 ft**
					Sys Sample Code	**WM-34-1_0.0-0.5_03142011**	**WM-34-2_0.5-1.0_03142011**	**WM-34-3_1.0-1.5_03142011**	**UC-35-1_0.0-0.5_03092011**	**UC-35-2_0.5-1.0_03092011**	**UC-35-3_2.0-2.5_03092011**	**UC-35-4_4.0-4.5_03092011**	**UC-36-1_0.0-0.5_03092011**	**UC-36-2_1.0-1.5_03092011**
					Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II										
Effective Date			2/1/2007	2/1/2007										
Exceedance Key			**Bold**	Underline										
SVOCs														
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	**0.34 j mg/kg**	**0.19 mg/kg**	< 0.014 mg/kg	**0.069 mg/kg**	**0.02 j mg/kg**	< 0.0041 mg/kg	< 0.0038 mg/kg	**0.02 mg/kg**	**0.02 j mg/kg**
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	**0.54 j mg/kg**	**0.037 mg/kg**	< 0.014 mg/kg	**0.48 mg/kg**	**0.03 j mg/kg**	< 0.0041 mg/kg	< 0.0038 mg/kg	**0.23 mg/kg**	**0.069 mg/kg**
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	**1.8 mg/kg**	**0.33 mg/kg**	< 0.014 mg/kg	**0.42 mg/kg**	**0.078 mg/kg**	< 0.0041 mg/kg	< 0.0038 mg/kg	**0.17 mg/kg**	**0.48 mg/kg**
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	**6.1 mg/kg**	**1 mg/kg**	0.046 mg/kg	**1.8 mg/kg**	**0.59 mg/kg**	< 0.0041 mg/kg	< 0.0038 mg/kg	**1.5 mg/kg**	**1.9 mg/kg**
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	**5.4 mg/kg**	**0.82 mg/kg**	0.074 mg/kg	**1.8 mg/kg**	**0.82 mg/kg**	< 0.0041 mg/kg	< 0.0038 mg/kg	**1.4 mg/kg**	**2.1 mg/kg**
Benzo(b)fluoranthene	NA	Lab			3.8 mg/kg	0.71 mg/kg	0.067 j mg/kg	1.9 mg/kg	0.98 j mg/kg	0.0054 j mg/kg	< 0.0038 mg/kg	1.3 mg/kg	2 mg/kg
Benzo(g,h,i)perylene	NA	Lab			3.2 mg/kg	0.9 j mg/kg	0.037 j mg/kg	1.2 mg/kg	0.43 j mg/kg	0.0061 j mg/kg	< 0.0038 mg/kg	0.94 mg/kg	1.5 mg/kg
Benzo(k)fluoranthene	NA	Lab			5.4 mg/kg	0.9 mg/kg	0.051 mg/kg	1.3 mg/kg	0.64 mg/kg	0.0044 mg/kg	< 0.0038 mg/kg	1.1 mg/kg	1.8 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	**4.8 mg/kg**	**0.91 mg/kg**	0.029 mg/kg	**1.9 mg/kg**	**0.48 mg/kg**	< 0.0041 mg/kg	< 0.0038 mg/kg	**1.5 mg/kg**	**1.8 mg/kg**
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	**0.97 mg/kg**	**0.36 mg/kg**	0.015 mg/kg	**0.4 mg/kg**	**0.17 mg/kg**	< 0.0041 mg/kg	< 0.0038 mg/kg	**0.32 mg/kg**	**0.15 mg/kg**
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	**15 mg/kg**	**2.7 mg/kg**	0.055 mg/kg	**4 mg/kg**	**0.64 mg/kg**	< 0.0041 mg/kg	< 0.0038 mg/kg	**3.2 mg/kg**	**4.1 mg/kg**
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	**0.79 mg/kg**	**0.37 mg/kg**	< 0.014 mg/kg	**0.18 mg/kg**	0.041 j mg/kg	< 0.0041 mg/kg	< 0.0038 mg/kg	0.072 mg/kg	0.047 mg/kg
Indeno(1,2,3-cd)pyrene	NA	Lab			3.4 mg/kg	1.3 j mg/kg	0.046 mg/kg	1.1 mg/kg	0.51 mg/kg	0.0061 mg/kg	< 0.0038 mg/kg	0.95 mg/kg	1.6 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	**0.064 mg/kg**	**0.025 mg/kg**	< 0.014 mg/kg	**0.094 mg/kg**	0.018 j mg/kg	< 0.0041 mg/kg	< 0.0038 mg/kg	**0.024 mg/kg**	0.017 mg/kg
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	**0.29 j mg/kg**	0.029 mg/kg	< 0.014 mg/kg	**1.3 mg/kg**	0.069 j mg/kg	< 0.0041 mg/kg	< 0.0038 mg/kg	0.098 mg/kg	**0.42 mg/kg**
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	**2.4 mg/kg**	**0.53 mg/kg**	0.022 mg/kg	**0.73 mg/kg**	0.12 mg/kg	< 0.0041 mg/kg	< 0.0038 mg/kg	**0.43 mg/kg**	**0.79 mg/kg**
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	**9.8 mg/kg**	**1.5 mg/kg**	0.051 mg/kg	**2.3 mg/kg**	**0.63 mg/kg**	< 0.0041 mg/kg	< 0.0038 mg/kg	**1.8 mg/kg**	**2.7 mg/kg**
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	**48.3 a mg/kg**	**8.8 mg/kg**	0.334 mg/kg	**15.5 mg/kg**	**3.71 a mg/kg**	0.0267 mg/kg	0.0247 mg/kg	**10.8 mg/kg**	**14.6 a mg/kg**
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	**2.1 mg/kg**	**0.383 mg/kg**	0.0145 mg/kg	**0.673 mg/kg**	**0.161 mg/kg**	0.00116 mg/kg	0.00107 mg/kg	**0.468 mg/kg**	**0.634 mg/kg**
1-Methylnaphthalene	NA	Lab			0.037 mg/kg	--	--	0.03 mg/kg	--	--	--	0.0080 mg/kg	0.0097 mg/kg
Benzo(e)pyrene	NA	Lab			2.8 mg/kg	--	--	1.1 mg/kg	--	--	--	1 mg/kg	0.32 mg/kg
Perylene	NA	Lab			0.9 j mg/kg	--	--	0.54 mg/kg	--	--	--	0.52 mg/kg	0.17 mg/kg
C1-Chrysenes	NA	Lab			2.5 X mg/kg	--	--	0.86 X mg/kg	--	--	--	0.66 X mg/kg	0.46 X mg/kg
C1-Fluoranthenes/Pyrenes	NA	Lab			7.4 X mg/kg	--	--	1.3 X mg/kg	--	--	--	0.89 X mg/kg	0.71 X mg/kg
C1-Fluorenes	NA	Lab			0.43 X mg/kg	--	--	0.12 X mg/kg	--	--	--	0.058 X mg/kg	0.045 X mg/kg
C1-Naphthalenes	NA	Lab			0.076 X mg/kg	--	--	0.082 X mg/kg	--	--	--	0.022 X mg/kg	0.018 X mg/kg
C1-Phenanthrenes/Anthracenes	NA	Lab			1.4 X mg/kg	--	--	0.25 X mg/kg	--	--	--	0.17 X mg/kg	0.16 X mg/kg
C2-Chrysenes	NA	Lab			2.4 X mg/kg	--	--	0.81 X mg/kg	--	--	--	0.57 X mg/kg	0.49 X mg/kg
C2-Fluorenes	NA	Lab			0.52 X mg/kg	--	--	0.15 X mg/kg	--	--	--	0.066 X mg/kg	0.055 X mg/kg
C2-Naphthalenes	NA	Lab			0.21 X mg/kg	--	--	0.097 X mg/kg	--	--	--	0.042 X mg/kg	0.031 X mg/kg
C2-Phenanthrenes/Anthracenes	NA	Lab			1.7 X mg/kg	--	--	0.26 X mg/kg	--	--	--	0.13 X mg/kg	0.13 X mg/kg
C3-Chrysenes	NA	Lab			1.8 X mg/kg	--	--	0.49 X mg/kg	--	--	--	0.32 X mg/kg	0.26 X mg/kg
C3-Fluorenes	NA	Lab			0.83 X mg/kg	--	--	0.19 X mg/kg	--	--	--	0.064 X mg/kg	< 0.0078 X mg/kg
C3-Naphthalenes	NA	Lab			0.39 X mg/kg	--	--	0.14 X mg/kg	--	--	--	0.047 X mg/kg	0.049 X mg/kg
C3-Phenanthrenes/Anthracenes	NA	Lab			2 X mg/kg	--	--	0.39 X mg/kg	--	--	--	0.13 X mg/kg	0.18 X mg/kg
C4-Chrysenes	NA	Lab			0.51 X mg/kg	--	--	0.2 X mg/kg	--	--	--	0.11 X mg/kg	0.1 X mg/kg
C4-Napthalenes	NA	Lab			0.38 X mg/kg	--	--	0.12 X mg/kg	--	--	--	< 0.0072 X mg/kg	0.042 X mg/kg
C4-Phenanthrenes/Anthracenes	NA	Lab			1.4 X mg/kg	--	--	0.27 X mg/kg	--	--	--	< 0.0072 X mg/kg	0.11 X mg/kg
Sum of ESBPAH17@ 0.5DL	NA	Lab			64.1 a mg/kg	12.6 a mg/kg	0.535 a mg/kg	21 mg/kg	6.3 a mg/kg	0.049 a mg/kg	0.032 mg/kg	15.1 mg/kg	21.5 a mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.915 a tu	0.162 a tu	0.005 a BQX tu	0.487 tu	0.068 a tu	0.024 a tu	BQX	0.554 tu	0.480 a tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			91.7 a mg/kg	--	--	28.2 a mg/kg	--	--	--	19.8 a mg/kg	24.8 a mg/kg
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		**1.29 a tu**	--	--	0.634 a tu	--	--	--	0.716 a tu	0.55 a tu
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		--	0.534 a tu	0.266 a BQX tu	--	0.373 a tu	0.298 a tu	BQX	--	--

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

				Sys Loc Code	**UC-36**	**UC-36**	**UC-37**	**UC-37**	**UC-37**	**UC-37**	**UC-38**	**UC-38**	**UC-38**
				Sample Date	**3/9/2011**	**3/9/2011**	**3/10/2011**	**3/10/2011**	**3/10/2011**	**3/10/2011**	**3/11/2011**	**3/11/2011**	**3/11/2011**
				Depth Interval	**2 - 2.5 ft**	**2.5 - 3 ft**	**0 - 0.5 ft**	**0.5 - 1 ft**	**3 - 3.5 ft**	**5.5 - 6 ft**	**0 - 0.5 ft**	**1.5 - 2 ft**	**2 - 2.5 ft**
				Sys Sample Code	**UC-36-3_2.0-2.5_03092011**	**UC-36-4_2.5-3.0_03092011**	**UC-37-1_0.0-0.5_03102011**	**UC-37-2_0.5-1.0_03102011**	**UC-37-3_3.0-3.5_03102011**	**UC-37-4_5.5-6.0_03102011**	**UC-38-1_0.0-0.5_03112011**	**UC-38-2_1.5-2.0_03112011**	**UC-38-3_2.0-2.5_03112011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
SVOCs													
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	< 0.0069 mg/kg	< 0.018 mg/kg	< 0.0072 mg/kg	< 0.0049 mg/kg	< 0.0046 mg/kg	< 0.0046 mg/kg	**0.024 mg/kg**	**0.33 mg/kg**	**0.17 mg/kg**
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	< 0.0069 mg/kg	< 0.018 mg/kg	**0.069 mg/kg**	0.0051 mg/kg	< 0.0046 mg/kg	< 0.0046 mg/kg	**0.25 mg/kg**	**0.5 mg/kg**	**0.15 mg/kg**
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	0.0079 mg/kg	< 0.018 mg/kg	**0.1 mg/kg**	0.011 mg/kg	< 0.0046 mg/kg	< 0.0046 mg/kg	**0.22 mg/kg**	**1.8 mg/kg**	**0.56 mg/kg**
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	0.033 mg/kg	0.033 mg/kg	**0.71 mg/kg**	0.089 mg/kg	< 0.0046 mg/kg	< 0.0046 mg/kg	**1.5 mg/kg**	**2.6 mg/kg**	**1.4 mg/kg**
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	0.034 mg/kg	0.035 mg/kg	**0.88 mg/kg**	0.13 mg/kg	< 0.0046 mg/kg	< 0.0046 mg/kg	**1.4 mg/kg**	**2.7 mg/kg**	**1.5 mg/kg**
Benzo(b)fluoranthene	NA	Lab			0.047 mg/kg	0.036 j mg/kg	0.75 mg/kg	0.13 j mg/kg	< 0.0046 j mg/kg	< 0.0046 mg/kg	1.3 mg/kg	3 mg/kg	1.5 mg/kg
Benzo(g,h,i)perylene	NA	Lab			0.03 mg/kg	0.035 mg/kg	0.65 mg/kg	0.086 j mg/kg	0.0070 j mg/kg	< 0.0046 mg/kg	0.94 mg/kg	1.6 mg/kg	1 mg/kg
Benzo(k)fluoranthene	NA	Lab			0.026 mg/kg	0.029 mg/kg	0.82 mg/kg	0.11 j mg/kg	< 0.0046 mg/kg	< 0.0046 mg/kg	1.2 mg/kg	2.4 mg/kg	1.3 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	0.029 mg/kg	0.025 mg/kg	**0.65 mg/kg**	0.07 mg/kg	< 0.0046 mg/kg	< 0.0046 mg/kg	**1.4 mg/kg**	**2.7 mg/kg**	**1.6 mg/kg**
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	0.011 mg/kg	< 0.018 mg/kg	**0.21 mg/kg**	0.025 mg/kg	< 0.0046 mg/kg	< 0.0046 mg/kg	**0.24 mg/kg**	**0.51 mg/kg**	**0.56 mg/kg**
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	0.056 mg/kg	0.054 mg/kg	**1.5 mg/kg**	0.17 mg/kg	0.0068 mg/kg	< 0.0046 mg/kg	**3.1 mg/kg**	**3.5 mg/kg**	**3 mg/kg**
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	< 0.0069 mg/kg	0.017 j mg/kg	0.033 mg/kg	< 0.0049 mg/kg	< 0.0046 mg/kg	< 0.0046 mg/kg	**0.12 mg/kg**	**0.96 mg/kg**	**0.37 mg/kg**
Indeno(1,2,3-cd)pyrene	NA	Lab			0.032 mg/kg	0.039 mg/kg	0.66 mg/kg	0.085 mg/kg	0.0056 mg/kg	< 0.0046 mg/kg	0.88 mg/kg	1.6 mg/kg	1.1 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	< 0.0069 mg/kg	< 0.018 mg/kg	0.016 mg/kg	< 0.0049 mg/kg	< 0.0046 mg/kg	< 0.0046 mg/kg	**0.052 mg/kg**	**0.28 mg/kg**	**0.16 mg/kg**
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	< 0.0069 mg/kg	< 0.018 mg/kg	0.064 mg/kg	0.0056 mg/kg	< 0.0046 mg/kg	< 0.0046 mg/kg	**0.23 mg/kg**	**2.7 mg/kg**	**2.7 mg/kg**
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	0.017 j mg/kg	0.036 mg/kg	0.14 mg/kg	0.014 mg/kg	0.0063 mg/kg	< 0.0046 mg/kg	**1.3 mg/kg**	**3.2 mg/kg**	**1.2 mg/kg**
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	0.063 mg/kg	0.058 mg/kg	**0.89 mg/kg**	0.15 mg/kg	0.0067 mg/kg	< 0.0046 mg/kg	**2.1 mg/kg**	**2.5 mg/kg**	**2 mg/kg**
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	0.268 a mg/kg	0.312 mg/kg	**5.27 mg/kg**	0.677 mg/kg	0.0428 mg/kg	0.0299 mg/kg	**11.9 mg/kg**	**24.3 mg/kg**	**15.4 mg/kg**
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	0.0117 mg/kg	0.0136 mg/kg	**0.229 mg/kg**	0.0294 mg/kg	0.00186 mg/kg	0.0013 mg/kg	**0.519 mg/kg**	**1.06 mg/kg**	**0.668 mg/kg**
1-Methylnaphthalene	NA	Lab			< 0.0069 mg/kg	< 0.018 mg/kg	0.0081 mg/kg	--	--	--	0.016 mg/kg	--	--
Benzo(e)pyrene	NA	Lab			0.021 j mg/kg	0.018 mg/kg	0.57 mg/kg	--	--	--	0.9 mg/kg	--	--
Perylene	NA	Lab			0.21 mg/kg	0.043 mg/kg	0.44 mg/kg	--	--	--	0.32 mg/kg	--	--
C1-Chrysenes	NA	Lab			0.029 X mg/kg	0.023 X mg/kg	0.44 X mg/kg	--	--	--	0.5 X mg/kg	--	--
C1-Fluoranthenes/Pyrenes	NA	Lab			0.033 X mg/kg	0.034 X mg/kg	0.59 X mg/kg	--	--	--	0.86 X mg/kg	--	--
C1-Fluorenes	NA	Lab			0.021 X mg/kg	< 0.018 X mg/kg	0.041 X mg/kg	--	--	--	0.048 X mg/kg	--	--
C1-Naphthalenes	NA	Lab			< 0.0069 X mg/kg	< 0.018 X mg/kg	0.017 X mg/kg	--	--	--	0.047 X mg/kg	--	--
C1-Phenanthrenes/Anthracenes	NA	Lab			0.014 X mg/kg	0.018 X mg/kg	0.1 X mg/kg	--	--	--	0.2 X mg/kg	--	--
C2-Chrysenes	NA	Lab			0.029 X mg/kg	< 0.018 X mg/kg	0.48 X mg/kg	--	--	--	0.32 X mg/kg	--	--
C2-Fluorenes	NA	Lab			0.014 X mg/kg	< 0.018 X mg/kg	0.06 X mg/kg	--	--	--	< 0.0097 X mg/kg	--	--
C2-Naphthalenes	NA	Lab			0.0069 X mg/kg	< 0.018 X mg/kg	0.032 X mg/kg	--	--	--	0.041 X mg/kg	--	--
C2-Phenanthrenes/Anthracenes	NA	Lab			0.0093 X mg/kg	< 0.018 X mg/kg	0.11 X mg/kg	--	--	--	0.1 X mg/kg	--	--
C3-Chrysenes	NA	Lab			< 0.0069 X mg/kg	< 0.018 X mg/kg	0.3 X mg/kg	--	--	--	0.18 X mg/kg	--	--
C3-Fluorenes	NA	Lab			0.01 X mg/kg	< 0.018 X mg/kg	0.051 X mg/kg	--	--	--	< 0.0097 X mg/kg	--	--
C3-Naphthalenes	NA	Lab			0.014 X mg/kg	< 0.018 X mg/kg	0.049 X mg/kg	--	--	--	0.034 X mg/kg	--	--
C3-Phenanthrenes/Anthracenes	NA	Lab			0.011 X mg/kg	< 0.018 X mg/kg	0.14 X mg/kg	--	--	--	0.06 X mg/kg	--	--
C4-Chrysenes	NA	Lab			< 0.0069 X mg/kg	< 0.018 X mg/kg	0.14 X mg/kg	--	--	--	< 0.0097 X mg/kg	--	--
C4-Napthalenes	NA	Lab			< 0.0069 X mg/kg	< 0.018 X mg/kg	0.035 X mg/kg	--	--	--	< 0.0097 X mg/kg	--	--
C4-Phenanthrenes/Anthracenes	NA	Lab			< 0.0069 X mg/kg	< 0.018 X mg/kg	< 0.0072 X mg/kg	--	--	--	< 0.0097 X mg/kg	--	--
Sum of ESBPAH17@ 0.5DL	NA	Lab			0.403 a mg/kg	0.451 a mg/kg	8.2 mg/kg	1.1 a mg/kg	0.060 a mg/kg	0.039 mg/kg	16.3 mg/kg	32.9 mg/kg	20.3 mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.009 a tu	0.005 a BQX tu	0.300 tu	0.089 a tu	0.005 a tu	0.004 tu	0.327 tu	0.698 tu	0.435 tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			0.839 a mg/kg	0.695 a mg/kg	11.7 a mg/kg	--	--	--	19.8 a mg/kg	--	--
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		0.019 a tu	0.0075 a BQX tu	0.425 a tu	--	--	--	0.393 a tu	--	--
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		--	--	--	0.409 a tu	0.266 a tu	0.264 a tu	--	**1.45 a tu**	**1 a tu**

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

					Sys Loc Code	**UC-38**	**UC-39**	**UC-39**	**UC-39**	**UC-39**	**UC-40**	**UC-40**	**UC-40**
					Sample Date	**3/11/2011**	**3/3/2011**	**3/3/2011**	**3/3/2011**	**3/3/2011**	**3/10/2011**	**3/10/2011**	**3/10/2011**
					Depth Interval	**2.9 - 3.4 ft**	**0 - 0.5 ft**	**2 - 2.5 ft**	**3 - 3.5 ft**	**4 - 4.5 ft**	**0 - 0.5 ft**	**1.5 - 2 ft**	**3 - 3.5 ft**
					Sys Sample Code	**UC-38-4_2.9-3.4_03112011**	**UC-39-1_0.0-0.5_03032011**	**UC-39-2_2.0-2.5_03032011**	**UC-39-3_3.0-3.5_03032011**	**UC-39-4_4.0-4.5_03032011**	**UC-40-1_0.0-0.5_03102011**	**UC-40-2_1.5-2.0_03102011**	**UC-40-3_3.0-3.5_03102011**
					Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
SVOCs													
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	< 0.0062 mg/kg	**0.016 mg/kg**	**0.6 mg/kg**	**0.18 mg/kg**	**0.0074 mg/kg**	**0.03 j mg/kg**	**0.12 mg/kg**	**0.11 mg/kg**	**0.086 mg/kg**
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	< 0.0062 mg/kg	**0.11 mg/kg**	**1.2 mg/kg**	**0.13 mg/kg**	**0.0069 mg/kg**	**0.031 j mg/kg**	**0.15 mg/kg**	**0.1 mg/kg**	**0.065 j mg/kg**
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	< 0.0062 mg/kg	**0.1 mg/kg**	**2.6 mg/kg**	**0.46 mg/kg**	0.022 mg/kg	**0.079 j mg/kg**	**0.9 mg/kg**	**0.59 mg/kg**	**0.37 mg/kg**
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	< 0.0062 mg/kg	**0.68 mg/kg**	**3.5 mg/kg**	**0.9 mg/kg**	0.066 mg/kg	**0.29 j mg/kg**	**2.4 mg/kg**	**2.3 mg/kg**	**1.2 mg/kg**
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	< 0.0062 mg/kg	**0.65 mg/kg**	**4.4 mg/kg**	**0.86 mg/kg**	0.064 mg/kg	**0.27 j mg/kg**	**2.3 mg/kg**	**2.8 mg/kg**	**1.4 mg/kg**
Benzo(b)fluoranthene	NA	Lab			< 0.0062 mg/kg	0.66 mg/kg	3.7 mg/kg	0.99 mg/kg	0.049 mg/kg	0.31 j mg/kg	2.1 mg/kg	2.3 mg/kg	1.2 mg/kg
Benzo(g,h,i)perylene	NA	Lab			< 0.0062 mg/kg	0.3 mg/kg	3.6 mg/kg	0.64 mg/kg	0.03 j mg/kg	0.2 j mg/kg	1.4 mg/kg	1.7 mg/kg	0.93 mg/kg
Benzo(k)fluoranthene	NA	Lab			< 0.0062 mg/kg	0.64 mg/kg	3 mg/kg	0.69 mg/kg	0.055 mg/kg	0.26 j mg/kg	1.7 mg/kg	2.5 mg/kg	1.4 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	< 0.0062 mg/kg	**0.65 mg/kg**	**3.2 mg/kg**	**1.1 mg/kg**	0.055 mg/kg	**0.24 j mg/kg**	**2.6 mg/kg**	**2.2 mg/kg**	**1.2 mg/kg**
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	< 0.0062 mg/kg	**0.12 mg/kg**	**1.4 mg/kg**	**0.36 mg/kg**	0.011 mg/kg	**0.051 j mg/kg**	**0.45 mg/kg**	**0.46 mg/kg**	**0.47 mg/kg**
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	0.0075 mg/kg	**1.4 mg/kg**	**4.3 mg/kg**	**2.6 mg/kg**	0.12 mg/kg	0.37 j mg/kg	**3 mg/kg**	**3.3 mg/kg**	**2.4 mg/kg**
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	< 0.0062 mg/kg	0.06 mg/kg	**1.7 mg/kg**	**0.35 mg/kg**	0.011 mg/kg	0.054 j mg/kg	**0.35 mg/kg**	**0.3 mg/kg**	**0.21 mg/kg**
Indeno(1,2,3-cd)pyrene	NA	Lab			< 0.0062 mg/kg	0.33 mg/kg	3.8 mg/kg	0.55 mg/kg	0.035 mg/kg	0.22 j mg/kg	1.3 mg/kg	1.9 mg/kg	0.99 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	< 0.0062 mg/kg	**0.022 mg/kg**	**0.21 mg/kg**	**0.22 mg/kg**	< 0.0069 mg/kg	0.011 j mg/kg	**0.045 mg/kg**	**0.083 mg/kg**	**0.086 mg/kg**
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	< 0.0062 mg/kg	0.1 mg/kg	**0.72 mg/kg**	**3.1 mg/kg**	0.025 mg/kg	0.032 j mg/kg	0.17 mg/kg	**0.69 mg/kg**	**0.7 mg/kg**
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	0.0090 mg/kg	**0.23 mg/kg**	**3.8 mg/kg**	**1.2 mg/kg**	0.058 mg/kg	0.13 j mg/kg	**1.5 mg/kg**	**1.1 mg/kg**	**0.75 mg/kg**
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	< 0.0062 mg/kg	**0.71 mg/kg**	**3 mg/kg**	**1.5 mg/kg**	0.095 mg/kg	**0.44 j mg/kg**	**2.5 mg/kg**	**2.5 mg/kg**	**2 mg/kg**
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	0.0506 mg/kg	**4.85 mg/kg**	**30.6 mg/kg**	**13 mg/kg**	0.545 mg/kg	**2.03 a mg/kg**	**16.5 mg/kg**	**16.5 mg/kg**	**10.9 a mg/kg**
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	0.0022 mg/kg	**0.211 mg/kg**	**1.33 mg/kg**	**0.563 mg/kg**	0.0237 mg/kg	0.0882 mg/kg	**0.717 mg/kg**	**0.719 mg/kg**	**0.476 mg/kg**
1-Methylnaphthalene	NA	Lab			--	< 0.011 mg/kg	--	--	--	< 0.0089 j mg/kg	--	--	--
Benzo(e)pyrene	NA	Lab			--	0.33 mg/kg	--	--	--	0.15 j mg/kg	--	--	--
Perylene	NA	Lab			--	0.19 mg/kg	--	--	--	0.17 j mg/kg	--	--	--
C1-Chrysenes	NA	Lab			--	0.23 X mg/kg	--	--	--	0.13 X mg/kg	--	--	--
C1-Fluoranthenes/Pyrenes	NA	Lab			--	0.25 X mg/kg	--	--	--	0.19 X mg/kg	--	--	--
C1-Fluorenes	NA	Lab			--	0.046 X mg/kg	--	--	--	0.019 X mg/kg	--	--	--
C1-Naphthalenes	NA	Lab			--	0.022 X mg/kg	--	--	--	0.013 X mg/kg	--	--	--
C1-Phenanthrenes/Anthracenes	NA	Lab			--	0.079 X mg/kg	--	--	--	0.066 X mg/kg	--	--	--
C2-Chrysenes	NA	Lab			--	0.17 X mg/kg	--	--	--	0.13 X mg/kg	--	--	--
C2-Fluorenes	NA	Lab			--	0.016 X mg/kg	--	--	--	< 0.0089 X mg/kg	--	--	--
C2-Naphthalenes	NA	Lab			--	0.024 X mg/kg	--	--	--	0.025 X mg/kg	--	--	--
C2-Phenanthrenes/Anthracenes	NA	Lab			--	0.034 X mg/kg	--	--	--	0.029 X mg/kg	--	--	--
C3-Chrysenes	NA	Lab			--	0.11 X mg/kg	--	--	--	0.064 X mg/kg	--	--	--
C3-Fluorenes	NA	Lab			--	< 0.011 X mg/kg	--	--	--	< 0.0089 X mg/kg	--	--	--
C3-Naphthalenes	NA	Lab			--	0.034 X mg/kg	--	--	--	0.025 X mg/kg	--	--	--
C3-Phenanthrenes/Anthracenes	NA	Lab			--	0.027 X mg/kg	--	--	--	0.032 X mg/kg	--	--	--
C4-Chrysenes	NA	Lab			--	< 0.011 X mg/kg	--	--	--	0.022 X mg/kg	--	--	--
C4-Napthalenes	NA	Lab			--	0.015 X mg/kg	--	--	--	< 0.0089 X mg/kg	--	--	--
C4-Phenanthrenes/Anthracenes	NA	Lab			--	< 0.011 X mg/kg	--	--	--	< 0.0089 X mg/kg	--	--	--
Sum of ESBPAH17@ 0.5DL	NA	Lab			0.063 mg/kg	6.8 mg/kg	44.7 mg/kg	15.8 mg/kg	0.714 a mg/kg	3.0 a mg/kg	23 mg/kg	24.9 mg/kg	15.5 a mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.003 tu	0.137 tu	1.0 tu	0.394 tu	0.021 a tu	0.080 a tu	0.627 tu	0.553 tu	0.373 a tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			--	8.35 a mg/kg	--	--	--	4.09 a mg/kg	--	--	--
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		--	0.166 a tu	--	--	--	0.106 a tu	--	--	--
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		0.262 a tu	--	**1.97 a tu**	0.93 a tu	0.293 a tu	--	**1.33 a tu**	**1.2 a tu**	0.894 a tu

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

					Sys Loc Code	**UC-40**	**WM-41**	**WM-41**	**WM-41**	**WM-41**	**WM-42**	**WM-42**	**WM-42**	**WM-42**
					Sample Date	**3/10/2011**	**3/15/2011**	**3/15/2011**	**3/15/2011**	**3/15/2011**	**3/15/2011**	**3/15/2011**	**3/15/2011**	**3/15/2011**
					Depth Interval	**4.5 - 5 ft**	**0 - 0.5 ft**	**1 - 1.5 ft**	**2 - 2.5 ft**	**3 - 3.4 ft**	**0 - 0.5 ft**	**1 - 1.5 ft**	**2 - 2.5 ft**	**2.5 - 3 ft**
					Sys Sample Code	**UC-40-4_4.5-5.0_03102011**	**WM-41-1_0.0-0.5_03152011**	**WM-41-2_1.0-1.5_03152011**	**WM-41-3_2.0-2.5_03152011**	**WM-41-4_3.0-3.4_03152011**	**WM-42-1_0.0-0.5_03152011**	**WM-42-2_1.0-1.5_03152011**	**WM-42-3_2.0-2.5_03152011**	**WM-42-4_2.5-3.0_03152011**
					Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II										
Effective Date			2/1/2007	2/1/2007										
Exceedance Key			**Bold**	Underline										
SVOCs														
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	**0.0067 mg/kg**	< 0.0054 mg/kg	< 0.0064 mg/kg	< 0.0045 mg/kg	< 0.0052 mg/kg	**0.026 mg/kg**	< 0.014 mg/kg	< 0.0067 mg/kg	< 0.0047 mg/kg
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	< 0.0063 mg/kg	**0.012 mg/kg**	< 0.0064 mg/kg	< 0.0045 mg/kg	< 0.0052 mg/kg	**0.1 mg/kg**	< 0.014 mg/kg	< 0.0067 mg/kg	< 0.0047 mg/kg
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	0.0091 mg/kg	0.012 mg/kg	< 0.0064 mg/kg	< 0.0045 mg/kg	< 0.0052 mg/kg	**0.097 mg/kg**	< 0.014 mg/kg	< 0.0067 mg/kg	< 0.0047 mg/kg
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	0.03 mg/kg	0.079 mg/kg	< 0.0064 mg/kg	< 0.0045 mg/kg	< 0.0052 mg/kg	**0.44 mg/kg**	< 0.014 mg/kg	< 0.0067 mg/kg	< 0.0047 mg/kg
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	0.035 mg/kg	0.074 mg/kg	0.012 mg/kg	< 0.0045 mg/kg	< 0.0052 mg/kg	**0.33 mg/kg**	< 0.014 mg/kg	< 0.0067 mg/kg	< 0.0047 mg/kg
Benzo(b)fluoranthene	NA	Lab			0.021 mg/kg	0.048 mg/kg	< 0.0064 mg/kg	< 0.0045 mg/kg	< 0.0052 mg/kg	0.18 mg/kg	< 0.014 mg/kg	< 0.0067 mg/kg	< 0.0047 mg/kg
Benzo(g,h,i)perylene	NA	Lab			0.018 j mg/kg	0.044 mg/kg	0.0065 j mg/kg	0.0038 j mg/kg	< 0.0052 mg/kg	0.14 mg/kg	< 0.014 mg/kg	< 0.0067 mg/kg	< 0.0047 mg/kg
Benzo(k)fluoranthene	NA	Lab			0.028 mg/kg	0.052 mg/kg	< 0.0064 j mg/kg	< 0.0045 j mg/kg	< 0.0052 j mg/kg	0.33 mg/kg	< 0.014 j mg/kg	< 0.0067 j mg/kg	< 0.0047 j mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	0.025 mg/kg	0.044 mg/kg	< 0.0064 mg/kg	< 0.0045 mg/kg	< 0.0052 mg/kg	**0.35 mg/kg**	< 0.014 mg/kg	< 0.0067 mg/kg	< 0.0047 mg/kg
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	0.0059 j mg/kg	0.014 mg/kg	< 0.0064 mg/kg	< 0.0045 mg/kg	< 0.0052 mg/kg	**0.042 mg/kg**	< 0.014 mg/kg	< 0.0067 mg/kg	< 0.0047 mg/kg
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	0.043 mg/kg	0.045 mg/kg	< 0.0064 mg/kg	< 0.0045 mg/kg	< 0.0052 mg/kg	**0.79 mg/kg**	< 0.014 mg/kg	< 0.0067 mg/kg	< 0.0047 mg/kg
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	0.0059 j mg/kg	0.0064 mg/kg	< 0.0064 mg/kg	< 0.0045 mg/kg	< 0.0052 mg/kg	**0.086 mg/kg**	< 0.014 mg/kg	< 0.0067 mg/kg	< 0.0047 mg/kg
Indeno(1,2,3-cd)pyrene	NA	Lab			0.019 mg/kg	0.049 mg/kg	0.0074 mg/kg	< 0.0045 mg/kg	0.0043 j mg/kg	0.23 mg/kg	0.012 j mg/kg	0.0071 mg/kg	< 0.0047 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	< 0.0063 mg/kg	< 0.0054 mg/kg	< 0.0064 mg/kg	< 0.0045 mg/kg	< 0.0052 mg/kg	0.014 mg/kg	< 0.014 mg/kg	< 0.0067 mg/kg	< 0.0047 mg/kg
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	0.0099 mg/kg	0.0085 mg/kg	< 0.0064 mg/kg	< 0.0045 mg/kg	< 0.0052 mg/kg	0.029 mg/kg	< 0.014 mg/kg	< 0.0067 mg/kg	< 0.0047 mg/kg
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	0.023 mg/kg	0.017 mg/kg	< 0.0064 mg/kg	0.0036 j mg/kg	0.0051 j mg/kg	0.17 mg/kg	< 0.014 mg/kg	< 0.0067 mg/kg	< 0.0047 mg/kg
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	0.039 mg/kg	0.047 mg/kg	< 0.0064 mg/kg	< 0.0045 mg/kg	< 0.0052 mg/kg	**0.81 mg/kg**	< 0.014 mg/kg	0.0062 j mg/kg	< 0.0047 mg/kg
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	0.239 a mg/kg	0.364 mg/kg	0.0504 mg/kg	0.0306 a mg/kg	0.0363 a mg/kg	**3.28 mg/kg**	0.091 mg/kg	0.0464 a mg/kg	0.0305 mg/kg
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	0.0104 mg/kg	0.0158 mg/kg	0.00219 mg/kg	0.00133 mg/kg	0.00158 mg/kg	**0.143 mg/kg**	0.00396 mg/kg	0.00202 mg/kg	0.00133 mg/kg
1-Methylnaphthalene	NA	Lab			--	< 0.0054 mg/kg	--	--	--	< 0.014 mg/kg	--	--	--
Benzo(e)pyrene	NA	Lab			--	0.034 mg/kg	--	--	--	0.11 mg/kg	--	--	--
Perylene	NA	Lab			--	0.03 mg/kg	--	--	--	0.078 mg/kg	--	--	--
C1-Chrysenes	NA	Lab			--	0.066 X mg/kg	--	--	--	0.27 X mg/kg	--	--	--
C1-Fluoranthenes/Pyrenes	NA	Lab			--	0.062 X mg/kg	--	--	--	0.52 X mg/kg	--	--	--
C1-Fluorenes	NA	Lab			--	< 0.0054 X mg/kg	--	--	--	0.038 X mg/kg	--	--	--
C1-Naphthalenes	NA	Lab			--	< 0.0054 X mg/kg	--	--	--	0.02 X mg/kg	--	--	--
C1-Phenanthrenes/Anthracenes	NA	Lab			--	0.013 X mg/kg	--	--	--	0.14 X mg/kg	--	--	--
C2-Chrysenes	NA	Lab			--	0.11 X mg/kg	--	--	--	0.3 X mg/kg	--	--	--
C2-Fluorenes	NA	Lab			--	< 0.0054 X mg/kg	--	--	--	0.062 X mg/kg	--	--	--
C2-Naphthalenes	NA	Lab			--	0.0055 X mg/kg	--	--	--	0.045 X mg/kg	--	--	--
C2-Phenanthrenes/Anthracenes	NA	Lab			--	0.024 X mg/kg	--	--	--	0.16 X mg/kg	--	--	--
C3-Chrysenes	NA	Lab			--	0.093 X mg/kg	--	--	--	< 0.014 X mg/kg	--	--	--
C3-Fluorenes	NA	Lab			--	< 0.0054 X mg/kg	--	--	--	< 0.014 X mg/kg	--	--	--
C3-Naphthalenes	NA	Lab			--	0.0094 X mg/kg	--	--	--	0.063 X mg/kg	--	--	--
C3-Phenanthrenes/Anthracenes	NA	Lab			--	0.033 X mg/kg	--	--	--	0.17 X mg/kg	--	--	--
C4-Chrysenes	NA	Lab			--	0.038 X mg/kg	--	--	--	0.015 X mg/kg	--	--	--
C4-Napthalenes	NA	Lab			--	< 0.0054 X mg/kg	--	--	--	0.11 X mg/kg	--	--	--
C4-Phenanthrenes/Anthracenes	NA	Lab			--	< 0.0054 X mg/kg	--	--	--	< 0.014 X mg/kg	--	--	--
Sum of ESBPAH17@ 0.5DL	NA	Lab			0.325 a mg/kg	0.557 mg/kg	0.071 a mg/kg	0.042 a mg/kg	0.048 a mg/kg	4.2 mg/kg	0.124 a mg/kg	0.064 a mg/kg	0.041 a mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.011 a tu	0.026 tu	0.001 a tu	0.005 a tu	0.002 a tu	0.065 tu	0.002 a tu	0.001 a tu	0.003 a tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			--	1.09 a mg/kg	--	--	--	6.27 a mg/kg	--	--	--
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		--	0.048 a tu	--	--	--	0.0962 a tu	--	--	--
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		0.276 a tu	--	0.259 a tu	0.266 a tu	0.260 a tu	--	0.260 a tu	0.259 a tu	0.262 a tu

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

					Sys Loc Code	**WM-43**	**WM-43**	**WM-43**	**WM-43**	**WM-44**	**WM-44**	**WM-44**	**WM-44**	**WM-45**
					Sample Date	**3/15/2011**	**3/15/2011**	**3/15/2011**	**3/15/2011**	**3/16/2011**	**3/16/2011**	**3/16/2011**	**3/16/2011**	**3/16/2011**
					Depth Interval	**0 - 0.5 ft**	**1.7 - 2.2 ft**	**2.2 - 2.7 ft**	**5 - 5.5 ft**	**0 - 0.5 ft**	**0.5 - 1 ft**	**1 - 1.5 ft**	**2 - 2.5 ft**	**0 - 0.5 ft**
					Sys Sample Code	**WM-43-1_0.0-0.5_03152011**	**WM-43-2_1.7-2.2_03152011**	**WM-43-3_2.2-2.7_03152011**	**WM-43-4_5.0-5.5_03152011**	**WM-44-1_0.0-0.5_03162011**	**WM-44-2_0.5-1.0_03162011**	**WM-44-3_1.0-1.5_03162011**	**WM-44-4_2.0-2.5_03162011**	**WM-45-1_0.0-0.5_03162011**
					Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II										
Effective Date			2/1/2007	2/1/2007										
Exceedance Key			**Bold**	Underline										
SVOCs														
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	< 0.0063 mg/kg	**2.3 mg/kg**	**16 mg/kg**	< 0.0040 mg/kg	< 0.0045 mg/kg	**0.019 mg/kg**	**0.019 mg/kg**	< 0.0040 mg/kg	< 0.0041 mg/kg	
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	< 0.0063 mg/kg	**0.15 mg/kg**	**1.3 mg/kg**	< 0.0040 mg/kg	< 0.0045 mg/kg	**0.022 mg/kg**	**0.013 mg/kg**	< 0.0040 mg/kg	< 0.0041 mg/kg	
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	< 0.0063 mg/kg	**4.8 mg/kg**	**57 mg/kg**	< 0.0040 mg/kg	< 0.0045 mg/kg	**0.26 mg/kg**	**0.3 mg/kg**	< 0.0040 mg/kg	< 0.0041 mg/kg	
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	0.015 mg/kg	**5.5 j mg/kg**	**65 mg/kg**	< 0.0040 mg/kg	0.0091 mg/kg	**1.1 mg/kg**	**0.89 mg/kg**	< 0.0040 mg/kg	0.0084 mg/kg	
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	0.017 mg/kg	**4.7 mg/kg**	**21 mg/kg**	< 0.0040 mg/kg	0.013 mg/kg	**1 mg/kg**	**0.84 mg/kg**	< 0.0040 mg/kg	0.0087 mg/kg	
Benzo(b)fluoranthene	NA	Lab			0.012 mg/kg	3.6 mg/kg	100 mg/kg	< 0.0040 mg/kg	0.0069 mg/kg	0.79 mg/kg	0.8 mg/kg	< 0.0040 mg/kg	0.008 mg/kg	
Benzo(g,h,i)perylene	NA	Lab			0.016 mg/kg	2.8 mg/kg	28 mg/kg	< 0.0040 mg/kg	0.011 mg/kg	0.68 mg/kg	0.58 mg/kg	0.0037 j mg/kg	0.0074 mg/kg	
Benzo(k)fluoranthene	NA	Lab			0.014 mg/kg	4.8 mg/kg	22 mg/kg	< 0.0040 j mg/kg	0.016 mg/kg	1.1 mg/kg	0.84 mg/kg	< 0.0040 j mg/kg	0.009 mg/kg	
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	0.015 mg/kg	**4.5 j mg/kg**	**48 mg/kg**	< 0.0040 mg/kg	0.0083 mg/kg	**0.91 mg/kg**	**0.75 mg/kg**	< 0.0040 mg/kg	0.0075 mg/kg	
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	< 0.0063 mg/kg	**0.87 mg/kg**	**8.4 mg/kg**	< 0.0040 mg/kg	< 0.0045 mg/kg	**0.33 mg/kg**	**0.32 mg/kg**	< 0.0040 mg/kg	< 0.0041 mg/kg	
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	0.013 mg/kg	**17 j mg/kg**	**200 mg/kg**	< 0.0040 mg/kg	0.0071 mg/kg	**2.2 mg/kg**	**1.8 mg/kg**	0.0055 mg/kg	0.0061 mg/kg	
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	< 0.0063 mg/kg	**3.4 mg/kg**	**28 mg/kg**	< 0.0040 mg/kg	< 0.0045 mg/kg	**0.077 mg/kg**	0.072 mg/kg	< 0.0040 mg/kg	< 0.0041 mg/kg	
Indeno(1,2,3-cd)pyrene	NA	Lab			0.013 mg/kg	4.4 mg/kg	34 mg/kg	< 0.0040 mg/kg	0.013 mg/kg	0.8 mg/kg	0.68 mg/kg	< 0.0040 mg/kg	0.0078 mg/kg	
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	< 0.0063 mg/kg	**0.068 j mg/kg**	**0.55 mg/kg**	< 0.0040 mg/kg	< 0.0045 mg/kg	0.014 mg/kg	0.0078 mg/kg	< 0.0040 mg/kg	< 0.0041 mg/kg	
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	< 0.0063 mg/kg	**0.24 mg/kg**	**1.2 mg/kg**	< 0.0040 mg/kg	< 0.0045 mg/kg	0.031 mg/kg	0.016 mg/kg	< 0.0040 mg/kg	< 0.0041 mg/kg	
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	< 0.0063 mg/kg	**8.5 mg/kg**	**89 mg/kg**	< 0.0040 mg/kg	< 0.0045 mg/kg	**0.33 mg/kg**	**0.36 mg/kg**	0.0035 j mg/kg	< 0.0041 mg/kg	
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	0.019 mg/kg	**11 j mg/kg**	**89 mg/kg**	< 0.0040 mg/kg	0.0075 mg/kg	**1.3 mg/kg**	**1 mg/kg**	0.0051 mg/kg	0.01 mg/kg	
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	0.104 mg/kg	**63 a mg/kg**	**624 mg/kg**	0.026 mg/kg	0.063 mg/kg	**7.59 mg/kg**	**6.39 mg/kg**	0.0341 a mg/kg	0.0571 mg/kg	
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	0.00453 mg/kg	**2.74 mg/kg**	**27.1 mg/kg**	0.00113 mg/kg	0.00274 mg/kg	**0.33 mg/kg**	**0.278 mg/kg**	0.00148 mg/kg	0.00248 mg/kg	
1-Methylnaphthalene	NA	Lab			< 0.0063 mg/kg	--	--	--	< 0.0045 mg/kg	--	--	--	< 0.0041 mg/kg	
Benzo(e)pyrene	NA	Lab			0.01 mg/kg	--	--	--	0.0083 j mg/kg	--	--	--	0.0062 mg/kg	
Perylene	NA	Lab			0.017 mg/kg	--	--	--	0.023 mg/kg	--	--	--	0.035 mg/kg	
C1-Chrysenes	NA	Lab			0.016 X mg/kg	--	--	--	0.0087 X mg/kg	--	--	--	0.0067 X mg/kg	
C1-Fluoranthenes/Pyrenes	NA	Lab			0.011 X mg/kg	--	--	--	0.0074 X mg/kg	--	--	--	0.0082 X mg/kg	
C1-Fluorenes	NA	Lab			< 0.0063 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	< 0.0041 X mg/kg	
C1-Naphthalenes	NA	Lab			< 0.0063 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	< 0.0041 X mg/kg	
C1-Phenanthrenes/Anthracenes	NA	Lab			< 0.0063 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	< 0.0041 X mg/kg	
C2-Chrysenes	NA	Lab			0.012 X mg/kg	--	--	--	0.0074 X mg/kg	--	--	--	< 0.0041 X mg/kg	
C2-Fluorenes	NA	Lab			< 0.0063 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	< 0.0041 X mg/kg	
C2-Naphthalenes	NA	Lab			< 0.0063 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	< 0.0041 X mg/kg	
C2-Phenanthrenes/Anthracenes	NA	Lab			< 0.0063 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	< 0.0041 X mg/kg	
C3-Chrysenes	NA	Lab			< 0.0063 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	< 0.0041 X mg/kg	
C3-Fluorenes	NA	Lab			< 0.0063 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	< 0.0041 X mg/kg	
C3-Naphthalenes	NA	Lab			< 0.0063 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	< 0.0041 X mg/kg	
C3-Phenanthrenes/Anthracenes	NA	Lab			< 0.0063 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	< 0.0041 X mg/kg	
C4-Chrysenes	NA	Lab			< 0.0063 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	< 0.0041 X mg/kg	
C4-Napthalenes	NA	Lab			< 0.0063 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	< 0.0041 X mg/kg	
C4-Phenanthrenes/Anthracenes	NA	Lab			< 0.0063 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	< 0.0041 X mg/kg	
Sum of ESBPAH17@ 0.5DL	NA	Lab			0.160 mg/kg	78.6 a mg/kg	808 mg/kg	0.034 a mg/kg	0.11 mg/kg	11 mg/kg	9.3 mg/kg	0.044 a mg/kg	0.090 mg/kg	
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.008 tu	1.3 a tu	9.3 tu	0.032 a tu	0.007 tu	0.826 tu	0.713 tu	0.009 a tu	0.014 tu	
Sum of ESBPAH34@ 0.5DL	NA	Lab			0.263 a mg/kg	--	--	--	0.192 a mg/kg	--	--	--	0.172 a mg/kg	
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		0.0126 a tu	--	--	--	0.011 a tu	--	--	--	0.0260 a tu	
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		--	**2.48 a tu**	**16.2 a tu**	0.312 a tu	--	**1.67 a tu**	**1.48 a tu**	0.272 a tu	--	

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

				Sys Loc Code	WM-45		WM-45	WM-45	WM-46	WM-46	WM-46	WM-46	WM-47
				Sample Date	3/16/2011		3/16/2011	3/16/2011	3/16/2011	3/16/2011	3/16/2011	3/16/2011	3/16/2011
				Depth Interval	1.5 - 2 ft	1.5 - 2 ft	3 - 3.5 ft	5 - 5.5 ft	0 - 0.5 ft	2.3 - 2.8 ft	2.8 - 3.3 ft	4 - 4.5 ft	0 - 0.5 ft
				Sys Sample Code	WM-45-2_1.5-2.0_03162011	WM-45-2_1.5-2.0_03162011_FD	WM-45-3_3.0-3.5_03162011	WM-45-4_5.0-5.5_03162011	WM-46-1_0.0-0.5_03162011	WM-46-2_2.3-2.8_03162011	WM-46-3_2.8-3.3_03162011	WM-46-4_4.0-4.5_03162011	WM-47-1_0.0-0.5_03162011
				Sample Type Code	N	FD	N	N	N	N	N	N	N
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
SVOCs													
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	< 0.21 mg/kg	< 0.0041 mg/kg	< 0.0040 mg/kg	< 0.0040 mg/kg	< 0.0062 mg/kg	**0.4 mg/kg**	**11 mg/kg**	< 0.0041 mg/kg	< 0.0051 mg/kg
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	< 0.21 mg/kg	< 0.0041 mg/kg	< 0.0040 mg/kg	< 0.0040 mg/kg	< 0.0062 mg/kg	**0.052 j mg/kg**	**1.3 mg/kg**	< 0.0041 mg/kg	< 0.0051 mg/kg
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	< 0.21 mg/kg	< 0.0041 mg/kg	< 0.0040 mg/kg	< 0.0040 mg/kg	< 0.0062 mg/kg	**0.34 mg/kg**	**42 mg/kg**	< 0.0041 mg/kg	< 0.0051 mg/kg
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	< 0.21 j mg/kg	< 0.0041 mg/kg	< 0.0040 mg/kg	< 0.0040 mg/kg	0.015 mg/kg	**0.55 mg/kg**	**47 mg/kg**	0.0051 mg/kg	0.014 mg/kg
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	< 0.21 mg/kg	< 0.0041 mg/kg	< 0.0040 mg/kg	< 0.0040 mg/kg	0.017 mg/kg	**0.4 mg/kg**	**40 mg/kg**	0.0078 mg/kg	0.016 mg/kg
Benzo(b)fluoranthene	NA	Lab			< 0.21 mg/kg	< 0.0041 mg/kg	< 0.0040 mg/kg	< 0.0040 mg/kg	0.017 mg/kg	0.38 mg/kg	27 mg/kg	0.0063 mg/kg	0.013 mg/kg
Benzo(g,h,i)perylene	NA	Lab			< 0.21 mg/kg	< 0.0041 mg/kg	< 0.0040 mg/kg	< 0.0040 mg/kg	0.013 mg/kg	0.29 j mg/kg	19 mg/kg	< 0.0041 j mg/kg	0.011 mg/kg
Benzo(k)fluoranthene	NA	Lab			< 0.21 mg/kg	< 0.0041 mg/kg	< 0.0040 j mg/kg	< 0.0040 mg/kg	0.014 mg/kg	0.33 mg/kg	45 mg/kg	0.0064 mg/kg	0.013 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	< 0.21 j mg/kg	< 0.0041 mg/kg	< 0.0040 mg/kg	< 0.0040 mg/kg	0.014 mg/kg	**0.66 mg/kg**	**35 mg/kg**	0.0050 mg/kg	0.013 mg/kg
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	< 0.21 mg/kg	< 0.0041 mg/kg	< 0.0040 mg/kg	< 0.0040 mg/kg	0.0063 mg/kg	**0.25 mg/kg**	**6.2 j mg/kg**	< 0.0041 mg/kg	0.0054 mg/kg
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	< 0.21 j mg/kg	< 0.0041 mg/kg	< 0.0040 mg/kg	0.0047 mg/kg	0.022 mg/kg	**1.5 mg/kg**	**83 mg/kg**	0.0055 mg/kg	0.01 mg/kg
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	< 0.21 mg/kg	< 0.0041 mg/kg	< 0.0040 mg/kg	< 0.0040 mg/kg	< 0.0062 mg/kg	**0.42 mg/kg**	**21 mg/kg**	< 0.0041 mg/kg	< 0.0051 mg/kg
Indeno(1,2,3-cd)pyrene	NA	Lab			< 0.21 mg/kg	< 0.0041 mg/kg	< 0.0040 mg/kg	< 0.0040 mg/kg	0.013 mg/kg	0.25 j mg/kg	25 mg/kg	< 0.0041 mg/kg	0.01 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	< 0.21 mg/kg	< 0.0041 mg/kg	< 0.0040 mg/kg	< 0.0040 mg/kg	< 0.0062 mg/kg	**0.048 mg/kg**	**1.1 mg/kg**	< 0.0041 mg/kg	< 0.0051 mg/kg
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	< 0.21 mg/kg	< 0.0041 mg/kg	< 0.0040 mg/kg	< 0.0040 mg/kg	< 0.0062 mg/kg	0.12 mg/kg	**1.1 mg/kg**	< 0.0041 mg/kg	< 0.0051 mg/kg
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	< 0.21 mg/kg	< 0.0041 mg/kg	< 0.0040 mg/kg	0.0054 j mg/kg	0.0092 mg/kg	**0.73 mg/kg**	**57 mg/kg**	< 0.0041 mg/kg	0.0050 j mg/kg
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	< 0.21 j mg/kg	< 0.0041 mg/kg	< 0.0040 mg/kg	0.0056 mg/kg	0.027 j mg/kg	**1.2 mg/kg**	**58 mg/kg**	0.0056 j mg/kg	0.014 j mg/kg
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	1.37 mg/kg	0.0267 mg/kg	0.026 mg/kg	0.0357 a mg/kg	0.129 a mg/kg	**6.67 a mg/kg**	**404 a mg/kg**	0.0454 a mg/kg	0.0927 a mg/kg
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	0.0593 mg/kg	0.00116 mg/kg	0.00113 mg/kg	0.00155 mg/kg	0.00561 mg/kg	**0.29 mg/kg**	**17.6 mg/kg**	0.00197 mg/kg	0.00403 mg/kg
1-Methylnaphthalene	NA	Lab			--	--	--	--	< 0.0062 mg/kg	--	--	--	< 0.0051 mg/kg
Benzo(e)pyrene	NA	Lab			--	--	--	--	0.0097 mg/kg	--	--	--	0.0075 mg/kg
Perylene	NA	Lab			--	--	--	--	0.057 mg/kg	--	--	--	0.02 mg/kg
C1-Chrysenes	NA	Lab			--	--	--	--	0.016 X mg/kg	--	--	--	0.0086 X mg/kg
C1-Fluoranthenes/Pyrenes	NA	Lab			--	--	--	--	0.016 X mg/kg	--	--	--	0.0096 X mg/kg
C1-Fluorenes	NA	Lab			--	--	--	--	0.0058 X mg/kg	--	--	--	< 0.0051 X mg/kg
C1-Naphthalenes	NA	Lab			--	--	--	--	< 0.0062 X mg/kg	--	--	--	< 0.0051 X mg/kg
C1-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	--	< 0.0062 X mg/kg	--	--	--	< 0.0051 X mg/kg
C2-Chrysenes	NA	Lab			--	--	--	--	0.011 X mg/kg	--	--	--	< 0.0051 X mg/kg
C2-Fluorenes	NA	Lab			--	--	--	--	< 0.0062 X mg/kg	--	--	--	< 0.0051 X mg/kg
C2-Naphthalenes	NA	Lab			--	--	--	--	< 0.0062 X mg/kg	--	--	--	< 0.0051 X mg/kg
C2-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	--	< 0.0062 X mg/kg	--	--	--	< 0.0051 X mg/kg
C3-Chrysenes	NA	Lab			--	--	--	--	0.013 X mg/kg	--	--	--	< 0.0051 X mg/kg
C3-Fluorenes	NA	Lab			--	--	--	--	< 0.0062 X mg/kg	--	--	--	< 0.0051 X mg/kg
C3-Naphthalenes	NA	Lab			--	--	--	--	0.0069 X mg/kg	--	--	--	< 0.0051 X mg/kg
C3-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	--	< 0.0062 X mg/kg	--	--	--	< 0.0051 X mg/kg
C4-Chrysenes	NA	Lab			--	--	--	--	< 0.0062 X mg/kg	--	--	--	< 0.0051 X mg/kg
C4-Napthalenes	NA	Lab			--	--	--	--	< 0.0062 X mg/kg	--	--	--	< 0.0051 X mg/kg
C4-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	--	< 0.0062 X mg/kg	--	--	--	< 0.0051 X mg/kg
Sum of ESBPAH17@ 0.5DL	NA	Lab			1.9 a mg/kg	0.036 mg/kg	0.034 a mg/kg	0.044 a mg/kg	0.186 a mg/kg	7.9 a mg/kg	520 a mg/kg	0.063 a mg/kg	0.140 a mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			1.6 a tu	0.016 tu	0.025 a tu	0.016 a tu	0.011 a tu	0.168 a tu	5.9 a tu	0.019 a tu	0.017 a tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			--	--	--	--	0.349 a mg/kg	--	--	--	0.219 a mg/kg
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** (1)		--	--	--	--	0.020 a tu	--	--	--	0.026 a tu
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** (1)		**2.99 a tu**	0.284 a tu	0.30 a tu	0.284 a tu	--	0.544 a tu	**10.3 a tu**	0.289 a tu	--

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

					Sys Loc Code	**WM-47**	**WM-47**	**WM-47**	**WM-48**	**WM-48**	**WM-48**	**WM-48**	**WM-49**	**WM**
					Sample Date	**3/16/2011**	**3/16/2011**	**3/16/2011**	**3/17/2011**	**3/17/2011**	**3/17/2011**	**3/17/2011**	**3/17/2011**	**3/17/**
					Depth Interval	**2.5 - 3 ft**	**3 - 3.5 ft**	**3.5 - 4 ft**	**0 - 0.5 ft**	**2 - 2.5 ft**	**2.5 - 3 ft**	**3 - 3.5 ft**	**0 - 0.5 ft**	**2.5 - 3 ft**
					Sys Sample Code	**WM-47-2_2.5-3.0_03162011**	**WM-47-3_3.0-3.5_03162011**	**WM-47-4_3.5-4.0_03162011**	**WM-48-1_0.0-0.5_03172011**	**WM-48-2_2.0-2.5_03172011**	**WM-48-3_2.5-3.0_03172011**	**WM-48-4_3.0-3.5_03172011**	**WM-49-1_0.0-0.5_03172011**	**WM-49-2_2.5-3.0_03172011**
					Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II										
Effective Date			2/1/2007	2/1/2007										
Exceedance Key			**Bold**	Underline										
SVOCs														
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	**2.7 mg/kg**	**0.37 mg/kg**	< 0.0052 mg/kg	< 0.0045 mg/kg	**0.18 mg/kg**	**0.41 mg/kg**	**0.16 mg/kg**	< 0.0046 mg/kg	< 0.0050 mg/kg	
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	**0.19 mg/kg**	**0.046 mg/kg**	< 0.0052 mg/kg	< 0.0045 mg/kg	**0.021 mg/kg**	< 1.4 mg/kg	**0.0069 mg/kg**	< 0.0046 mg/kg	< 0.0050 mg/kg	
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	**8.9 mg/kg**	**1.3 mg/kg**	0.0060 mg/kg	< 0.0045 mg/kg	**0.33 mg/kg**	**2.2 mg/kg**	**0.33 mg/kg**	< 0.0046 mg/kg	< 0.0050 j mg/kg	
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	**11 j mg/kg**	**1.7 j mg/kg**	0.014 mg/kg	0.0099 mg/kg	**0.77 mg/kg**	**3.3 j mg/kg**	**0.52 mg/kg**	0.0086 mg/kg	0.015 mg/kg	
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	**9.1 mg/kg**	**1.5 mg/kg**	0.013 mg/kg	0.011 mg/kg	**0.8 mg/kg**	**3.5 mg/kg**	**0.36 mg/kg**	0.011 mg/kg	0.018 mg/kg	
Benzo(b)fluoranthene	NA	Lab			6.9 mg/kg	1 mg/kg	0.0056 mg/kg	0.012 mg/kg	0.69 mg/kg	3.5 mg/kg	0.29 j mg/kg	0.0088 mg/kg	0.0074 j mg/kg	
Benzo(g,h,i)perylene	NA	Lab			5.2 mg/kg	1 mg/kg	0.0080 j mg/kg	0.0092 mg/kg	0.52 mg/kg	2 mg/kg	0.23 j mg/kg	0.0079 mg/kg	0.017 j mg/kg	
Benzo(k)fluoranthene	NA	Lab			10 mg/kg	1.5 mg/kg	0.011 j mg/kg	0.0093 mg/kg	0.71 mg/kg	3.3 mg/kg	0.45 mg/kg	0.0078 mg/kg	0.01 mg/kg	
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	**8.2 j mg/kg**	**1.3 j mg/kg**	0.0091 mg/kg	0.0095 mg/kg	**0.7 mg/kg**	**2.8 j mg/kg**	**0.43 mg/kg**	0.0081 mg/kg	0.014 mg/kg	
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	**2.2 mg/kg**	**0.3 mg/kg**	< 0.0052 mg/kg	0.0045 j mg/kg	**0.14 j mg/kg**	**0.56 mg/kg**	**0.32 mg/kg**	< 0.0046 mg/kg	0.013 mg/kg	
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	**31 j mg/kg**	**3.7 j mg/kg**	0.022 mg/kg	0.0076 mg/kg	**1.5 mg/kg**	**8.7 j mg/kg**	**1.1 mg/kg**	0.011 mg/kg	0.018 mg/kg	
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	**3.6 mg/kg**	**0.59 mg/kg**	< 0.0052 mg/kg	< 0.0045 mg/kg	**0.23 mg/kg**	**0.72 mg/kg**	**0.19 mg/kg**	< 0.0046 mg/kg	< 0.0050 mg/kg	
Indeno(1,2,3-cd)pyrene	NA	Lab			6.3 mg/kg	1.2 mg/kg	0.0098 mg/kg	0.0090 mg/kg	0.54 mg/kg	2.4 mg/kg	0.31 mg/kg	0.0071 mg/kg	0.015 mg/kg	
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	**0.19 mg/kg**	0.019 mg/kg	< 0.0052 mg/kg	< 0.0045 mg/kg	**0.021 mg/kg**	< 1.4 mg/kg	0.0084 mg/kg	< 0.0046 mg/kg	< 0.0050 mg/kg	
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	**0.3 mg/kg**	0.029 mg/kg	< 0.0052 mg/kg	< 0.0045 mg/kg	0.053 mg/kg	< 1.4 mg/kg	0.01 mg/kg	< 0.0046 mg/kg	< 0.0050 mg/kg	
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	**11 mg/kg**	**1.8 mg/kg**	0.0094 mg/kg	< 0.0045 mg/kg	**0.42 mg/kg**	**3.2 mg/kg**	**0.48 mg/kg**	0.0045 j mg/kg	0.0094 mg/kg	
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	**20 j mg/kg**	**2.2 j mg/kg**	0.019 mg/kg	0.0094 j mg/kg	**0.98 mg/kg**	**3.2 j mg/kg**	**0.61 mg/kg**	0.013 j mg/kg	0.022 mg/kg	
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	**108 a mg/kg**	**14.9 a mg/kg**	0.108 mg/kg	0.0676 mg/kg	**6.14 a mg/kg**	**30.7 a mg/kg**	**4.53 mg/kg**	0.0723 a mg/kg	0.124 mg/kg	
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	**4.71 mg/kg**	**0.646 mg/kg**	0.0047 mg/kg	0.00294 mg/kg	**0.267 mg/kg**	**1.33 mg/kg**	**0.197 mg/kg**	0.00314 mg/kg	0.00541 mg/kg	
1-Methylnaphthalene	NA	Lab			--	--	--	< 0.0045 mg/kg	--	--	--	< 0.0046 mg/kg	--	
Benzo(e)pyrene	NA	Lab			--	--	--	0.0072 mg/kg	--	--	--	0.0054 mg/kg	--	
Perylene	NA	Lab			--	--	--	0.024 mg/kg	--	--	--	0.02 mg/kg	--	
C1-Chrysenes	NA	Lab			--	--	--	0.0084 X mg/kg	--	--	--	0.0073 X mg/kg	--	
C1-Fluoranthenes/Pyrenes	NA	Lab			--	--	--	< 0.0045 X mg/kg	--	--	--	0.0061 X mg/kg	--	
C1-Fluorenes	NA	Lab			--	--	--	< 0.0045 X mg/kg	--	--	--	< 0.0046 X mg/kg	--	
C1-Naphthalenes	NA	Lab			--	--	--	< 0.0045 X mg/kg	--	--	--	< 0.0046 X mg/kg	--	
C1-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	< 0.0045 X mg/kg	--	--	--	< 0.0046 X mg/kg	--	
C2-Chrysenes	NA	Lab			--	--	--	< 0.0045 X mg/kg	--	--	--	0.0053 X mg/kg	--	
C2-Fluorenes	NA	Lab			--	--	--	< 0.0045 X mg/kg	--	--	--	< 0.0046 X mg/kg	--	
C2-Naphthalenes	NA	Lab			--	--	--	< 0.0045 X mg/kg	--	--	--	< 0.0046 X mg/kg	--	
C2-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	< 0.0045 X mg/kg	--	--	--	< 0.0046 X mg/kg	--	
C3-Chrysenes	NA	Lab			--	--	--	< 0.0045 X mg/kg	--	--	--	< 0.0046 X mg/kg	--	
C3-Fluorenes	NA	Lab			--	--	--	< 0.0045 X mg/kg	--	--	--	< 0.0046 X mg/kg	--	
C3-Naphthalenes	NA	Lab			--	--	--	< 0.0045 X mg/kg	--	--	--	< 0.0046 X mg/kg	--	
C3-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	< 0.0045 X mg/kg	--	--	--	< 0.0046 X mg/kg	--	
C4-Chrysenes	NA	Lab			--	--	--	< 0.0045 X mg/kg	--	--	--	< 0.0046 X mg/kg	--	
C4-Napthalenes	NA	Lab			--	--	--	< 0.0045 X mg/kg	--	--	--	< 0.0046 X mg/kg	--	
C4-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	< 0.0045 X mg/kg	--	--	--	< 0.0046 X mg/kg	--	
Sum of ESBPAH17@ 0.5DL	NA	Lab			137 a mg/kg	19.6 a mg/kg	0.142 a mg/kg	0.108 a mg/kg	8.6 a mg/kg	41.9 a mg/kg	5.8 a mg/kg	0.104 a mg/kg	0.174 a mg/kg	
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			2.3 a tu	0.762 a tu	0.027 a tu	0.012 a tu	0.565 a tu	1.9 a tu	0.221 a tu	0.014 a tu	0.012 a tu	
Sum of ESBPAH34@ 0.5DL	NA	Lab			--	--	--	0.178 a mg/kg	--	--	--	0.176 a mg/kg	--	
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		--	--	--	0.019 a tu	--	--	--	0.023 a tu	--	
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		**4.19 a tu**	**1.56 a tu**	0.303 a tu	--	**1.22 a tu**	**3.5 a tu**	0.635 a tu	--	0.278 a tu	

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

					Sys Loc Code	**I-49**	**WM-49**	**WM-49**	**WM-50**	**WM-50**	**WM-50**	**WM-50**	**WM-51**	**WM-51**
					Sample Date	**2011**	**3/17/2011**	**3/17/2011**	**3/17/2011**	**3/17/2011**	**3/17/2011**	**3/17/2011**	**3/18/2011**	**3/18/2011**
					Depth Interval	**2.5 - 3 ft**	**4.8 - 5.3 ft**	**5.5 - 6 ft**	**0 - 0.5 ft**	**1 - 1.5 ft**	**2.5 - 3 ft**	**3 - 3.5 ft**	**0 - 0.5 ft**	**2 - 2.5 ft**
					Sys Sample Code	**WM-49-2_2.5-3.0_03172011_FD**	**WM-49-3_4.8-5.3_03172011**	**WM-49-4_5.5-6.0_03172011**	**WM-50-1_0.0-0.5_03172011**	**WM-50-2_1.0-1.5_03172011**	**WM-50-3_2.5-3.0_03172011**	**WM-50-4_3.0-3.5_03172011**	**WM-51-1_0.0-0.5_03182011**	**WM-51-2_2.0-2.5_03182011**
					Sample Type Code	**FD**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II										
Effective Date			2/1/2007	2/1/2007										
Exceedance Key			**Bold**	Underline										
SVOCs														
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	< 0.0049 mg/kg	< 0.0052 mg/kg	< 0.0040 mg/kg	< 0.0058 mg/kg	< 0.0059 mg/kg	**0.022 mg/kg**	< 0.0062 mg/kg	< 0.0051 mg/kg	< 0.0054 mg/kg
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	< 0.0049 mg/kg	< 0.0052 mg/kg	< 0.0040 mg/kg	< 0.0058 mg/kg	**0.017 mg/kg**	**0.051 mg/kg**	< 0.0062 mg/kg	< 0.0051 mg/kg	**0.0062 mg/kg**
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	< 0.0049 j mg/kg	< 0.0052 mg/kg	< 0.0040 j mg/kg	0.0064 mg/kg	0.011 mg/kg	**0.27 mg/kg**	< 0.0062 mg/kg	< 0.0051 mg/kg	0.0065 mg/kg
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	0.011 mg/kg	0.033 mg/kg	< 0.0040 mg/kg	0.026 mg/kg	**0.12 j mg/kg**	**1.2 j mg/kg**	0.01 mg/kg	0.014 mg/kg	0.044 mg/kg
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	0.017 mg/kg	0.029 mg/kg	0.0073 mg/kg	0.023 mg/kg	0.11 j mg/kg	**1.4 mg/kg**	0.01 mg/kg	0.016 mg/kg	0.04 mg/kg
Benzo(b)fluoranthene	NA	Lab			0.018 j mg/kg	0.015 mg/kg	< 0.0040 j mg/kg	0.025 mg/kg	0.14 j mg/kg	1.1 mg/kg	0.013 mg/kg	0.014 mg/kg	0.027 mg/kg
Benzo(g,h,i)perylene	NA	Lab			0.015 j mg/kg	0.021 mg/kg	0.0075 j mg/kg	0.014 j mg/kg	0.089 j mg/kg	0.9 mg/kg	0.0093 mg/kg	0.012 j mg/kg	0.026 mg/kg
Benzo(k)fluoranthene	NA	Lab			0.0074 mg/kg	0.022 mg/kg	0.0038 j mg/kg	0.022 mg/kg	0.088 j mg/kg	1.4 mg/kg	0.0088 mg/kg	0.018 mg/kg	0.027 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	0.011 mg/kg	0.027 mg/kg	< 0.0040 mg/kg	0.024 mg/kg	0.11 j mg/kg	**1 j mg/kg**	0.0083 mg/kg	0.014 mg/kg	0.035 mg/kg
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	0.012 mg/kg	0.0083 mg/kg	0.0079 mg/kg	0.0079 mg/kg	0.026 mg/kg	**0.46 mg/kg**	< 0.0062 mg/kg	0.0085 mg/kg	0.0065 mg/kg
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	0.013 mg/kg	0.034 mg/kg	0.0039 j mg/kg	0.032 mg/kg	0.13 j mg/kg	**2.6 j mg/kg**	0.01 mg/kg	0.019 mg/kg	0.046 mg/kg
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	< 0.0049 mg/kg	< 0.0052 mg/kg	< 0.0040 mg/kg	< 0.0058 mg/kg	< 0.0059 mg/kg	**0.1 mg/kg**	< 0.0062 mg/kg	< 0.0051 mg/kg	< 0.0054 mg/kg
Indeno(1,2,3-cd)pyrene	NA	Lab			0.013 mg/kg	0.019 mg/kg	0.0083 mg/kg	0.015 mg/kg	0.059 mg/kg	0.95 mg/kg	0.01 mg/kg	0.012 mg/kg	0.025 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	< 0.0049 mg/kg	< 0.0052 mg/kg	< 0.0040 mg/kg	< 0.0058 mg/kg	< 0.0059 mg/kg	0.015 mg/kg	< 0.0062 mg/kg	< 0.0051 mg/kg	< 0.0054 mg/kg
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	< 0.0049 mg/kg	< 0.0052 mg/kg	< 0.0040 mg/kg	< 0.0058 mg/kg	< 0.0059 mg/kg	0.059 mg/kg	< 0.0062 mg/kg	< 0.0051 mg/kg	0.022 mg/kg
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	0.0070 mg/kg	0.011 j mg/kg	< 0.0040 mg/kg	0.0060 mg/kg	0.017 j mg/kg	**0.5 mg/kg**	< 0.0062 mg/kg	0.0055 mg/kg	0.014 j mg/kg
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	0.017 mg/kg	0.04 mg/kg	0.0048 mg/kg	0.027 j mg/kg	0.15 j mg/kg	**1.5 j mg/kg**	0.012 mg/kg	0.016 j mg/kg	0.052 mg/kg
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	0.103 mg/kg	0.198 mg/kg	0.0419 a mg/kg	0.167 a mg/kg	0.703 a mg/kg	**9.18 a mg/kg**	0.0751 mg/kg	0.108 a mg/kg	0.28 a mg/kg
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	0.00447 mg/kg	0.0086 mg/kg	0.00182 mg/kg	0.00725 mg/kg	0.0306 mg/kg	**0.399 mg/kg**	0.00327 mg/kg	0.00471 mg/kg	0.0122 mg/kg
1-Methylnaphthalene	NA	Lab			--	--	--	< 0.0058 mg/kg	--	--	--	< 0.0051 mg/kg	--
Benzo(e)pyrene	NA	Lab			--	--	--	0.011 mg/kg	--	--	--	0.0077 mg/kg	--
Perylene	NA	Lab			--	--	--	0.014 mg/kg	--	--	--	0.029 mg/kg	--
C1-Chrysenes	NA	Lab			--	--	--	0.013 X mg/kg	--	--	--	0.01 X mg/kg	--
C1-Fluoranthenes/Pyrenes	NA	Lab			--	--	--	0.02 X mg/kg	--	--	--	0.013 X mg/kg	--
C1-Fluorenes	NA	Lab			--	--	--	< 0.0058 X mg/kg	--	--	--	< 0.0051 X mg/kg	--
C1-Naphthalenes	NA	Lab			--	--	--	< 0.0058 X mg/kg	--	--	--	< 0.0051 X mg/kg	--
C1-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	0.0055 X mg/kg	--	--	--	< 0.0051 X mg/kg	--
C2-Chrysenes	NA	Lab			--	--	--	0.0071 X mg/kg	--	--	--	0.0066 X mg/kg	--
C2-Fluorenes	NA	Lab			--	--	--	< 0.0058 X mg/kg	--	--	--	< 0.0051 X mg/kg	--
C2-Naphthalenes	NA	Lab			--	--	--	< 0.0058 X mg/kg	--	--	--	< 0.0051 X mg/kg	--
C2-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	0.0054 X mg/kg	--	--	--	< 0.0051 X mg/kg	--
C3-Chrysenes	NA	Lab			--	--	--	0.0099 X mg/kg	--	--	--	< 0.0051 X mg/kg	--
C3-Fluorenes	NA	Lab			--	--	--	< 0.0058 X mg/kg	--	--	--	< 0.0051 X mg/kg	--
C3-Naphthalenes	NA	Lab			--	--	--	< 0.0058 X mg/kg	--	--	--	< 0.0051 X mg/kg	--
C3-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	0.0059 X mg/kg	--	--	--	< 0.0051 X mg/kg	--
C4-Chrysenes	NA	Lab			--	--	--	< 0.0058 X mg/kg	--	--	--	< 0.0051 X mg/kg	--
C4-Napthalenes	NA	Lab			--	--	--	< 0.0058 X mg/kg	--	--	--	< 0.0051 X mg/kg	--
C4-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	< 0.0058 X mg/kg	--	--	--	< 0.0051 X mg/kg	--
Sum of ESBPAH17@ 0.5DL	NA	Lab			0.156 a mg/kg	0.275 a mg/kg	0.064 a mg/kg	0.243 a mg/kg	1.1 a mg/kg	13.5 a mg/kg	0.116 mg/kg	0.165 a mg/kg	0.385 a mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.015 a tu	0.011 a tu	0.161 a tu	0.016 a tu	0.05 a tu	0.362 a tu	0.005 tu	0.010 a tu	0.017 a tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			--	--	--	0.358 a mg/kg	--	--	--	0.261 a mg/kg	--
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		--	--	--	0.023 a tu	--	--	--	0.016 a tu	--
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		0.283 a tu	0.276 a tu	0.532 a tu	--	0.342 a tu	0.876 a tu	0.266 a tu	--	0.286 a tu

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

				Sys Loc Code	**WM-51**	**WM-51**
				Sample Date	**3/18/2011**	**3/18/2011**
				Depth Interval	**4 - 4.5 ft**	**6 - 6.5 ft**
				Sys Sample Code	**WM-51-3_4.0-4.5_03182011**	**WM-51-4_6.0-6.5_03182011**
				Sample Type Code	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II		
Effective Date			2/1/2007	2/1/2007		
Exceedance Key			**Bold**	Underline		
SVOCs						
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	< 0.0045 mg/kg	< 0.0042 mg/kg
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	< 0.0045 mg/kg	< 0.0042 mg/kg
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	< 0.0045 j mg/kg	< 0.0042 mg/kg
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	< 0.0045 mg/kg	< 0.0042 mg/kg
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	0.0058 mg/kg	< 0.0042 mg/kg
Benzo(b)fluoranthene	NA	Lab			< 0.0045 j mg/kg	< 0.0042 mg/kg
Benzo(g,h,i)perylene	NA	Lab			0.0087 j mg/kg	< 0.0042 mg/kg
Benzo(k)fluoranthene	NA	Lab			0.0046 mg/kg	< 0.0042 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	< 0.0045 mg/kg	< 0.0042 mg/kg
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	0.0089 mg/kg	< 0.0042 mg/kg
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	0.0050 mg/kg	< 0.0042 mg/kg
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	< 0.0045 mg/kg	< 0.0042 mg/kg
Indeno(1,2,3-cd)pyrene	NA	Lab			0.0096 mg/kg	< 0.0042 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	< 0.0045 mg/kg	< 0.0042 mg/kg
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	< 0.0045 mg/kg	< 0.0042 mg/kg
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	0.0056 mg/kg	< 0.0042 mg/kg
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	0.0051 mg/kg	< 0.0042 mg/kg
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	0.0484 mg/kg	0.0273 mg/kg
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	0.0021 mg/kg	0.00119 mg/kg
1-Methylnaphthalene	NA	Lab			--	--
Benzo(e)pyrene	NA	Lab			--	--
Perylene	NA	Lab			--	--
C1-Chrysenes	NA	Lab			--	--
C1-Fluoranthenes/Pyrenes	NA	Lab			--	--
C1-Fluorenes	NA	Lab			--	--
C1-Naphthalenes	NA	Lab			--	--
C1-Phenanthrenes/Anthracenes	NA	Lab			--	--
C2-Chrysenes	NA	Lab			--	--
C2-Fluorenes	NA	Lab			--	--
C2-Naphthalenes	NA	Lab			--	--
C2-Phenanthrenes/Anthracenes	NA	Lab			--	--
C3-Chrysenes	NA	Lab			--	--
C3-Fluorenes	NA	Lab			--	--
C3-Naphthalenes	NA	Lab			--	--
C3-Phenanthrenes/Anthracenes	NA	Lab			--	--
C4-Chrysenes	NA	Lab			--	--
C4-Napthalenes	NA	Lab			--	--
C4-Phenanthrenes/Anthracenes	NA	Lab			--	--
Sum of ESBPAH17@ 0.5DL	NA	Lab			0.074 a mg/kg	0.036 mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.009 a tu	0.023 tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			--	--
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		--	--
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		0.272 a tu	0.296 a tu

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

					Sys Loc Code	**UC-52**	**UC-52**	**UC-52**	**UC-52**	**UC-53**	**UC-53**	**UC-53**	**UC-53**	**UC-54**
					Sample Date	**3/18/2011**	**3/18/2011**	**3/18/2011**	**3/18/2011**	**3/18/2011**	**3/18/2011**	**3/18/2011**	**3/18/2011**	**3/18/2011**
					Depth Interval	**0 - 0.5 ft**	**2 - 2.5 ft**	**4 - 4.5 ft**	**5 - 5.5 ft**	**0 - 0.5 ft**	**2 - 2.5 ft**	**3 - 3.5 ft**	**4.5 - 5 ft**	**0 - 0.5 ft**
					Sys Sample Code	**UC-52-1_0.0-0.5_03182011**	**UC-52-2_2.0-2.5_03182011**	**UC-52-3_4.0-4.5_03182011**	**UC-52-4_5.0-5.5_03182011**	**UC-53-1_0.0-0.5_03182011**	**UC-53-2_2.0-2.5_03182011**	**UC-53-3_3.0-3.5_03182011**	**UC-53-4_4.5-5.0_03182011**	**UC-54-1_0.0-0.5_03182011**
					Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II										
Effective Date			2/1/2007	2/1/2007										
Exceedance Key			**Bold**	Underline										
SVOCs														
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	< 0.0065 mg/kg	**0.0087 mg/kg**	< 0.0053 mg/kg	< 0.0041 mg/kg	**0.03 mg/kg**	**0.16 mg/kg**	**0.13 mg/kg**	< 0.0083 mg/kg	**0.037 mg/kg**
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	**0.015 mg/kg**	**0.013 mg/kg**	< 0.0053 mg/kg	< 0.0041 mg/kg	**0.36 mg/kg**	**0.78 mg/kg**	**0.27 mg/kg**	< 0.0083 mg/kg	**0.18 mg/kg**
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	0.014 mg/kg	**0.12 mg/kg**	< 0.0053 mg/kg	< 0.0041 j mg/kg	**0.26 mg/kg**	**2.8 mg/kg**	**0.6 mg/kg**	0.016 mg/kg	**0.3 mg/kg**
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	**0.12 mg/kg**	**0.57 mg/kg**	< 0.0053 mg/kg	0.0049 mg/kg	**1.1 mg/kg**	**3.7 j mg/kg**	**0.93 mg/kg**	0.043 j mg/kg	**0.78 mg/kg**
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	**0.15 mg/kg**	**0.48 mg/kg**	0.0067 mg/kg	0.0099 mg/kg	**1 mg/kg**	**3.6 mg/kg**	**0.8 mg/kg**	0.018 j mg/kg	**0.69 mg/kg**
Benzo(b)fluoranthene	NA	Lab			0.14 mg/kg	0.43 mg/kg	0.0060 mg/kg	0.017 j mg/kg	0.85 mg/kg	3.7 mg/kg	0.87 mg/kg	0.018 mg/kg	0.57 mg/kg
Benzo(g,h,i)perylene	NA	Lab			0.12 mg/kg	0.42 j mg/kg	0.0054 mg/kg	0.01 j mg/kg	0.75 mg/kg	2 mg/kg	0.58 mg/kg	0.012 mg/kg	0.47 mg/kg
Benzo(k)fluoranthene	NA	Lab			0.13 mg/kg	0.5 mg/kg	0.0055 mg/kg	0.0062 mg/kg	0.76 mg/kg	2.6 mg/kg	0.55 mg/kg	0.018 mg/kg	0.57 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	0.12 mg/kg	**0.35 mg/kg**	< 0.0053 mg/kg	< 0.0041 mg/kg	**1 mg/kg**	**3.6 j mg/kg**	**1.2 mg/kg**	0.041 mg/kg	**0.74 mg/kg**
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	**0.039 mg/kg**	**0.23 mg/kg**	< 0.0053 mg/kg	0.01 mg/kg	**0.52 mg/kg**	**0.59 mg/kg**	**0.28 mg/kg**	< 0.0083 mg/kg	**0.23 mg/kg**
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	0.092 mg/kg	**1 j mg/kg**	< 0.0053 mg/kg	0.0047 mg/kg	**2.4 mg/kg**	**5.8 j mg/kg**	**2.7 mg/kg**	0.08 mg/kg	**1.7 mg/kg**
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	0.0062 j mg/kg	0.04 mg/kg	< 0.0053 mg/kg	< 0.0041 mg/kg	**0.14 mg/kg**	**1.5 mg/kg**	**0.45 mg/kg**	0.0090 mg/kg	**0.14 mg/kg**
Indeno(1,2,3-cd)pyrene	NA	Lab			0.12 mg/kg	0.34 mg/kg	0.0056 mg/kg	0.011 mg/kg	0.7 mg/kg	1.8 mg/kg	0.5 mg/kg	0.012 mg/kg	0.47 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	< 0.0065 mg/kg	< 0.0060 mg/kg	< 0.0053 mg/kg	< 0.0041 mg/kg	**0.047 mg/kg**	**0.24 mg/kg**	**0.26 mg/kg**	< 0.0083 mg/kg	**0.022 mg/kg**
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	0.0095 mg/kg	0.015 mg/kg	< 0.0053 mg/kg	< 0.0041 mg/kg	**0.23 mg/kg**	**0.66 mg/kg**	**5.1 mg/kg**	0.016 mg/kg	0.11 mg/kg
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	0.019 mg/kg	**0.23 mg/kg**	< 0.0053 mg/kg	< 0.0041 mg/kg	**1 mg/kg**	**5.3 mg/kg**	**1.9 mg/kg**	0.041 mg/kg	**0.85 mg/kg**
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	0.095 j mg/kg	**0.58 mg/kg**	0.0061 mg/kg	0.0043 mg/kg	**1.6 mg/kg**	**3.6 j mg/kg**	**1.7 mg/kg**	0.072 mg/kg	**1.1 mg/kg**
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	0.686 a mg/kg	**3.64 a mg/kg**	0.0419 mg/kg	0.0502 mg/kg	**9.69 mg/kg**	**32.3 a mg/kg**	**16.3 mg/kg**	0.353 a mg/kg	**6.88 mg/kg**
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	0.0298 mg/kg	**0.158 mg/kg**	0.00182 mg/kg	0.00218 mg/kg	**0.421 mg/kg**	**1.41 mg/kg**	**0.71 mg/kg**	0.0153 mg/kg	**0.299 mg/kg**
1-Methylnaphthalene	NA	Lab			< 0.0065 mg/kg	--	--	--	0.016 mg/kg	--	--	--	0.0093 mg/kg
Benzo(e)pyrene	NA	Lab			0.084 mg/kg	--	--	--	0.66 mg/kg	--	--	--	0.45 mg/kg
Perylene	NA	Lab			0.094 mg/kg	--	--	--	0.45 mg/kg	--	--	--	0.23 mg/kg
C1-Chrysenes	NA	Lab			0.069 X mg/kg	--	--	--	0.47 X mg/kg	--	--	--	0.28 X mg/kg
C1-Fluoranthenes/Pyrenes	NA	Lab			0.057 X mg/kg	--	--	--	0.64 X mg/kg	--	--	--	0.46 X mg/kg
C1-Fluorenes	NA	Lab			< 0.0065 X mg/kg	--	--	--	0.045 X mg/kg	--	--	--	0.029 X mg/kg
C1-Naphthalenes	NA	Lab			< 0.0065 X mg/kg	--	--	--	0.043 X mg/kg	--	--	--	0.023 X mg/kg
C1-Phenanthrenes/Anthracenes	NA	Lab			0.014 X mg/kg	--	--	--	0.18 X mg/kg	--	--	--	0.12 X mg/kg
C2-Chrysenes	NA	Lab			0.065 X mg/kg	--	--	--	0.32 X mg/kg	--	--	--	0.18 X mg/kg
C2-Fluorenes	NA	Lab			< 0.0065 X mg/kg	--	--	--	< 0.01 X mg/kg	--	--	--	< 0.0046 X mg/kg
C2-Naphthalenes	NA	Lab			0.01 X mg/kg	--	--	--	0.037 X mg/kg	--	--	--	0.022 X mg/kg
C2-Phenanthrenes/Anthracenes	NA	Lab			0.015 X mg/kg	--	--	--	0.085 X mg/kg	--	--	--	0.054 X mg/kg
C3-Chrysenes	NA	Lab			0.044 X mg/kg	--	--	--	0.18 X mg/kg	--	--	--	0.1 X mg/kg
C3-Fluorenes	NA	Lab			0.01 X mg/kg	--	--	--	< 0.01 X mg/kg	--	--	--	< 0.0046 X mg/kg
C3-Naphthalenes	NA	Lab			0.012 X mg/kg	--	--	--	0.04 X mg/kg	--	--	--	0.023 X mg/kg
C3-Phenanthrenes/Anthracenes	NA	Lab			0.018 X mg/kg	--	--	--	0.05 X mg/kg	--	--	--	0.034 X mg/kg
C4-Chrysenes	NA	Lab			< 0.0065 X mg/kg	--	--	--	0.068 X mg/kg	--	--	--	< 0.0046 X mg/kg
C4-Napthalenes	NA	Lab			0.0064 X mg/kg	--	--	--	< 0.01 X mg/kg	--	--	--	0.0097 X mg/kg
C4-Phenanthrenes/Anthracenes	NA	Lab			< 0.0065 X mg/kg	--	--	--	< 0.01 X mg/kg	--	--	--	< 0.0046 X mg/kg
Sum of ESBPAH17@ 0.5DL	NA	Lab			1.2 a mg/kg	5.3 a mg/kg	0.065 mg/kg	0.095 a mg/kg	12.7 mg/kg	42.4 a mg/kg	18.8 mg/kg	0.413 a mg/kg	9 mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.048 a tu	0.231 a tu	0.004 tu	0.014 a tu	0.286 tu	1.2 a tu	0.387 tu	0.007 a tu	0.501 tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			1.71 a mg/kg	--	--	--	16 a mg/kg	--	--	--	11 a mg/kg
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		0.068 a tu	--	--	--	0.349 a tu	--	--	--	0.60 a tu
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		--	0.652 a tu	0.264 a tu	0.281 a tu	--	**2.31 a tu**	0.918 a tu	0.269 a tu	--

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

					Sys Loc Code	**UC-54**	**UC-54**	**UC-55**	**UC-55**		**UC-55**	**UC-55**	**UC-56**	**UC-56**
					Sample Date	**3/18/2011**	**3/18/2011**	**3/18/2011**	**3/18/2011**		**3/18/2011**	**3/18/2011**	**3/19/2011**	**3/19/2011**
					Depth Interval	**0.5 - 1 ft**	**1 - 1.5 ft**	**0 - 0.5 ft**	**2 - 2.5 ft**	**2 - 2.5 ft**	**3 - 3.5 ft**	**4 - 4.5 ft**	**0 - 0.5 ft**	**1 - 1.5 ft**
					Sys Sample Code	**UC-54-2_0.5-1.0_03182011**	**UC-54-3_1.0-1.5_03182011**	**UC-55-1_0.0-0.5_03182011**	**UC-55-2_2.0-2.5_03182011**	**UC-55-2_2.0-2.5_03182011_FD**	**UC-55-3_3.0-3.5_03182011**	**UC-55-4_4.0-4.5_03182011**	**UC-56-1_0.0-0.5_03192011**	**UC-56-2_1.0-1.5_03192011**
					Sample Type Code	**N**	**N**	**N**	**N**	**FD**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II										
Effective Date			2/1/2007	2/1/2007										
Exceedance Key			**Bold**	Underline										
SVOCs														
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg		< 0.0048 mg/kg	< 0.0041 mg/kg	**0.81 mg/kg**	< 0.0042 mg/kg	< 0.0037 mg/kg	< 0.041 j mg/kg	< 0.0041 mg/kg	**0.042 mg/kg**	< 0.14 mg/kg
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg		< 0.0048 mg/kg	< 0.0041 mg/kg	**0.84 mg/kg**	< 0.0042 mg/kg	< 0.0037 mg/kg	< 0.041 j mg/kg	< 0.0041 mg/kg	**0.33 mg/kg**	**0.15 mg/kg**
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg		< 0.0048 mg/kg	< 0.0041 mg/kg	**2.9 mg/kg**	< 0.0042 mg/kg	< 0.0037 mg/kg	< 0.041 j mg/kg	< 0.0041 mg/kg	**0.22 mg/kg**	< 0.14 mg/kg
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg		0.0098 mg/kg	0.011 mg/kg	**6 mg/kg**	< 0.0042 mg/kg	< 0.0037 mg/kg	**0.12 j mg/kg**	< 0.0041 mg/kg	**1 mg/kg**	**0.46 mg/kg**
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg		0.019 mg/kg	0.016 mg/kg	**4.7 mg/kg**	0.013 mg/kg	0.0099 mg/kg	0.093 j mg/kg	< 0.0041 j mg/kg	**0.91 mg/kg**	**0.41 mg/kg**
Benzo(b)fluoranthene	NA	Lab				0.022 j mg/kg	0.018 j mg/kg	5 mg/kg	0.011 j mg/kg	0.0087 j mg/kg	0.067 j mg/kg	< 0.0041 mg/kg	0.67 mg/kg	0.56 mg/kg
Benzo(g,h,i)perylene	NA	Lab				0.016 j mg/kg	0.01 mg/kg	2.9 mg/kg	0.0095 j mg/kg	0.0088 j mg/kg	0.082 j mg/kg	< 0.0041 mg/kg	0.68 mg/kg	0.42 mg/kg
Benzo(k)fluoranthene	NA	Lab				0.011 mg/kg	0.011 mg/kg	3.9 mg/kg	0.0066 mg/kg	0.0050 mg/kg	0.071 j mg/kg	< 0.0041 mg/kg	0.79 mg/kg	0.35 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg		0.0071 mg/kg	0.0083 mg/kg	**5.5 mg/kg**	< 0.0042 mg/kg	< 0.0037 mg/kg	0.098 j mg/kg	< 0.0041 mg/kg	**0.99 mg/kg**	**0.5 mg/kg**
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg		0.013 mg/kg	0.011 mg/kg	**0.88 mg/kg**	0.0092 mg/kg	0.0082 mg/kg	**0.063 j mg/kg**	< 0.0041 mg/kg	**0.44 mg/kg**	**0.24 mg/kg**
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg		0.0076 mg/kg	< 0.0041 mg/kg	**19 mg/kg**	< 0.0042 mg/kg	< 0.0037 mg/kg	< 0.041 j mg/kg	< 0.0041 mg/kg	**2.1 mg/kg**	**0.91 j mg/kg**
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg		< 0.0048 mg/kg	< 0.0041 mg/kg	**1.4 mg/kg**	< 0.0042 mg/kg	< 0.0037 mg/kg	< 0.041 j mg/kg	< 0.0041 mg/kg	**0.095 mg/kg**	< 0.14 mg/kg
Indeno(1,2,3-cd)pyrene	NA	Lab				0.019 mg/kg	0.014 mg/kg	2.8 mg/kg	0.011 mg/kg	0.01 mg/kg	0.09 j mg/kg	< 0.0041 mg/kg	0.84 mg/kg	0.39 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg		< 0.0048 mg/kg	< 0.0041 mg/kg	**0.14 mg/kg**	< 0.0042 mg/kg	< 0.0037 mg/kg	< 0.041 j mg/kg	< 0.0041 mg/kg	**0.036 mg/kg**	**0.08 mg/kg**
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg		< 0.0048 mg/kg	< 0.0041 mg/kg	**0.35 mg/kg**	< 0.0042 mg/kg	< 0.0037 mg/kg	< 0.041 j mg/kg	< 0.0041 mg/kg	0.12 mg/kg	**0.87 mg/kg**
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg		< 0.0048 mg/kg	< 0.0041 mg/kg	**6.4 mg/kg**	< 0.0042 mg/kg	< 0.0037 mg/kg	< 0.041 j mg/kg	< 0.0041 mg/kg	**0.35 mg/kg**	**0.23 j mg/kg**
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg		0.0074 mg/kg	0.0055 mg/kg	**17 j mg/kg**	< 0.0042 mg/kg	< 0.0037 mg/kg	0.058 j mg/kg	< 0.0041 mg/kg	**1.4 mg/kg**	**0.61 mg/kg**
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg		0.0807 mg/kg	0.0682 mg/kg	**65.9 a mg/kg**	0.0453 mg/kg	0.0384 mg/kg	0.596 a mg/kg	0.0267 mg/kg	**8.03 mg/kg**	**4.67 a mg/kg**
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg		0.00351 mg/kg	0.00297 mg/kg	**2.87 mg/kg**	0.00197 mg/kg	0.00167 mg/kg	0.0259 mg/kg	0.00116 mg/kg	**0.349 mg/kg**	**0.203 mg/kg**
1-Methylnaphthalene	NA	Lab				--	--	0.15 mg/kg	--	--	--	--	0.017 mg/kg	--
Benzo(e)pyrene	NA	Lab				--	--	9.3 j mg/kg	--	--	--	--	0.69 mg/kg	--
Perylene	NA	Lab				--	--	1.5 j mg/kg	--	--	--	--	0.32 mg/kg	--
C1-Chrysenes	NA	Lab				--	--	1.6 X mg/kg	--	--	--	--	0.46 X mg/kg	--
C1-Fluoranthenes/Pyrenes	NA	Lab				--	--	5.1 X mg/kg	--	--	--	--	0.72 X mg/kg	--
C1-Fluorenes	NA	Lab				--	--	0.25 X mg/kg	--	--	--	--	0.052 X mg/kg	--
C1-Naphthalenes	NA	Lab				--	--	0.17 X mg/kg	--	--	--	--	0.04 X mg/kg	--
C1-Phenanthrenes/Anthracenes	NA	Lab				--	--	1.3 X mg/kg	--	--	--	--	0.16 X mg/kg	--
C2-Chrysenes	NA	Lab				--	--	< 9.6 X mg/kg	--	--	--	--	0.4 X mg/kg	--
C2-Fluorenes	NA	Lab				--	--	< 0.0096 X mg/kg	--	--	--	--	0.058 X mg/kg	--
C2-Naphthalenes	NA	Lab				--	--	0.18 X mg/kg	--	--	--	--	0.053 X mg/kg	--
C2-Phenanthrenes/Anthracenes	NA	Lab				--	--	0.64 X mg/kg	--	--	--	--	0.13 X mg/kg	--
C3-Chrysenes	NA	Lab				--	--	0.41 X mg/kg	--	--	--	--	0.2 X mg/kg	--
C3-Fluorenes	NA	Lab				--	--	0.2 X mg/kg	--	--	--	--	0.067 X mg/kg	--
C3-Naphthalenes	NA	Lab				--	--	0.17 X mg/kg	--	--	--	--	0.074 X mg/kg	--
C3-Phenanthrenes/Anthracenes	NA	Lab				--	--	0.43 X mg/kg	--	--	--	--	0.16 X mg/kg	--
C4-Chrysenes	NA	Lab				--	--	< 0.0096 X mg/kg	--	--	--	--	0.073 X mg/kg	--
C4-Napthalenes	NA	Lab				--	--	< 0.0096 X mg/kg	--	--	--	--	0.052 X mg/kg	--
C4-Phenanthrenes/Anthracenes	NA	Lab				--	--	< 0.0096 X mg/kg	--	--	--	--	< 0.013 X mg/kg	--
Sum of ESBPAH17@ 0.5DL	NA	Lab				0.149 a mg/kg	0.122 a mg/kg	80.5 a mg/kg	0.083 a mg/kg	0.072 a mg/kg	0.910 a mg/kg	0.036 a mg/kg	11 mg/kg	6.4 a mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab				0.017 a tu	0.063 a tu	0.962 a tu	0.010 a tu	0.010 a tu	0.483 a tu	0.001 a tu	0.121 tu	0.271 a tu
Sum of ESBPAH34@ 0.5DL	NA	Lab				--	--	106 a mg/kg	--	--	--	--	14.7 a mg/kg	--
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]			--	--	**1.22 a tu**	--	--	--	--	0.158 a tu	--
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]			0.286 a tu	0.365 a tu	--	0.274 a tu	0.274 a tu	**1.08 a tu**	0.259 a tu	--	0.72 a tu

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II	UC-56	UC-56	UC-57	UC-57	UC-57	UC-57	WM-58	WM-58	WM-58
					3/19/2011	3/19/2011	3/19/2011	3/19/2011	3/19/2011	3/19/2011	3/19/2011	3/19/2011	3/19/2011
					3 - 3.5 ft	3.9 - 4.4 ft	0 - 0.5 ft	0.5 - 1 ft	1.5 - 2 ft	2 - 2.5 ft	0 - 0.5 ft	0.5 - 1 ft	1 - 1.5 ft
					UC-56-3_3.0-3.5_03192011	UC-56-4_3.9-4.4_03192011	UC-57-1_0.0-0.5_03192011	UC-57-2_0.5-1.0_03192011	UC-57-3_1.5-2.0_03192011	UC-57-4_2.0-2.5_03192011	WM-58-1_0.0-0.5_03192011	WM-58-2_0.5-1.0_03192011	WM-58-3_1.0-1.5_03192011
					N	N	N	N	N	N	N	N	N
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
SVOCs													
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	< 0.0060 mg/kg	< 0.0051 mg/kg	**0.14 mg/kg**	**0.65 mg/kg**	**0.025 mg/kg**	< 0.0047 mg/kg	**0.26 mg/kg**	**0.3 mg/kg**	**3.2 mg/kg**
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	< 0.0060 mg/kg	< 0.0051 mg/kg	**0.82 mg/kg**	**1.1 mg/kg**	**0.11 mg/kg**	< 0.0047 mg/kg	**0.27 mg/kg**	**0.35 mg/kg**	**0.42 mg/kg**
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	< 0.0060 mg/kg	< 0.0051 mg/kg	**1.7 mg/kg**	**4.4 mg/kg**	**0.26 mg/kg**	< 0.0047 mg/kg	**0.092 mg/kg**	**0.47 mg/kg**	**14 mg/kg**
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	0.026 mg/kg	0.0094 mg/kg	**4.9 mg/kg**	**5 j mg/kg**	**1.1 j mg/kg**	< 0.0047 mg/kg	**0.3 mg/kg**	**0.73 mg/kg**	**17 mg/kg**
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	0.04 mg/kg	< 0.0051 mg/kg	**4.4 mg/kg**	**7.8 mg/kg**	**1.4 mg/kg**	< 0.0047 mg/kg	**0.39 mg/kg**	**0.41 mg/kg**	**14 mg/kg**
Benzo(b)fluoranthene	NA	Lab			0.038 j mg/kg	0.0086 j mg/kg	5.5 mg/kg	5.1 mg/kg	1.4 mg/kg	< 0.0047 mg/kg	0.28 mg/kg	0.34 mg/kg	7.4 mg/kg
Benzo(g,h,i)perylene	NA	Lab			0.022 j mg/kg	0.0090 mg/kg	2.8 mg/kg	4.4 mg/kg	0.78 mg/kg	< 0.0047 j mg/kg	0.64 mg/kg	0.37 mg/kg	8 mg/kg
Benzo(k)fluoranthene	NA	Lab			0.024 mg/kg	0.0065 mg/kg	3.2 mg/kg	5 mg/kg	1.3 mg/kg	< 0.0047 mg/kg	0.31 mg/kg	0.43 mg/kg	14 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	0.018 mg/kg	0.0090 mg/kg	**4.7 mg/kg**	**5.2 j mg/kg**	**1 j mg/kg**	< 0.0047 mg/kg	**0.37 mg/kg**	**1 mg/kg**	**14 mg/kg**
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	0.017 mg/kg	0.0065 mg/kg	**0.88 mg/kg**	**1.7 mg/kg**	**0.46 mg/kg**	< 0.0047 mg/kg	**0.24 mg/kg**	**0.13 mg/kg**	**2.4 mg/kg**
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	0.015 mg/kg	< 0.0051 mg/kg	**84 mg/kg**	**23 j mg/kg**	**2.4 j mg/kg**	< 0.0047 mg/kg	**0.7 mg/kg**	**1.2 mg/kg**	**26 mg/kg**
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	< 0.0060 mg/kg	< 0.0051 mg/kg	**0.72 mg/kg**	**2.1 mg/kg**	**0.11 mg/kg**	< 0.0047 mg/kg	**0.13 mg/kg**	**0.34 mg/kg**	**7.6 mg/kg**
Indeno(1,2,3-cd)pyrene	NA	Lab			0.028 mg/kg	0.0093 mg/kg	2.7 mg/kg	4.3 mg/kg	0.92 mg/kg	< 0.0047 j mg/kg	0.35 mg/kg	0.31 mg/kg	8.8 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	< 0.0060 mg/kg	< 0.0051 mg/kg	**0.094 mg/kg**	< 3.5 mg/kg	**0.035 mg/kg**	< 0.0047 mg/kg	**0.093 mg/kg**	**0.46 mg/kg**	**1.2 mg/kg**
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	< 0.0060 mg/kg	< 0.0051 mg/kg	**0.39 mg/kg**	**0.64 mg/kg**	**0.19 mg/kg**	< 0.0047 mg/kg	**0.33 mg/kg**	**0.41 mg/kg**	**0.78 mg/kg**
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	0.0071 mg/kg	< 0.0051 mg/kg	**4.1 mg/kg**	**14 mg/kg**	**0.5 mg/kg**	< 0.0047 mg/kg	**0.56 mg/kg**	**1.7 mg/kg**	**19 mg/kg**
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	0.016 mg/kg	0.0055 mg/kg	**67 j mg/kg**	**14 j mg/kg**	**1.4 j mg/kg**	< 0.0047 mg/kg	**0.56 mg/kg**	**1.6 mg/kg**	**18 mg/kg**
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	0.1571 mg/kg	0.0534 mg/kg	**174 a mg/kg**	**81.3 a mg/kg**	**8.99 a mg/kg**	0.0305 mg/kg	**4.3 mg/kg**	**9.1 mg/kg**	**138 mg/kg**
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	0.00683 mg/kg	0.00232 mg/kg	**7.56 mg/kg**	**3.54 mg/kg**	**0.391 mg/kg**	0.00133 mg/kg	**0.187 mg/kg**	**0.396 mg/kg**	**5.98 mg/kg**
1-Methylnaphthalene	NA	Lab			--	--	0.027 mg/kg	--	--	--	0.065 mg/kg	--	--
Benzo(e)pyrene	NA	Lab			--	--	31 mg/kg	--	--	--	0.22 mg/kg	--	--
Perylene	NA	Lab			--	--	16 mg/kg	--	--	--	0.11 mg/kg	--	--
C1-Chrysenes	NA	Lab			--	--	1.5 X mg/kg	--	--	--	0.47 X mg/kg	--	--
C1-Fluoranthenes/Pyrenes	NA	Lab			--	--	4.3 X mg/kg	--	--	--	1.2 X mg/kg	--	--
C1-Fluorenes	NA	Lab			--	--	0.17 X mg/kg	--	--	--	0.11 X mg/kg	--	--
C1-Naphthalenes	NA	Lab			--	--	0.078 X mg/kg	--	--	--	0.14 X mg/kg	--	--
C1-Phenanthrenes/Anthracenes	NA	Lab			--	--	0.84 X mg/kg	--	--	--	0.66 X mg/kg	--	--
C2-Chrysenes	NA	Lab			--	--	0.96 X mg/kg	--	--	--	0.56 X mg/kg	--	--
C2-Fluorenes	NA	Lab			--	--	< 0.0084 X mg/kg	--	--	--	0.74 X mg/kg	--	--
C2-Naphthalenes	NA	Lab			--	--	0.092 X mg/kg	--	--	--	0.19 X mg/kg	--	--
C2-Phenanthrenes/Anthracenes	NA	Lab			--	--	0.47 X mg/kg	--	--	--	1.4 X mg/kg	--	--
C3-Chrysenes	NA	Lab			--	--	0.55 X mg/kg	--	--	--	0.55 X mg/kg	--	--
C3-Fluorenes	NA	Lab			--	--	0.12 X mg/kg	--	--	--	1.2 X mg/kg	--	--
C3-Naphthalenes	NA	Lab			--	--	0.11 X mg/kg	--	--	--	0.55 X mg/kg	--	--
C3-Phenanthrenes/Anthracenes	NA	Lab			--	--	0.3 X mg/kg	--	--	--	2 X mg/kg	--	--
C4-Chrysenes	NA	Lab			--	--	0.2 X mg/kg	--	--	--	0.38 X mg/kg	--	--
C4-Napthalenes	NA	Lab			--	--	< 0.0084 X mg/kg	--	--	--	0.64 X mg/kg	--	--
C4-Phenanthrenes/Anthracenes	NA	Lab			--	--	< 0.0084 X mg/kg	--	--	--	1.4 X mg/kg	--	--
Sum of ESBPAH17@ 0.5DL	NA	Lab			0.269 a mg/kg	0.087 a mg/kg	188 a mg/kg	100 a mg/kg	13.4 a mg/kg	0.041 a mg/kg	5.9 mg/kg	10.6 mg/kg	176 mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.009 a tu	0.003 a tu	5 a tu	2.5 a tu	0.453 a tu	0.004 a tu	0.327 tu	0.290 tu	3.3 tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			--	--	245 a mg/kg	--	--	--	18.3 a mg/kg	--	--
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [1]		--	--	**6.1 a tu**	--	--	--	0.954 a tu	--	--
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [1]		0.272 a tu	0.262 a tu	--	**4.53 a tu**	**1.03 a tu**	0.264 a tu	--	0.753 a tu	**5.9 a tu**

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

					Sys Loc Code	**WM-58**	**WM-59**	**WM-59**	**WM-59**	**WM-59**	**WM-60**	**WM-60**	**WM-60**	**WM**
					Sample Date	**3/19/2011**	**3/21/2011**	**3/21/2011**	**3/21/2011**	**3/21/2011**	**3/21/2011**	**3/21/2011**	**3/21/2011**	**3/21/**
					Depth Interval	**2 - 2.5 ft**	**0 - 0.5 ft**	**0.5 - 1 ft**	**1 - 1.5 ft**	**1.5 - 2 ft**	**0 - 0.5 ft**	**0.5 - 1 ft**	**1 - 1.4 ft**	**0 - 0.5 ft**
					Sys Sample Code	**WM-58-4_2.0-2.5_03192011**	**WM-59-1_0.0-0.5_03212011**	**WM-59-2_0.5-1.0_03212011**	**WM-59-3_1.0-1.5_03212011**	**WM-59-4_1.5-2.0_03212011**	**WM-60-1_0.0-0.5_03212011**	**WM-60-2_0.5-1.0_03212011**	**WM-60-3_1.0-1.4_03212011**	**WM-61-1_0.0-0.5_03212011**
					Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II										
Effective Date			2/1/2007	2/1/2007										
Exceedance Key			**Bold**	Underline										
SVOCs														
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg		< 0.012 mg/kg	< 0.28 mg/kg	**1 mg/kg**	**0.025 mg/kg**	< 0.011 mg/kg	< 0.0042 mg/kg	< 0.0053 mg/kg	< 0.0047 mg/kg	< 0.0044 mg/kg
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg		< 0.012 mg/kg	0.0050 j mg/kg	**0.16 mg/kg**	< 0.016 mg/kg	< 0.011 mg/kg	< 0.0042 mg/kg	< 0.0053 mg/kg	< 0.0047 mg/kg	0.0047 mg/kg
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg		< 0.012 mg/kg	0.0063 mg/kg	**3.8 mg/kg**	0.049 mg/kg	< 0.011 j mg/kg	< 0.0042 mg/kg	< 0.0053 mg/kg	< 0.0047 mg/kg	< 0.0044 mg/kg
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg		0.011 j mg/kg	0.041 mg/kg	**7.6 mg/kg**	**0.11 mg/kg**	< 0.011 mg/kg	0.0043 mg/kg	0.023 mg/kg	0.0085 mg/kg	0.013 mg/kg
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg		0.029 mg/kg	0.035 mg/kg	**5.5 mg/kg**	0.13 mg/kg	0.015 mg/kg	0.0055 mg/kg	0.032 mg/kg	0.0092 mg/kg	0.015 mg/kg
Benzo(b)fluoranthene	NA	Lab				0.016 j mg/kg	0.023 mg/kg	4.8 mg/kg	0.11 j mg/kg	< 0.011 j mg/kg	0.0047 mg/kg	0.026 j mg/kg	< 0.0047 j mg/kg	0.016 mg/kg
Benzo(g,h,i)perylene	NA	Lab				0.033 j mg/kg	0.024 mg/kg	2.6 mg/kg	0.097 j mg/kg	0.022 j mg/kg	0.0070 mg/kg	0.02 j mg/kg	0.0079 j mg/kg	0.013 mg/kg
Benzo(k)fluoranthene	NA	Lab				0.012 mg/kg	0.027 mg/kg	4.6 mg/kg	0.071 mg/kg	0.012 mg/kg	0.0046 mg/kg	0.024 mg/kg	< 0.0047 mg/kg	0.0089 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg		< 0.012 mg/kg	0.035 mg/kg	**4.6 mg/kg**	0.068 mg/kg	< 0.011 mg/kg	0.0041 j mg/kg	0.017 mg/kg	< 0.0047 mg/kg	0.018 mg/kg
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg		0.027 mg/kg	0.0096 mg/kg	**0.93 mg/kg**	**0.051 mg/kg**	0.025 mg/kg	0.0041 j mg/kg	0.013 mg/kg	0.0064 mg/kg	0.0060 mg/kg
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg		< 0.012 mg/kg	0.037 mg/kg	**13 mg/kg**	0.15 mg/kg	0.013 mg/kg	0.0039 j mg/kg	0.022 mg/kg	< 0.0047 mg/kg	0.01 mg/kg
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg		< 0.012 mg/kg	0.0052 j mg/kg	**1.9 mg/kg**	0.033 mg/kg	< 0.011 mg/kg	< 0.0042 mg/kg	< 0.0053 mg/kg	< 0.0047 mg/kg	< 0.0044 mg/kg
Indeno(1,2,3-cd)pyrene	NA	Lab				0.031 mg/kg	0.025 mg/kg	3.8 mg/kg	0.095 mg/kg	0.025 mg/kg	0.0061 mg/kg	0.023 mg/kg	0.0078 mg/kg	0.0097 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg		< 0.012 mg/kg	< 0.28 mg/kg	**0.03 mg/kg**	< 0.016 mg/kg	< 0.011 mg/kg	< 0.0042 mg/kg	< 0.0053 mg/kg	< 0.0047 mg/kg	< 0.0044 mg/kg
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg		< 0.012 mg/kg	< 0.28 mg/kg	0.085 mg/kg	< 0.016 mg/kg	< 0.011 mg/kg	< 0.0042 mg/kg	< 0.0053 mg/kg	< 0.0047 mg/kg	< 0.0044 mg/kg
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg		< 0.012 mg/kg	0.011 mg/kg	**4.2 mg/kg**	0.088 mg/kg	< 0.011 mg/kg	< 0.0042 mg/kg	0.0068 mg/kg	< 0.0047 mg/kg	< 0.0044 mg/kg
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg		< 0.012 mg/kg	0.045 j mg/kg	**7.9 mg/kg**	0.13 mg/kg	0.012 mg/kg	0.0046 mg/kg	0.026 mg/kg	< 0.0047 mg/kg	0.015 mg/kg
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg		0.127 a mg/kg	0.65 a mg/kg	**50.7 mg/kg**	0.858 mg/kg	0.115 mg/kg	0.0412 a mg/kg	0.156 mg/kg	0.0476 mg/kg	0.0949 mg/kg
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg		0.00552 mg/kg	0.0283 mg/kg	**2.2 mg/kg**	0.0373 mg/kg	0.00498 mg/kg	0.00179 mg/kg	0.00677 mg/kg	0.00207 mg/kg	0.00413 mg/kg
1-Methylnaphthalene	NA	Lab				--	< 0.0053 mg/kg	--	--	--	< 0.0042 mg/kg	--	--	< 0.0044 mg/kg
Benzo(e)pyrene	NA	Lab				--	0.021 mg/kg	--	--	--	< 0.0042 mg/kg	--	--	0.013 mg/kg
Perylene	NA	Lab				--	0.029 mg/kg	--	--	--	0.013 mg/kg	--	--	0.016 mg/kg
C1-Chrysenes	NA	Lab				--	0.034 X mg/kg	--	--	--	< 0.0042 X mg/kg	--	--	0.035 X mg/kg
C1-Fluoranthenes/Pyrenes	NA	Lab				--	0.032 X mg/kg	--	--	--	0.0050 X mg/kg	--	--	0.026 X mg/kg
C1-Fluorenes	NA	Lab				--	0.0055 X mg/kg	--	--	--	< 0.0042 X mg/kg	--	--	< 0.0044 X mg/kg
C1-Naphthalenes	NA	Lab				--	< 0.0053 X mg/kg	--	--	--	< 0.0042 X mg/kg	--	--	< 0.0044 X mg/kg
C1-Phenanthrenes/Anthracenes	NA	Lab				--	0.0088 X mg/kg	--	--	--	< 0.0042 X mg/kg	--	--	0.0056 X mg/kg
C2-Chrysenes	NA	Lab				--	< 0.0053 X mg/kg	--	--	--	< 0.0042 X mg/kg	--	--	0.047 X mg/kg
C2-Fluorenes	NA	Lab				--	< 0.0053 X mg/kg	--	--	--	< 0.0042 X mg/kg	--	--	< 0.0044 X mg/kg
C2-Naphthalenes	NA	Lab				--	0.0050 X mg/kg	--	--	--	< 0.0042 X mg/kg	--	--	< 0.0044 X mg/kg
C2-Phenanthrenes/Anthracenes	NA	Lab				--	0.0078 X mg/kg	--	--	--	< 0.0042 X mg/kg	--	--	0.011 X mg/kg
C3-Chrysenes	NA	Lab				--	0.035 X mg/kg	--	--	--	< 0.0042 X mg/kg	--	--	0.042 X mg/kg
C3-Fluorenes	NA	Lab				--	< 0.0053 X mg/kg	--	--	--	< 0.0042 X mg/kg	--	--	< 0.0044 X mg/kg
C3-Naphthalenes	NA	Lab				--	0.0085 X mg/kg	--	--	--	< 0.0042 X mg/kg	--	--	< 0.0044 X mg/kg
C3-Phenanthrenes/Anthracenes	NA	Lab				--	0.017 X mg/kg	--	--	--	< 0.0042 X mg/kg	--	--	0.026 X mg/kg
C4-Chrysenes	NA	Lab				--	0.017 X mg/kg	--	--	--	< 0.0042 X mg/kg	--	--	0.019 X mg/kg
C4-Napthalenes	NA	Lab				--	0.0058 X mg/kg	--	--	--	< 0.0042 X mg/kg	--	--	< 0.0044 X mg/kg
C4-Phenanthrenes/Anthracenes	NA	Lab				--	< 0.0053 X mg/kg	--	--	--	< 0.0042 X mg/kg	--	--	0.026 X mg/kg
Sum of ESBPAH17@ 0.5DL	NA	Lab				0.219 mg/kg	0.749 a mg/kg	66.5 mg/kg	1.2 a mg/kg	0.179 a mg/kg	0.064 a mg/kg	0.249 a mg/kg	0.069 a mg/kg	0.142 mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab				0.002 a BQX tu	0.068 a tu	0.94 tu	0.013 a BQX tu	0.018 a BQX tu	0.012 a tu	0.007 a tu	0.004 a tu	0.019 tu
Sum of ESBPAH34@ 0.5DL	NA	Lab				--	0.849 a mg/kg	--	--	--	0.113 a mg/kg	--	--	0.422 a mg/kg
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]			--	0.067 a tu	--	--	--	0.021 a tu	--	--	0.051 a tu
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]			0.630 a BQX tu	--	**1.86 a tu**	0.28 a BQX tu	0.29 a BQX tu	--	0.269 a tu	0.264 a tu	--

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II	Sys Loc Code: I-61 Sample Date: 2011 Depth Interval: 0 - 0.5 ft Sys Sample Code: WM-61-1_0.0-0.5_03212011_FD Sample Type Code: FD	WM-61 3/21/2011 1 - 1.5 ft WM-61-2_1.0-1.5_03212011 N	WM-61 3/21/2011 1.5 - 2 ft WM-61-3_1.5-2.0_03212011 N	WM-61 3/21/2011 2.5 - 3 ft WM-61-4_2.5-3.0_03212011 N	WM-62 3/21/2011 0 - 0.5 ft WM-62-1_0.0-0.5_03212011 N	WM-62 3/21/2011 0.5 - 1 ft WM-62-2_0.5-1.0_03212011 N	WM-62 3/21/2011 1 - 1.5 ft WM-62-3_1.0-1.5_03212011 N	WM-62 3/21/2011 1.5 - 2 ft WM-62-4_1.5-2.0_03212011 N	WM-63 3/21/2011 0 - 0.5 ft WM-63-1_0.0-0.5_03212011 N
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
SVOCs													
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	< 0.0043 mg/kg	< 0.0045 j mg/kg	< 0.0046 mg/kg	< 0.0042 mg/kg	< 0.0045 mg/kg	< 0.0043 mg/kg	< 0.0042 mg/kg	< 0.0043 mg/kg	**0.096 mg/kg**
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	0.0041 j mg/kg	< 0.0045 j mg/kg	< 0.0046 mg/kg	< 0.0042 mg/kg	< 0.0045 mg/kg	< 0.0043 mg/kg	< 0.0042 mg/kg	< 0.0043 mg/kg	**0.23 mg/kg**
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	< 0.0043 mg/kg	< 0.0045 j mg/kg	< 0.0046 mg/kg	< 0.0042 mg/kg	< 0.0045 mg/kg	< 0.0043 mg/kg	< 0.0042 mg/kg	< 0.0043 mg/kg	**0.31 mg/kg**
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	0.013 mg/kg	< 0.0045 j mg/kg	< 0.0046 mg/kg	< 0.0042 mg/kg	0.0074 mg/kg	< 0.0043 mg/kg	< 0.0042 mg/kg	0.01 mg/kg	**0.61 mg/kg**
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	0.013 mg/kg	< 0.0045 j mg/kg	< 0.0046 mg/kg	< 0.0042 mg/kg	0.0083 mg/kg	< 0.0043 mg/kg	< 0.0042 j mg/kg	0.0075 mg/kg	**0.52 mg/kg**
Benzo(b)fluoranthene	NA	Lab			0.0089 mg/kg	< 0.0045 j mg/kg	< 0.0046 j mg/kg	< 0.0042 mg/kg	0.0081 mg/kg	< 0.0043 j mg/kg	< 0.0042 mg/kg	< 0.0043 j mg/kg	0.34 mg/kg
Benzo(g,h,i)perylene	NA	Lab			0.011 mg/kg	< 0.0045 j mg/kg	0.0070 j mg/kg	< 0.0042 mg/kg	0.011 mg/kg	0.0063 j mg/kg	< 0.0042 mg/kg	0.011 j mg/kg	0.32 mg/kg
Benzo(k)fluoranthene	NA	Lab			0.0080 mg/kg	< 0.0045 j mg/kg	< 0.0046 mg/kg	< 0.0042 mg/kg	0.0074 mg/kg	< 0.0043 mg/kg	< 0.0042 mg/kg	0.0087 mg/kg	0.42 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	0.017 mg/kg	< 0.0045 j mg/kg	< 0.0046 mg/kg	< 0.0042 mg/kg	0.0074 mg/kg	< 0.0043 mg/kg	< 0.0042 mg/kg	0.0057 mg/kg	**0.66 mg/kg**
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	0.0061 mg/kg	< 0.0045 j mg/kg	0.0061 mg/kg	< 0.0042 mg/kg	0.0068 mg/kg	0.0056 mg/kg	< 0.0042 mg/kg	0.0077 mg/kg	**0.084 mg/kg**
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	0.011 mg/kg	< 0.0045 j mg/kg	< 0.0046 mg/kg	< 0.0042 mg/kg	< 0.0045 mg/kg	< 0.0043 mg/kg	< 0.0042 mg/kg	0.013 mg/kg	**1.6 mg/kg**
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	< 0.0043 mg/kg	< 0.0045 j mg/kg	< 0.0046 mg/kg	< 0.0042 mg/kg	< 0.0045 mg/kg	< 0.0043 mg/kg	< 0.0042 mg/kg	< 0.0043 mg/kg	**0.11 mg/kg**
Indeno(1,2,3-cd)pyrene	NA	Lab			0.0083 mg/kg	< 0.0045 j mg/kg	0.0074 mg/kg	< 0.0042 mg/kg	0.011 mg/kg	0.0065 mg/kg	< 0.0042 mg/kg	0.012 mg/kg	0.32 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	< 0.0043 mg/kg	< 0.0045 j mg/kg	< 0.0046 mg/kg	< 0.0042 mg/kg	< 0.0045 mg/kg	< 0.0043 mg/kg	< 0.0042 mg/kg	< 0.0043 mg/kg	**0.035 mg/kg**
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	< 0.0043 mg/kg	< 0.0045 j mg/kg	< 0.0046 mg/kg	< 0.0042 mg/kg	< 0.0045 mg/kg	< 0.0043 mg/kg	< 0.0042 mg/kg	< 0.0043 mg/kg	**0.38 mg/kg**
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	< 0.0043 mg/kg	< 0.0045 j mg/kg	< 0.0046 mg/kg	< 0.0042 mg/kg	< 0.0045 mg/kg	< 0.0043 mg/kg	< 0.0042 mg/kg	< 0.0043 mg/kg	**0.62 mg/kg**
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	0.017 mg/kg	< 0.0045 j mg/kg	< 0.0046 mg/kg	< 0.0042 mg/kg	0.0049 mg/kg	< 0.0043 mg/kg	< 0.0042 mg/kg	0.012 mg/kg	**1 mg/kg**
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	0.0941 a mg/kg	0.0292 mg/kg	0.0337 mg/kg	0.0273 mg/kg	0.0528 mg/kg	0.0314 mg/kg	0.0273 mg/kg	0.071 mg/kg	**6.26 mg/kg**
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	0.00409 mg/kg	0.00127 mg/kg	0.00147 mg/kg	0.00119 mg/kg	0.0023 mg/kg	0.00137 mg/kg	0.00119 mg/kg	0.00308 mg/kg	**0.272 mg/kg**
1-Methylnaphthalene	NA	Lab			< 0.0043 mg/kg	--	--	--	< 0.0045 mg/kg	--	--	--	0.025 mg/kg
Benzo(e)pyrene	NA	Lab			0.013 mg/kg	--	--	--	0.0045 mg/kg	--	--	--	0.16 mg/kg
Perylene	NA	Lab			0.016 mg/kg	--	--	--	0.03 mg/kg	--	--	--	0.07 mg/kg
C1-Chrysenes	NA	Lab			0.033 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	0.43 X mg/kg
C1-Fluoranthenes/Pyrenes	NA	Lab			0.024 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	0.87 X mg/kg
C1-Fluorenes	NA	Lab			< 0.0043 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	0.061 X mg/kg
C1-Naphthalenes	NA	Lab			< 0.0043 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	0.043 X mg/kg
C1-Phenanthrenes/Anthracenes	NA	Lab			0.0056 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	0.39 X mg/kg
C2-Chrysenes	NA	Lab			0.053 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	0.87 X mg/kg
C2-Fluorenes	NA	Lab			< 0.0043 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	0.41 X mg/kg
C2-Naphthalenes	NA	Lab			< 0.0043 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	0.11 X mg/kg
C2-Phenanthrenes/Anthracenes	NA	Lab			0.012 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	0.73 X mg/kg
C3-Chrysenes	NA	Lab			0.038 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	0.65 X mg/kg
C3-Fluorenes	NA	Lab			< 0.0043 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	0.97 X mg/kg
C3-Naphthalenes	NA	Lab			< 0.0043 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	0.38 X mg/kg
C3-Phenanthrenes/Anthracenes	NA	Lab			0.025 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	0.95 X mg/kg
C4-Chrysenes	NA	Lab			0.019 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	0.31 X mg/kg
C4-Napthalenes	NA	Lab			< 0.0043 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	0.41 X mg/kg
C4-Phenanthrenes/Anthracenes	NA	Lab			0.021 X mg/kg	--	--	--	< 0.0045 X mg/kg	--	--	--	0.63 X mg/kg
Sum of ESBPAH17@ 0.5DL	NA	Lab			0.131 a mg/kg	0.039 a mg/kg	0.053 a mg/kg	0.036 mg/kg	0.091 mg/kg	0.049 a mg/kg	0.036 a mg/kg	0.105 a mg/kg	7.7 mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.012 a tu	0.006 a tu	0.014 a tu	0.011 tu	0.015 tu	0.015 a tu	0.012 a tu	0.040 a tu	0.480 tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			0.403 a mg/kg	--	--	--	0.159 a mg/kg	--	--	--	16.1 a mg/kg
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** (1)		0.032 a tu	--	--	--	0.025 a tu	--	--	--	0.947 a tu
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** (1)		--	0.267 a tu	0.281 a tu	0.276 a tu	--	0.283 a tu	0.278 a tu	0.325 a tu	--

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II	WM-63	WM-63	WM-63	WM-64	WM-64	WM-64	WM-64	WM-65	WM-65
Sys Loc Code					**WM-63**	**WM-63**	**WM-63**	**WM-64**	**WM-64**	**WM-64**	**WM-64**	**WM-65**	**WM-65**
Sample Date					**3/21/2011**	**3/21/2011**	**3/21/2011**	**3/10/2011**	**3/10/2011**	**3/10/2011**	**3/10/2011**	**3/21/2011**	**3/21/2011**
Depth Interval					**0.5 - 1 ft**	**1 - 1.5 ft**	**1.8 - 2.2 ft**	**0 - 0.5 ft**	**1 - 1.5 ft**	**2 - 2.5 ft**	**3 - 3.5 ft**	**0 - 0.5 ft**	**1 - 1.5 ft**
Sys Sample Code					**WM-63-2_0.5-1.0_03212011**	**WM-63-3_1.0-1.5_03212011**	**WM-63-4_1.8-2.2_03212011**	**WM-64-1_0.0-0.5_03102011**	**WM-64-2_1.0-1.5_03102011**	**WM-64-3_2.0-2.5_03102011**	**WM-64-4_3.0-3.5_03102011**	**WM-65-1_0.0-0.5_03212011**	**WM-65-2_1.0-1.5_03212011**
Sample Type Code					**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
SVOCs													
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	**0.37 j mg/kg**	**18 mg/kg**	**0.036 mg/kg**	< 0.0058 j mg/kg	**0.063 j mg/kg**	**24 j mg/kg**	**0.025 j mg/kg**	< 0.0070 mg/kg	**0.089 mg/kg**
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	**0.068 mg/kg**	**2 mg/kg**	< 0.0044 mg/kg	< 0.0058 j mg/kg	**0.062 j mg/kg**	**2.2 j mg/kg**	< 0.0064 j mg/kg	**0.0083 mg/kg**	< 0.064 mg/kg
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	**0.28 mg/kg**	**37 j mg/kg**	0.016 mg/kg	< 0.0058 j mg/kg	**0.057 j mg/kg**	**48 j mg/kg**	0.0069 j mg/kg	< 0.0070 mg/kg	**0.19 mg/kg**
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	**0.76 j mg/kg**	**43 j mg/kg**	0.016 mg/kg	0.014 j mg/kg	**0.28 j mg/kg**	**46 j mg/kg**	0.01 j mg/kg	0.02 mg/kg	**0.65 j mg/kg**
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	**0.41 j mg/kg**	**33 mg/kg**	0.019 mg/kg	0.012 j mg/kg	**0.17 j mg/kg**	**36 j mg/kg**	0.0061 j mg/kg	0.019 mg/kg	**0.53 j mg/kg**
Benzo(b)fluoranthene	NA	Lab			0.22 j mg/kg	22 mg/kg	0.0072 j mg/kg	0.012 j mg/kg	0.18 j mg/kg	35 j mg/kg	0.0065 j mg/kg	0.02 mg/kg	0.41 j mg/kg
Benzo(g,h,i)perylene	NA	Lab			0.29 j mg/kg	7.3 mg/kg	0.013 j mg/kg	0.012 j mg/kg	0.12 j mg/kg	20 j mg/kg	< 0.0064 j mg/kg	0.015 mg/kg	0.34 j mg/kg
Benzo(k)fluoranthene	NA	Lab			0.48 j mg/kg	34 mg/kg	0.015 mg/kg	0.012 j mg/kg	0.12 j mg/kg	35 j mg/kg	< 0.0064 j mg/kg	0.019 mg/kg	0.45 j mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	**0.9 j mg/kg**	**30 j mg/kg**	0.0096 mg/kg	0.014 j mg/kg	**0.4 j mg/kg**	**33 j mg/kg**	0.008 j mg/kg	0.019 mg/kg	**0.76 j mg/kg**
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	**0.2 mg/kg**	**6.1 mg/kg**	0.0082 mg/kg	< 0.0058 j mg/kg	0.017 j mg/kg	**22 j mg/kg**	< 0.0064 j mg/kg	0.0076 mg/kg	**0.22 j mg/kg**
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	**1.5 j mg/kg**	**95 j mg/kg**	0.04 mg/kg	0.02 j mg/kg	**0.63 j mg/kg**	**150 j mg/kg**	0.027 j mg/kg	0.021 mg/kg	**1.4 j mg/kg**
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	**0.21 mg/kg**	**24 mg/kg**	0.015 mg/kg	< 0.0058 j mg/kg	0.067 j mg/kg	**33 j mg/kg**	0.0064 j mg/kg	< 0.0070 mg/kg	**0.1 mg/kg**
Indeno(1,2,3-cd)pyrene	NA	Lab			0.44 mg/kg	20 mg/kg	0.016 mg/kg	0.012 j mg/kg	0.11 j mg/kg	23 j mg/kg	< 0.0064 j mg/kg	0.015 mg/kg	0.5 j mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	**0.6 j mg/kg**	**5.6 j mg/kg**	< 0.0044 mg/kg	< 0.0058 j mg/kg	0.015 j mg/kg	**3.8 j mg/kg**	< 0.0064 j mg/kg	< 0.0070 mg/kg	0.014 mg/kg
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	0.16 mg/kg	**13 j mg/kg**	< 0.0044 mg/kg	< 0.0058 j mg/kg	**0.21 j mg/kg**	**1 j mg/kg**	< 0.0064 j mg/kg	< 0.0070 mg/kg	0.054 mg/kg
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	**1.9 j mg/kg**	**55 j mg/kg**	0.041 mg/kg	0.0063 j mg/kg	**0.29 j mg/kg**	**48 j mg/kg**	0.015 j mg/kg	< 0.0070 mg/kg	**0.38 mg/kg**
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	**2 j mg/kg**	**76 j mg/kg**	0.029 mg/kg	0.022 j mg/kg	**0.53 j mg/kg**	**82 j mg/kg**	0.022 j mg/kg	0.019 mg/kg	**1.1 j mg/kg**
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	**9.36 a mg/kg**	**438 a mg/kg**	0.236 mg/kg	0.109 a mg/kg	**2.79 a mg/kg**	**529 a mg/kg**	0.139 a mg/kg	0.135 mg/kg	**5.52 a mg/kg**
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	**0.407 mg/kg**	**19 mg/kg**	0.0103 mg/kg	0.00472 mg/kg	**0.121 mg/kg**	**23 mg/kg**	0.00605 mg/kg	0.00587 mg/kg	**0.24 mg/kg**
1-Methylnaphthalene	NA	Lab			--	--	--	< 0.0058 j mg/kg	0.035 j mg/kg	6.5 j mg/kg	< 0.0064 j mg/kg	< 0.0070 mg/kg	--
Benzo(e)pyrene	NA	Lab			--	--	--	0.0081 j mg/kg	0.13 j mg/kg	50 j mg/kg	0.0088 j mg/kg	0.014 mg/kg	--
Perylene	NA	Lab			--	--	--	0.011 j mg/kg	0.032 j mg/kg	36 j mg/kg	0.04 j mg/kg	0.053 mg/kg	--
C1-Chrysenes	NA	Lab			--	--	--	0.011 X mg/kg	0.43 X mg/kg	9.6 X mg/kg	< 0.0064 X mg/kg	0.028 X mg/kg	--
C1-Fluoranthenes/Pyrenes	NA	Lab			--	--	--	0.014 X mg/kg	0.89 X mg/kg	74 X mg/kg	< 0.0064 X mg/kg	0.033 X mg/kg	--
C1-Fluorenes	NA	Lab			--	--	--	0.0066 X mg/kg	0.12 X mg/kg	4.1 X mg/kg	< 0.0064 X mg/kg	< 0.0070 X mg/kg	--
C1-Naphthalenes	NA	Lab			--	--	--	< 0.0058 X mg/kg	0.036 X mg/kg	4.2 X mg/kg	< 0.0064 X mg/kg	< 0.0070 X mg/kg	--
C1-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	0.0055 X mg/kg	0.56 X mg/kg	25 X mg/kg	0.0073 X mg/kg	0.0082 X mg/kg	--
C2-Chrysenes	NA	Lab			--	--	--	< 0.0058 X mg/kg	0.6 X mg/kg	6.6 X mg/kg	< 0.0064 X mg/kg	0.027 X mg/kg	--
C2-Fluorenes	NA	Lab			--	--	--	0.0082 X mg/kg	0.64 X mg/kg	3.2 X mg/kg	< 0.0064 X mg/kg	< 0.0070 X mg/kg	--
C2-Naphthalenes	NA	Lab			--	--	--	< 0.0058 X mg/kg	0.14 X mg/kg	9.5 X mg/kg	0.0068 X mg/kg	< 0.0070 X mg/kg	--
C2-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	0.0053 X mg/kg	1.3 X mg/kg	< 0.0057 X mg/kg	< 0.0064 X mg/kg	0.011 X mg/kg	--
C3-Chrysenes	NA	Lab			--	--	--	< 0.0058 X mg/kg	0.45 X mg/kg	3.7 X mg/kg	< 0.0064 X mg/kg	< 0.0070 X mg/kg	--
C3-Fluorenes	NA	Lab			--	--	--	< 0.0058 X mg/kg	1.1 X mg/kg	2.1 X mg/kg	< 0.0064 X mg/kg	< 0.0070 X mg/kg	--
C3-Naphthalenes	NA	Lab			--	--	--	0.0062 X mg/kg	0.38 X mg/kg	7.4 X mg/kg	0.0094 X mg/kg	0.011 X mg/kg	--
C3-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	0.0072 X mg/kg	1.5 X mg/kg	7.4 X mg/kg	< 0.0064 X mg/kg	0.0075 X mg/kg	--
C4-Chrysenes	NA	Lab			--	--	--	< 0.0058 X mg/kg	0.25 X mg/kg	1.3 X mg/kg	< 0.0064 X mg/kg	< 0.0070 X mg/kg	--
C4-Napthalenes	NA	Lab			--	--	--	< 0.0058 X mg/kg	0.53 X mg/kg	2.6 X mg/kg	< 0.0064 X mg/kg	< 0.0070 X mg/kg	--
C4-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	< 0.0058 X mg/kg	1.2 X mg/kg	2.9 X mg/kg	< 0.0064 X mg/kg	< 0.0070 X mg/kg	--
Sum of ESBPAH17@ 0.5DL	NA	Lab			10.8 a mg/kg	521 a mg/kg	0.288 a mg/kg	0.157 a mg/kg	3.3 a mg/kg	642 a mg/kg	0.155 a mg/kg	0.204 mg/kg	7.2 a mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.302 a tu	9.9 a tu	0.029 a tu	0.011 a tu	0.107 a tu	9 a tu	0.004 a tu	0.008 tu	0.132 a tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			--	--	--	0.26 a mg/kg	13.6 a mg/kg	888 a mg/kg	0.266 a mg/kg	0.425 a mg/kg	--
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** (1)		--	--	--	0.019 a tu	0.403 a tu	**12.1 a tu**	0.0066 a tu	0.0163 a tu	--
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** (1)		0.773 a tu	**17.2 a tu**	0.307 a tu	--	--	--	--	--	0.483 a tu

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

					Sys Loc Code	**WM-65**	**WM-65**	**WM-66**	**WM-66**		**WM-66**	**WM-66**	**WM-67**	**WM-67**
					Sample Date	**3/21/2011**	**3/21/2011**	**3/22/2011**	**3/22/2011**		**3/22/2011**	**3/22/2011**	**3/22/2011**	**3/22/2011**
					Depth Interval	**2 - 2.5 ft**	**3 - 3.5 ft**	**0 - 0.5 ft**	**1 - 1.5 ft**	**1 - 1.5 ft**	**2 - 2.5 ft**	**3 - 3.5 ft**	**0 - 0.5 ft**	**1 - 1.5 ft**
					Sys Sample Code	**WM-65-3_2.0-2.5_03212011**	**WM-65-4_3.0-3.5_03212011**	**WM-66-1_0.0-0.5_03222011**	**WM-66-2_1.0-1.5_03222011**	**WM-66-2_1.0-1.5_03222011_FD**	**WM-66-3_2.0-2.5_03222011**	**WM-66-4_3.0-3.5_03222011**	**WM-67-1_0.0-0.5_03222011**	**WM-67-2_1.0-1.5_03222011**
					Sample Type Code	**N**	**N**	**N**	**N**	**FD**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II										
Effective Date			2/1/2007	2/1/2007										
Exceedance Key			**Bold**	Underline										
SVOCs														
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	**31 mg/kg**	**0.011 mg/kg**	< 0.0068 mg/kg	< 0.0066 j mg/kg	< 0.0064 j mg/kg	**28 j mg/kg**	**0.016 mg/kg**	< 0.0057 mg/kg	< 0.0051 mg/kg
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	**2.5 mg/kg**	< 0.0049 mg/kg	< 0.0068 mg/kg	**0.013 j mg/kg**	**0.01 j mg/kg**	**1.3 j mg/kg**	< 0.0044 mg/kg	< 0.0057 mg/kg	< 0.0051 mg/kg
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	**57 j mg/kg**	< 0.0049 mg/kg	< 0.0068 mg/kg	0.0098 j mg/kg	< 0.0064 j mg/kg	**84 j mg/kg**	< 0.0044 mg/kg	< 0.0057 mg/kg	< 0.0051 mg/kg
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	**59 mg/kg**	< 0.0049 mg/kg	0.01 mg/kg	0.046 j mg/kg	0.027 j mg/kg	**85 j mg/kg**	< 0.0044 mg/kg	0.0061 mg/kg	0.0075 mg/kg
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	**44 mg/kg**	0.01 mg/kg	0.012 mg/kg	0.035 j mg/kg	0.023 j mg/kg	**69 j mg/kg**	< 0.0044 mg/kg	0.0080 mg/kg	0.0078 mg/kg
Benzo(b)fluoranthene	NA	Lab			31 mg/kg	< 0.0049 j mg/kg	0.012 mg/kg	0.042 j mg/kg	0.012 j mg/kg	41 j mg/kg	< 0.0044 mg/kg	0.0078 mg/kg	0.0048 j mg/kg
Benzo(g,h,i)perylene	NA	Lab			10 j mg/kg	0.0086 j mg/kg	0.011 mg/kg	0.026 j mg/kg	0.018 j mg/kg	40 j mg/kg	< 0.0044 mg/kg	0.0087 mg/kg	0.013 j mg/kg
Benzo(k)fluoranthene	NA	Lab			45 mg/kg	< 0.0049 mg/kg	0.01 mg/kg	0.033 j mg/kg	0.02 j mg/kg	63 j mg/kg	< 0.0044 mg/kg	0.0065 mg/kg	0.0076 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	**42 mg/kg**	< 0.0049 mg/kg	0.011 mg/kg	0.047 j mg/kg	0.029 j mg/kg	**62 j mg/kg**	< 0.0044 mg/kg	0.0062 mg/kg	0.0057 mg/kg
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	**8 j mg/kg**	0.0074 mg/kg	< 0.0068 mg/kg	0.011 j mg/kg	0.0083 j mg/kg	**16 j mg/kg**	< 0.0044 mg/kg	0.0051 j mg/kg	0.01 mg/kg
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	**150 mg/kg**	0.0059 mg/kg	0.011 mg/kg	0.043 j mg/kg	0.035 j mg/kg	**220 j mg/kg**	0.0045 mg/kg	0.0080 mg/kg	0.011 mg/kg
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	**30 mg/kg**	< 0.0049 mg/kg	< 0.0068 mg/kg	< 0.0066 j mg/kg	< 0.0064 j mg/kg	**43 j mg/kg**	< 0.0044 mg/kg	< 0.0057 mg/kg	< 0.0051 mg/kg
Indeno(1,2,3-cd)pyrene	NA	Lab			28 mg/kg	0.0092 mg/kg	0.0091 mg/kg	0.024 j mg/kg	0.017 j mg/kg	47 j mg/kg	< 0.0044 mg/kg	0.0078 mg/kg	0.013 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	**1.3 mg/kg**	< 0.0049 mg/kg	< 0.0068 mg/kg	< 0.0066 j mg/kg	< 0.0064 j mg/kg	**0.33 mg/kg**	< 0.0044 mg/kg	< 0.0057 mg/kg	< 0.0051 mg/kg
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	**2.1 mg/kg**	< 0.0049 mg/kg	< 0.0068 mg/kg	< 0.0066 j mg/kg	< 0.0064 j mg/kg	**1.5 j mg/kg**	< 0.0044 mg/kg	< 0.0057 mg/kg	< 0.0051 mg/kg
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	**94 j mg/kg**	0.0045 j mg/kg	< 0.0068 mg/kg	0.014 j mg/kg	0.0074 j mg/kg	**150 j mg/kg**	0.0080 mg/kg	< 0.0057 mg/kg	0.0071 mg/kg
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	**110 mg/kg**	0.0060 mg/kg	0.013 mg/kg	0.059 j mg/kg	0.035 j mg/kg	**180 j mg/kg**	< 0.0044 mg/kg	0.0078 mg/kg	0.011 mg/kg
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	**631 a mg/kg**	0.0619 a mg/kg	0.0842 mg/kg	0.291 a mg/kg	0.191 a mg/kg	**940 a mg/kg**	0.0505 mg/kg	0.0611 a mg/kg	0.0754 mg/kg
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	**27.4 mg/kg**	0.00269 mg/kg	0.00366 mg/kg	0.01265 mg/kg	0.00829 mg/kg	**40.9 mg/kg**	0.0022 mg/kg	0.00266 mg/kg	0.00328 mg/kg
1-Methylnaphthalene	NA	Lab			--	--	< 0.0068 mg/kg	--	--	--	--	< 0.0057 mg/kg	--
Benzo(e)pyrene	NA	Lab			--	--	0.0091 mg/kg	--	--	--	--	0.0065 mg/kg	--
Perylene	NA	Lab			--	--	0.039 mg/kg	--	--	--	--	0.021 mg/kg	--
C1-Chrysenes	NA	Lab			--	--	0.015 X mg/kg	--	--	--	--	< 0.0057 X mg/kg	--
C1-Fluoranthenes/Pyrenes	NA	Lab			--	--	0.017 X mg/kg	--	--	--	--	0.0085 X mg/kg	--
C1-Fluorenes	NA	Lab			--	--	< 0.0068 X mg/kg	--	--	--	--	< 0.0057 X mg/kg	--
C1-Naphthalenes	NA	Lab			--	--	< 0.0068 X mg/kg	--	--	--	--	< 0.0057 X mg/kg	--
C1-Phenanthrenes/Anthracenes	NA	Lab			--	--	< 0.0068 X mg/kg	--	--	--	--	< 0.0057 X mg/kg	--
C2-Chrysenes	NA	Lab			--	--	0.012 X mg/kg	--	--	--	--	< 0.0057 X mg/kg	--
C2-Fluorenes	NA	Lab			--	--	< 0.0068 X mg/kg	--	--	--	--	< 0.0057 X mg/kg	--
C2-Naphthalenes	NA	Lab			--	--	< 0.0068 X mg/kg	--	--	--	--	< 0.0057 X mg/kg	--
C2-Phenanthrenes/Anthracenes	NA	Lab			--	--	< 0.0068 X mg/kg	--	--	--	--	< 0.0057 X mg/kg	--
C3-Chrysenes	NA	Lab			--	--	< 0.0068 X mg/kg	--	--	--	--	< 0.0057 X mg/kg	--
C3-Fluorenes	NA	Lab			--	--	< 0.0068 X mg/kg	--	--	--	--	< 0.0057 X mg/kg	--
C3-Naphthalenes	NA	Lab			--	--	0.0068 X mg/kg	--	--	--	--	0.0060 X mg/kg	--
C3-Phenanthrenes/Anthracenes	NA	Lab			--	--	< 0.0068 X mg/kg	--	--	--	--	< 0.0057 X mg/kg	--
C4-Chrysenes	NA	Lab			--	--	< 0.0068 X mg/kg	--	--	--	--	< 0.0057 X mg/kg	--
C4-Napthalenes	NA	Lab			--	--	< 0.0068 X mg/kg	--	--	--	--	< 0.0057 X mg/kg	--
C4-Phenanthrenes/Anthracenes	NA	Lab			--	--	< 0.0068 X mg/kg	--	--	--	--	< 0.0057 X mg/kg	--
Sum of ESBPAH17@ 0.5DL	NA	Lab			745 a mg/kg	0.085 a mg/kg	0.126 mg/kg	0.416 a mg/kg	0.258 a mg/kg	1130 a mg/kg	0.059 mg/kg	0.092 a mg/kg	0.114 a mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			8.67 a BQX tu	0.006 a tu	0.006 tu	0.015 a tu	0.009 a tu	13.2 a tu	0.011 tu	0.007 a tu	0.006 a tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			--	--	0.263 a mg/kg	--	--	--	--	0.171 a mg/kg	--
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		--	--	0.013 a tu	--	--	--	--	0.012 a tu	--
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		**15.1 a BQX tu**	0.267 a tu	--	0.283 a tu	0.272 a tu	**22.8 a tu**	0.276 a tu	--	0.267 a tu

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

					Sys Loc Code	**WM-67**	**WM-67**	**WM-68**	**WM-68**	**WM-68**	**WM-69**	**WM-69**	**WM-69**	**WM-69**
					Sample Date	**3/22/2011**	**3/22/2011**	**3/23/2011**	**3/23/2011**	**3/23/2011**	**3/23/2011**	**3/23/2011**	**3/23/2011**	**3/23/2011**
					Depth Interval	**2.5 - 3 ft**	**3.1 - 3.5 ft**	**0 - 0.5 ft**	**0.5 - 1 ft**	**1 - 1.4 ft**	**0 - 0.5 ft**	**0.5 - 1 ft**	**1 - 1.5 ft**	**1.5 - 2 ft**
					Sys Sample Code	**WM-67-3_2.5-3.0_03222011**	**WM-67-4_3.1-3.5_03222011**	**WM-68-1_0.0-0.5_03232011**	**WM-68-2_0.5-1.0_03232011**	**WM-68-3_1.0-1.4_03232011**	**WM-69-1_0.0-0.5_03232011**	**WM-69-2_0.5-1.0_03232011**	**WM-69-3_1.0-1.5_03232011**	**WM-69-4_1.5-2.0_03232011**
					Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II										
Effective Date			2/1/2007	2/1/2007										
Exceedance Key			**Bold**	Underline										
SVOCs														
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	**2.4 j mg/kg**	**0.62 mg/kg**	< 0.0047 mg/kg	< 0.0048 mg/kg	< 0.0047 j mg/kg	< 0.0045 mg/kg	< 0.0044 j mg/kg	**0.062 mg/kg**	**0.23 j mg/kg**
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	**0.31 mg/kg**	**0.029 mg/kg**	< 0.0047 mg/kg	< 0.0048 mg/kg	< 0.0047 j mg/kg	< 0.0045 mg/kg	< 0.0044 j mg/kg	**0.015 mg/kg**	**0.049 mg/kg**
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	**8.8 j mg/kg**	**1.5 mg/kg**	< 0.0047 mg/kg	< 0.0048 mg/kg	< 0.0047 j mg/kg	< 0.0045 mg/kg	0.0056 j mg/kg	**0.59 mg/kg**	**1.7 mg/kg**
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	**13 j mg/kg**	**2.3 mg/kg**	0.0066 mg/kg	0.0059 mg/kg	0.0061 j mg/kg	0.0046 mg/kg	0.02 j mg/kg	**1.2 mg/kg**	**3.3 mg/kg**
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	**11 j mg/kg**	**1.8 mg/kg**	0.0076 mg/kg	0.0063 mg/kg	0.0061 j mg/kg	0.0063 mg/kg	0.016 j mg/kg	**1.1 mg/kg**	**2.8 mg/kg**
Benzo(b)fluoranthene	NA	Lab			7.3 j mg/kg	1.7 mg/kg	0.0063 mg/kg	< 0.0048 j mg/kg	0.0048 j mg/kg	0.0058 mg/kg	0.012 j mg/kg	0.83 mg/kg	2.4 mg/kg
Benzo(g,h,i)perylene	NA	Lab			3.3 mg/kg	1.1 mg/kg	0.0099 mg/kg	0.0098 j mg/kg	0.0051 j mg/kg	0.0072 mg/kg	0.012 j mg/kg	0.68 mg/kg	1.2 mg/kg
Benzo(k)fluoranthene	NA	Lab			12 j mg/kg	1.9 mg/kg	0.0065 mg/kg	0.0065 mg/kg	0.0044 j mg/kg	0.0051 mg/kg	0.011 j mg/kg	1.1 mg/kg	2.8 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	**9.8 j mg/kg**	**1.7 mg/kg**	0.0061 mg/kg	0.0047 j mg/kg	0.0055 j mg/kg	0.0050 mg/kg	0.017 j mg/kg	**0.96 mg/kg**	**2.5 mg/kg**
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	**1.7 mg/kg**	**0.35 mg/kg**	0.0060 mg/kg	0.0074 mg/kg	< 0.0047 j mg/kg	< 0.0045 mg/kg	0.0055 j mg/kg	**0.22 mg/kg**	**0.71 mg/kg**
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	**29 j mg/kg**	**5.1 j mg/kg**	0.0050 mg/kg	0.0086 mg/kg	0.0083 j mg/kg	0.0043 j mg/kg	0.025 j mg/kg	**2.9 mg/kg**	**7.3 mg/kg**
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	**4.6 j mg/kg**	**0.8 mg/kg**	< 0.0047 mg/kg	< 0.0048 mg/kg	< 0.0047 j mg/kg	< 0.0045 mg/kg	0.0044 j mg/kg	**0.11 mg/kg**	**0.57 mg/kg**
Indeno(1,2,3-cd)pyrene	NA	Lab			5.5 j mg/kg	1.3 mg/kg	0.0090 mg/kg	0.0095 mg/kg	0.0048 j mg/kg	0.0063 mg/kg	0.01 j mg/kg	0.81 mg/kg	1.9 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	**0.13 mg/kg**	0.016 mg/kg	< 0.0047 mg/kg	< 0.0048 mg/kg	< 0.0047 j mg/kg	< 0.0045 mg/kg	< 0.0044 j mg/kg	< 0.0049 mg/kg	< 0.0099 mg/kg
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	**0.36 mg/kg**	0.019 mg/kg	< 0.0047 mg/kg	< 0.0048 mg/kg	< 0.0047 j mg/kg	< 0.0045 mg/kg	< 0.0044 j mg/kg	0.0067 mg/kg	0.016 mg/kg
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	**12 j mg/kg**	**2.2 mg/kg**	< 0.0047 mg/kg	0.0059 mg/kg	< 0.0047 j mg/kg	< 0.0045 mg/kg	0.0086 j mg/kg	**0.9 mg/kg**	**2.7 mg/kg**
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	**22 j mg/kg**	**3.6 mg/kg**	0.0066 mg/kg	0.0093 mg/kg	0.011 j mg/kg	0.0062 mg/kg	0.026 j mg/kg	**2 mg/kg**	**5.1 mg/kg**
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	**115 a mg/kg**	**20 a mg/kg**	0.0543 mg/kg	0.0625 mg/kg	0.0558 a mg/kg	0.0444 mg/kg	0.137 a mg/kg	**10.1 mg/kg**	**27 a mg/kg**
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	**5 mg/kg**	**0.871 mg/kg**	0.00236 mg/kg	0.00272 mg/kg	0.00243 mg/kg	0.00193 mg/kg	0.00595 mg/kg	**0.438 mg/kg**	**1.17 mg/kg**
1-Methylnaphthalene	NA	Lab			--	--	< 0.0047 mg/kg	--	--	< 0.0045 mg/kg	--	--	--
Benzo(e)pyrene	NA	Lab			--	--	0.0043 j mg/kg	--	--	0.0039 j mg/kg	--	--	--
Perylene	NA	Lab			--	--	0.015 mg/kg	--	--	0.0098 mg/kg	--	--	--
C1-Chrysenes	NA	Lab			--	--	< 0.0047 X mg/kg	--	--	< 0.0045 X mg/kg	--	--	--
C1-Fluoranthenes/Pyrenes	NA	Lab			--	--	0.0079 X mg/kg	--	--	0.0055 X mg/kg	--	--	--
C1-Fluorenes	NA	Lab			--	--	< 0.0047 X mg/kg	--	--	< 0.0045 X mg/kg	--	--	--
C1-Naphthalenes	NA	Lab			--	--	< 0.0047 X mg/kg	--	--	< 0.0045 X mg/kg	--	--	--
C1-Phenanthrenes/Anthracenes	NA	Lab			--	--	< 0.0047 X mg/kg	--	--	< 0.0045 X mg/kg	--	--	--
C2-Chrysenes	NA	Lab			--	--	< 0.0047 X mg/kg	--	--	< 0.0045 X mg/kg	--	--	--
C2-Fluorenes	NA	Lab			--	--	< 0.0047 X mg/kg	--	--	< 0.0045 X mg/kg	--	--	--
C2-Naphthalenes	NA	Lab			--	--	< 0.0047 X mg/kg	--	--	< 0.0045 X mg/kg	--	--	--
C2-Phenanthrenes/Anthracenes	NA	Lab			--	--	< 0.0047 X mg/kg	--	--	< 0.0045 X mg/kg	--	--	--
C3-Chrysenes	NA	Lab			--	--	< 0.0047 X mg/kg	--	--	< 0.0045 X mg/kg	--	--	--
C3-Fluorenes	NA	Lab			--	--	< 0.0047 X mg/kg	--	--	< 0.0045 X mg/kg	--	--	--
C3-Naphthalenes	NA	Lab			--	--	< 0.0047 X mg/kg	--	--	0.0049 X mg/kg	--	--	--
C3-Phenanthrenes/Anthracenes	NA	Lab			--	--	< 0.0047 X mg/kg	--	--	< 0.0045 X mg/kg	--	--	--
C4-Chrysenes	NA	Lab			--	--	< 0.0047 X mg/kg	--	--	< 0.0045 X mg/kg	--	--	--
C4-Napthalenes	NA	Lab			--	--	< 0.0047 X mg/kg	--	--	< 0.0045 X mg/kg	--	--	--
C4-Phenanthrenes/Anthracenes	NA	Lab			--	--	< 0.0047 X mg/kg	--	--	< 0.0045 X mg/kg	--	--	--
Sum of ESBPAH17@ 0.5DL	NA	Lab			143 a mg/kg	26 a mg/kg	0.086 mg/kg	0.091 a mg/kg	0.075 a mg/kg	0.069 a mg/kg	0.182 a mg/kg	13.5 mg/kg	35.3 a mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			2.4 a tu	1.1 a tu	0.013 tu	0.007 a tu	0.005 a tu	0.008 a tu	0.020 a tu	0.759 tu	0.38 a BQX tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			--	--	0.146 a mg/kg	--	--	0.122 a mg/kg	--	--	--
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		--	--	0.022 a tu	--	--	0.014 a tu	--	--	--
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		**4.36 a tu**	**2.14 a tu**	--	0.269 a tu	0.266 a tu	--	0.291 a tu	**1.55 a tu**	0.90 a BQX tu

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

					Sys Loc Code	**WM-70**	**WM-70**		**WM-70**	**WM-70**	**WM-71**	**WM-71**	**WM-71**	**WM-71**
					Sample Date	**3/23/2011**	**3/23/2011**		**3/23/2011**	**3/23/2011**	**3/23/2011**	**3/23/2011**	**3/23/2011**	**3/23/2011**
					Depth Interval	**0 - 0.5 ft**	**2 - 2.5 ft**	**2 - 2.5 ft**	**2.5 - 3 ft**	**3 - 3.5 ft**	**0 - 0.5 ft**	**1 - 1.5 ft**	**2 - 2.5 ft**	**3 - 3.5 ft**
					Sys Sample Code	**WM-70-1_0.0-0.5_03232011**	**WM-70-2_2.0-2.5_03232011**	**WM-70-2_2.0-2.5_03232011_FD**	**WM-70-3_2.5-3.0_03232011**	**WM-70-4_3.0-3.5_03232011**	**WM-71-1_0.0-0.5_03232011**	**WM-71-2_1.0-1.5_03232011**	**WM-71-3_2.0-2.5_03232011**	**WM-71-4_3.0-3.5_03232011**
					Sample Type Code	**N**	**N**	**FD**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II										
Effective Date			2/1/2007	2/1/2007										
Exceedance Key			**Bold**	Underline										
SVOCs														
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	< 0.0065 mg/kg	**0.5 mg/kg**	**0.16 mg/kg**	**9 mg/kg**	**0.029 j mg/kg**	< 0.0035 mg/kg	**2.6 mg/kg**	< 0.0040 mg/kg	< 0.0041 mg/kg
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	< 0.0065 mg/kg	**0.035 mg/kg**	**0.03 mg/kg**	**0.87 mg/kg**	< 0.0046 mg/kg	**0.0066 mg/kg**	**0.22 mg/kg**	< 0.0040 mg/kg	< 0.0041 mg/kg
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	< 0.0065 mg/kg	**0.55 mg/kg**	**0.36 mg/kg**	**41 mg/kg**	0.019 mg/kg	< 0.0035 mg/kg	**12 mg/kg**	< 0.0040 mg/kg	0.0063 mg/kg
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	0.016 mg/kg	**0.53 mg/kg**	**0.42 mg/kg**	**43 mg/kg**	0.033 mg/kg	0.0055 mg/kg	**13 mg/kg**	< 0.0040 mg/kg	0.0099 j mg/kg
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	0.018 mg/kg	**0.49 mg/kg**	**0.34 mg/kg**	**34 mg/kg**	0.037 mg/kg	0.0073 mg/kg	**9.4 mg/kg**	< 0.0040 mg/kg	0.0060 j mg/kg
Benzo(b)fluoranthene	NA	Lab			0.019 mg/kg	0.47 mg/kg	0.26 j mg/kg	23 mg/kg	0.024 j mg/kg	0.0077 mg/kg	7 mg/kg	< 0.0040 j mg/kg	0.0060 mg/kg
Benzo(g,h,i)perylene	NA	Lab			0.02 mg/kg	0.28 j mg/kg	0.31 j mg/kg	23 mg/kg	0.022 j mg/kg	0.0075 mg/kg	6.3 mg/kg	0.0081 j mg/kg	0.0044 mg/kg
Benzo(k)fluoranthene	NA	Lab			0.017 mg/kg	0.38 mg/kg	0.33 mg/kg	34 mg/kg	0.031 mg/kg	0.0058 mg/kg	9.7 mg/kg	< 0.0040 mg/kg	0.0068 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	0.016 mg/kg	**0.61 mg/kg**	**0.49 mg/kg**	**31 mg/kg**	0.019 mg/kg	0.0070 mg/kg	**9.4 mg/kg**	< 0.0040 mg/kg	0.0070 mg/kg
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	0.012 mg/kg	**0.051 mg/kg**	**0.06 mg/kg**	**5.2 mg/kg**	0.011 mg/kg	0.0041 mg/kg	**1.5 mg/kg**	0.0066 mg/kg	< 0.0041 mg/kg
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	0.014 mg/kg	**1.8 mg/kg**	**1.3 mg/kg**	**120 mg/kg**	0.098 j mg/kg	0.0039 mg/kg	**36 mg/kg**	< 0.0040 mg/kg	0.021 mg/kg
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	< 0.0065 mg/kg	**0.6 mg/kg**	**0.37 mg/kg**	**16 mg/kg**	0.015 mg/kg	< 0.0035 mg/kg	**4.9 mg/kg**	< 0.0040 mg/kg	< 0.0041 mg/kg
Indeno(1,2,3-cd)pyrene	NA	Lab			0.018 mg/kg	0.31 mg/kg	0.35 mg/kg	26 mg/kg	0.027 mg/kg	0.0068 mg/kg	6.8 mg/kg	0.0087 mg/kg	0.0045 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	< 0.0065 mg/kg	0.0097 mg/kg	0.0077 mg/kg	**0.19 mg/kg**	< 0.0046 mg/kg	< 0.0035 mg/kg	**0.087 mg/kg**	< 0.0040 mg/kg	< 0.0041 mg/kg
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	< 0.0065 mg/kg	0.024 mg/kg	0.021 mg/kg	**0.24 mg/kg**	< 0.0046 mg/kg	< 0.0035 mg/kg	0.13 mg/kg	< 0.0040 mg/kg	< 0.0041 mg/kg
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	< 0.0065 mg/kg	**1.1 mg/kg**	**0.7 mg/kg**	**56 mg/kg**	0.035 mg/kg	< 0.0035 mg/kg	**17 mg/kg**	< 0.0040 mg/kg	0.0090 mg/kg
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	0.017 mg/kg	**1.2 mg/kg**	**0.89 mg/kg**	**86 mg/kg**	0.09 j mg/kg	0.0059 mg/kg	**25 mg/kg**	< 0.0040 mg/kg	0.017 mg/kg
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	0.116 mg/kg	**7.5 mg/kg**	**5.15 mg/kg**	**443 mg/kg**	0.393 a mg/kg	0.0508 mg/kg	**131 mg/kg**	0.0306 mg/kg	0.0885 a mg/kg
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	0.00503 mg/kg	**0.326 mg/kg**	**0.224 mg/kg**	**19.2 mg/kg**	0.0171 mg/kg	0.00221 mg/kg	**5.71 mg/kg**	0.00133 mg/kg	0.00385 mg/kg
1-Methylnaphthalene	NA	Lab			< 0.0065 mg/kg	--	--	--	--	< 0.0035 mg/kg	--	--	--
Benzo(e)pyrene	NA	Lab			0.011 mg/kg	--	--	--	--	0.0060 mg/kg	--	--	--
Perylene	NA	Lab			0.027 mg/kg	--	--	--	--	0.0058 mg/kg	--	--	--
C1-Chrysenes	NA	Lab			0.012 X mg/kg	--	--	--	--	0.01 X mg/kg	--	--	--
C1-Fluoranthenes/Pyrenes	NA	Lab			0.013 X mg/kg	--	--	--	--	0.0095 X mg/kg	--	--	--
C1-Fluorenes	NA	Lab			< 0.0065 X mg/kg	--	--	--	--	< 0.0035 X mg/kg	--	--	--
C1-Naphthalenes	NA	Lab			< 0.0065 X mg/kg	--	--	--	--	< 0.0035 X mg/kg	--	--	--
C1-Phenanthrenes/Anthracenes	NA	Lab			< 0.0065 X mg/kg	--	--	--	--	< 0.0035 X mg/kg	--	--	--
C2-Chrysenes	NA	Lab			0.015 X mg/kg	--	--	--	--	0.019 X mg/kg	--	--	--
C2-Fluorenes	NA	Lab			< 0.0065 X mg/kg	--	--	--	--	< 0.0035 X mg/kg	--	--	--
C2-Naphthalenes	NA	Lab			< 0.0065 X mg/kg	--	--	--	--	< 0.0035 X mg/kg	--	--	--
C2-Phenanthrenes/Anthracenes	NA	Lab			< 0.0065 X mg/kg	--	--	--	--	< 0.0035 X mg/kg	--	--	--
C3-Chrysenes	NA	Lab			0.019 X mg/kg	--	--	--	--	0.022 X mg/kg	--	--	--
C3-Fluorenes	NA	Lab			< 0.0065 X mg/kg	--	--	--	--	< 0.0035 X mg/kg	--	--	--
C3-Naphthalenes	NA	Lab			0.0084 X mg/kg	--	--	--	--	< 0.0035 X mg/kg	--	--	--
C3-Phenanthrenes/Anthracenes	NA	Lab			< 0.0065 X mg/kg	--	--	--	--	< 0.0035 X mg/kg	--	--	--
C4-Chrysenes	NA	Lab			< 0.0065 X mg/kg	--	--	--	--	0.017 X mg/kg	--	--	--
C4-Napthalenes	NA	Lab			< 0.0065 X mg/kg	--	--	--	--	< 0.0035 X mg/kg	--	--	--
C4-Phenanthrenes/Anthracenes	NA	Lab			< 0.0065 X mg/kg	--	--	--	--	< 0.0035 X mg/kg	--	--	--
Sum of ESBPAH17@ 0.5DL	NA	Lab			0.190 mg/kg	8.9 a mg/kg	6.4 a mg/kg	549 mg/kg	0.497 a mg/kg	0.079 mg/kg	161 mg/kg	0.051 a mg/kg	0.111 a mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.010 tu	0.179 a tu	0.121 a tu	7.4 tu	0.041 a tu	0.045 tu	75.5 tu	0.033 a tu	0.304 a tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			0.328 a mg/kg	--	--	--	--	0.185 a mg/kg	--	--	--
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		0.017 a tu	--	--	--	--	0.095 a tu	--	--	--
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		--	0.563 a tu	0.464 a tu	**12.9 a tu**	0.327 a tu	--	**129 a tu**	0.313 a tu	0.777 a tu

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II	WM-72 3/23/2011 0 - 0.5 ft WM-72-1_0.0-0.5_03232011 N	WM-72 3/23/2011 1 - 1.5 ft WM-72-2_1.0-1.5_03232011 N	WM-72 3/23/2011 2 - 2.5 ft WM-72-3_2.0-2.5_03232011 N	WM-72 3/23/2011 3 - 3.5 ft WM-72-4_3.0-3.5_03232011 N	WM-73 3/24/2011 0 - 0.5 ft WM-73-1_0.0-0.5_03242011 N	WM-73 3/24/2011 0.5 - 1 ft WM-73-2_0.5-1.0_03242011 N	WM-73 3/24/2011 1 - 1.5 ft WM-73-3_1.0-1.5_03242011 N	WM-73 3/24/2011 1.5 - 2 ft WM-73-4_1.5-2.0_03242011 N	WM-74 3/24/2011 0 - 0.5 ft WM-74-1_0.0-0.5_03242011 N
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
SVOCs													
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	< 0.0039 mg/kg	< 0.0045 mg/kg	< 0.0042 j mg/kg	< 0.0043 mg/kg	**0.01 mg/kg**	**0.057 mg/kg**	< 0.0067 j mg/kg	< 0.0051 mg/kg	< 0.0059 mg/kg
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	0.0043 mg/kg	< 0.0045 mg/kg	< 0.0042 mg/kg	< 0.0043 mg/kg	**0.14 mg/kg**	**0.17 mg/kg**	**0.013 mg/kg**	< 0.0051 mg/kg	< 0.0059 mg/kg
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	0.0082 mg/kg	0.0054 mg/kg	0.011 mg/kg	0.0054 mg/kg	0.035 mg/kg	**1.3 j mg/kg**	0.044 mg/kg	< 0.0051 mg/kg	< 0.0059 mg/kg
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	0.051 j mg/kg	0.0096 j mg/kg	0.02 mg/kg	0.0083 j mg/kg	**0.31 mg/kg**	**5.6 mg/kg**	**0.19 j mg/kg**	0.013 j mg/kg	0.027 mg/kg
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	0.051 j mg/kg	< 0.0045 j mg/kg	0.023 mg/kg	0.0042 j mg/kg	**0.46 mg/kg**	**6.6 mg/kg**	0.12 j mg/kg	0.0063 j mg/kg	0.022 mg/kg
Benzo(b)fluoranthene	NA	Lab			0.061 j mg/kg	< 0.0045 mg/kg	0.014 j mg/kg	< 0.0043 mg/kg	0.33 mg/kg	5.5 mg/kg	0.12 j mg/kg	0.0054 mg/kg	0.025 mg/kg
Benzo(g,h,i)perylene	NA	Lab			0.037 mg/kg	< 0.0045 mg/kg	0.013 j mg/kg	< 0.0043 mg/kg	0.24 mg/kg	2.1 mg/kg	0.091 j mg/kg	< 0.0051 j mg/kg	0.017 mg/kg
Benzo(k)fluoranthene	NA	Lab			0.054 j mg/kg	0.0049 mg/kg	0.019 mg/kg	0.0050 mg/kg	0.27 mg/kg	6.3 mg/kg	0.12 j mg/kg	0.0073 mg/kg	0.023 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	0.042 j mg/kg	0.0069 mg/kg	0.012 mg/kg	0.0058 mg/kg	**0.49 mg/kg**	**4.5 mg/kg**	**0.18 j mg/kg**	0.01 mg/kg	0.021 mg/kg
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	0.015 mg/kg	< 0.0045 mg/kg	0.0061 mg/kg	< 0.0043 mg/kg	**0.057 mg/kg**	**1.2 mg/kg**	**0.052 mg/kg**	< 0.0051 mg/kg	0.0084 mg/kg
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	0.056 j mg/kg	0.02 mg/kg	0.042 mg/kg	0.019 mg/kg	**0.71 mg/kg**	**10 j mg/kg**	**0.51 mg/kg**	0.018 mg/kg	0.038 mg/kg
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	0.0037 j mg/kg	< 0.0045 mg/kg	< 0.0042 mg/kg	< 0.0043 mg/kg	0.028 mg/kg	**0.31 mg/kg**	0.014 mg/kg	< 0.0051 mg/kg	< 0.0059 mg/kg
Indeno(1,2,3-cd)pyrene	NA	Lab			0.05 j mg/kg	< 0.0045 mg/kg	0.015 mg/kg	< 0.0043 mg/kg	0.22 mg/kg	2.7 mg/kg	0.091 j mg/kg	< 0.0051 mg/kg	0.018 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	< 0.0039 mg/kg	< 0.0045 mg/kg	< 0.0042 mg/kg	< 0.0043 mg/kg	**0.02 mg/kg**	**0.023 mg/kg**	< 0.0067 mg/kg	< 0.0051 mg/kg	< 0.0059 mg/kg
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	< 0.0039 mg/kg	< 0.0045 mg/kg	< 0.0042 mg/kg	< 0.0043 mg/kg	0.062 mg/kg	0.055 mg/kg	0.0081 mg/kg	< 0.0051 mg/kg	< 0.0059 mg/kg
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	0.0090 mg/kg	0.0070 mg/kg	0.023 mg/kg	0.0087 mg/kg	0.04 mg/kg	**1.5 j mg/kg**	0.094 mg/kg	< 0.0051 mg/kg	0.0069 mg/kg
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	0.064 j mg/kg	0.018 mg/kg	0.033 mg/kg	0.013 mg/kg	**0.69 mg/kg**	**7.1 mg/kg**	**0.35 mg/kg**	0.015 mg/kg	0.044 mg/kg
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	0.31 a mg/kg	0.0826 a mg/kg	0.181 mg/kg	0.0773 a mg/kg	**3.05 mg/kg**	**38.4 a mg/kg**	1.58 a mg/kg	0.0827 a mg/kg	0.185 mg/kg
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	0.0135 mg/kg	0.00359 mg/kg	0.00785 mg/kg	0.00336 mg/kg	**0.133 mg/kg**	**1.67 mg/kg**	0.0688 mg/kg	0.0036 mg/kg	0.00804 mg/kg
1-Methylnaphthalene	NA	Lab			< 0.0039 mg/kg	--	--	--	0.011 mg/kg	--	--	--	< 0.0059 mg/kg
Benzo(e)pyrene	NA	Lab			0.032 mg/kg	--	--	--	0.25 mg/kg	--	--	--	0.012 mg/kg
Perylene	NA	Lab			0.015 mg/kg	--	--	--	0.1 mg/kg	--	--	--	0.039 mg/kg
C1-Chrysenes	NA	Lab			0.047 X mg/kg	--	--	--	0.68 X mg/kg	--	--	--	0.019 X mg/kg
C1-Fluoranthenes/Pyrenes	NA	Lab			0.061 X mg/kg	--	--	--	0.62 X mg/kg	--	--	--	0.028 X mg/kg
C1-Fluorenes	NA	Lab			0.0080 X mg/kg	--	--	--	0.071 X mg/kg	--	--	--	0.0061 X mg/kg
C1-Naphthalenes	NA	Lab			< 0.0039 X mg/kg	--	--	--	0.024 X mg/kg	--	--	--	< 0.0059 X mg/kg
C1-Phenanthrenes/Anthracenes	NA	Lab			0.012 X mg/kg	--	--	--	0.13 X mg/kg	--	--	--	0.011 X mg/kg
C2-Chrysenes	NA	Lab			0.047 X mg/kg	--	--	--	0.96 X mg/kg	--	--	--	0.021 X mg/kg
C2-Fluorenes	NA	Lab			0.0094 X mg/kg	--	--	--	0.2 X mg/kg	--	--	--	< 0.0059 X mg/kg
C2-Naphthalenes	NA	Lab			< 0.0039 X mg/kg	--	--	--	0.076 X mg/kg	--	--	--	< 0.0059 X mg/kg
C2-Phenanthrenes/Anthracenes	NA	Lab			0.01 X mg/kg	--	--	--	0.24 X mg/kg	--	--	--	0.0067 X mg/kg
C3-Chrysenes	NA	Lab			0.036 X mg/kg	--	--	--	0.79 X mg/kg	--	--	--	< 0.0059 X mg/kg
C3-Fluorenes	NA	Lab			< 0.0039 X mg/kg	--	--	--	0.43 X mg/kg	--	--	--	< 0.0059 X mg/kg
C3-Naphthalenes	NA	Lab			0.0061 X mg/kg	--	--	--	0.088 X mg/kg	--	--	--	0.0080 X mg/kg
C3-Phenanthrenes/Anthracenes	NA	Lab			0.011 X mg/kg	--	--	--	0.64 X mg/kg	--	--	--	0.0075 X mg/kg
C4-Chrysenes	NA	Lab			0.015 X mg/kg	--	--	--	0.72 X mg/kg	--	--	--	< 0.0059 X mg/kg
C4-Napthalenes	NA	Lab			0.0043 X mg/kg	--	--	--	0.21 X mg/kg	--	--	--	< 0.0059 X mg/kg
C4-Phenanthrenes/Anthracenes	NA	Lab			< 0.0039 X mg/kg	--	--	--	0.71 X mg/kg	--	--	--	< 0.0059 X mg/kg
Sum of ESBPAH17@ 0.5DL	NA	Lab			0.512 a mg/kg	0.095 a mg/kg	0.242 a mg/kg	0.089 a mg/kg	4.1 mg/kg	55 a mg/kg	2 a mg/kg	0.101 a mg/kg	0.268 mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			BQX	0.007 a tu	0.061 a tu	0.048 a tu	0.092 tu	1.8 a tu	0.057 a tu	0.006 a tu	0.016 tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			0.832 a mg/kg	--	--	--	11 a mg/kg	--	--	--	0.447 a mg/kg
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** (1)		BQX	--	--	--	0.229 a tu	--	--	--	0.026 a tu
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** (1)		--	0.269 a tu	0.361 a tu	0.339 a tu	--	**3.33 a tu**	0.354 a tu	0.267 a tu	--

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II	WM-74	WM-74	WM-74	UC-75	UC-75	UC-75	UC-75	UC-76	UC-76
Sys Loc Code					**WM-74**	**WM-74**	**WM-74**	**UC-75**	**UC-75**	**UC-75**	**UC-75**	**UC-76**	**UC-76**
Sample Date					**3/24/2011**	**3/24/2011**	**3/24/2011**	**6/8/2011**	**6/8/2011**	**6/8/2011**	**6/8/2011**	**6/8/2011**	**6/8/2011**
Depth Interval					**2.5 - 3 ft**	**3 - 3.5 ft**	**4 - 4.5 ft**	**0 - 0.5 ft**	**0.5 - 1 ft**	**1 - 1.5 ft**	**1.5 - 2 ft**	**0 - 0.5 ft**	**0.5 - 1 ft**
Sys Sample Code					**WM-74-2_2.5-3.0_03242011**	**WM-74-3_3.0-3.5_03242011**	**WM-74-4_4.0-4.5_03242011**	**UC-75-1_0.0-0.5_06082011**	**UC-75-2_0.5-1.0_06082011**	**UC-75-3_1.0-1.5_06082011**	**UC-75-4_1.5-2.0_06082011**	**UC-76-1_0.0-0.5_06082011**	**UC-76-2_0.5-1.0_06082011**
Sample Type Code					**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
SVOCs													
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	**0.021 mg/kg**	**11 j mg/kg**	**0.022 mg/kg**	**3.1 j mg/kg**	**2.2 j mg/kg**	**0.52 j mg/kg**	**0.08 j mg/kg**	**0.44 j mg/kg**	**0.31 mg/kg**
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	**0.027 mg/kg**	**0.59 mg/kg**	< 0.0045 mg/kg	**50 mg/kg**	**62 j mg/kg**	**3.6 mg/kg**	**1 j mg/kg**	**6.2 j mg/kg**	**5.1 mg/kg**
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	0.033 mg/kg	**47 j mg/kg**	0.021 mg/kg	**130 mg/kg**	**230 mg/kg**	**23 mg/kg**	**5.1 j mg/kg**	**25 mg/kg**	**14 mg/kg**
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	**0.37 mg/kg**	**58 j mg/kg**	0.03 j mg/kg	**97 mg/kg**	**120 mg/kg**	**21 mg/kg**	**5 j mg/kg**	**27 mg/kg**	**15 mg/kg**
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	0.11 mg/kg	**45 j mg/kg**	0.011 j mg/kg	**96 mg/kg**	**110 mg/kg**	**23 mg/kg**	**7.7 j mg/kg**	**26 mg/kg**	**11 mg/kg**
Benzo(b)fluoranthene	NA	Lab			0.1 j mg/kg	33 j mg/kg	0.0090 mg/kg	70 mg/kg	81 mg/kg	13 mg/kg	7.5 mg/kg	15 mg/kg	13 mg/kg
Benzo(g,h,i)perylene	NA	Lab			0.061 mg/kg	26 j mg/kg	0.0067 j mg/kg	250 mg/kg	310 mg/kg	59 mg/kg	25 j mg/kg	67 mg/kg	6 mg/kg
Benzo(k)fluoranthene	NA	Lab			0.11 mg/kg	43 j mg/kg	0.013 mg/kg	86 mg/kg	100 mg/kg	20 mg/kg	5.2 j mg/kg	23 mg/kg	9.1 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	**0.42 mg/kg**	**42 j mg/kg**	0.021 mg/kg	**140 mg/kg**	**170 mg/kg**	**34 mg/kg**	**7.1 mg/kg**	**39 mg/kg**	**15 mg/kg**
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	0.018 mg/kg	**4.1 j mg/kg**	< 0.0045 mg/kg	**79 mg/kg**	**100 mg/kg**	**17 mg/kg**	**8.3 mg/kg**	**22 mg/kg**	**2.2 mg/kg**
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	0.18 mg/kg	**130 j mg/kg**	0.077 mg/kg	**320 mg/kg**	**490 mg/kg**	**60 mg/kg**	**12 mg/kg**	**89 mg/kg**	**45 mg/kg**
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	0.017 mg/kg	**20 j mg/kg**	0.018 mg/kg	**48 j mg/kg**	**86 mg/kg**	**5.4 mg/kg**	**1.3 j mg/kg**	**8.7 j mg/kg**	**8.9 mg/kg**
Indeno(1,2,3-cd)pyrene	NA	Lab			0.044 mg/kg	31 j mg/kg	0.0073 mg/kg	130 mg/kg	160 mg/kg	30 mg/kg	12 mg/kg	34 mg/kg	6.6 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	< 0.0064 mg/kg	**0.42 mg/kg**	< 0.0045 mg/kg	**7.8 mg/kg**	**7.2 j mg/kg**	**0.83 mg/kg**	**0.28 mg/kg**	**0.96 mg/kg**	**1.2 mg/kg**
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	0.0099 mg/kg	**0.86 j mg/kg**	< 0.0045 mg/kg	**5.1 mg/kg**	**1.6 mg/kg**	**1.4 mg/kg**	**1.5 j mg/kg**	**1.2 mg/kg**	**1.1 mg/kg**
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	0.08 mg/kg	**65 j mg/kg**	0.04 mg/kg	**260 mg/kg**	**460 mg/kg**	**45 mg/kg**	**8.8 mg/kg**	**56 mg/kg**	**38 mg/kg**
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	**0.49 mg/kg**	**110 j mg/kg**	0.052 mg/kg	**180 mg/kg**	**220 mg/kg**	**36 mg/kg**	**8.2 mg/kg**	**50 mg/kg**	**20 mg/kg**
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	**1.78 mg/kg**	**534 a mg/kg**	0.301 a mg/kg	**1420 a mg/kg**	**2060 a mg/kg**	**271 a mg/kg**	**66.4 a mg/kg**	**352 a mg/kg**	**177 mg/kg**
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	0.0774 mg/kg	**23.2 mg/kg**	0.0131 mg/kg	**61.6 mg/kg**	**89.5 mg/kg**	**11.8 mg/kg**	**2.89 mg/kg**	**15.3 mg/kg**	**7.69 mg/kg**
1-Methylnaphthalene	NA	Lab			--	--	--	3.9 mg/kg	4 mg/kg	0.21 j mg/kg	0.13 mg/kg	0.46 mg/kg	--
Benzo(e)pyrene	NA	Lab			--	--	--	54 mg/kg	66 mg/kg	13 mg/kg	3.2 j mg/kg	15 mg/kg	--
Perylene	NA	Lab			--	--	--	22 j mg/kg	16 j mg/kg	3 mg/kg	1.1 j mg/kg	5.1 j mg/kg	--
C1-Chrysenes	NA	Lab			--	--	--	13 X mg/kg	47 X mg/kg	5 X mg/kg	1.7 X mg/kg	7.7 X mg/kg	--
C1-Fluoranthenes/Pyrenes	NA	Lab			--	--	--	79 X mg/kg	120 X mg/kg	18 X mg/kg	5.7 X mg/kg	32 X mg/kg	--
C1-Fluorenes	NA	Lab			--	--	--	3.9 X mg/kg	3.7 X mg/kg	1.3 X mg/kg	0.42 X mg/kg	1.3 X mg/kg	--
C1-Naphthalenes	NA	Lab			--	--	--	5.7 X mg/kg	5 X mg/kg	0.5 X mg/kg	0.21 X mg/kg	0.62 X mg/kg	--
C1-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	39 X mg/kg	50 X mg/kg	7.5 X mg/kg	2.3 X mg/kg	12 X mg/kg	--
C2-Chrysenes	NA	Lab			--	--	--	6.7 X mg/kg	20 X mg/kg	3.1 X mg/kg	1.1 X mg/kg	4.3 X mg/kg	--
C2-Fluorenes	NA	Lab			--	--	--	1.8 X mg/kg	2.1 X mg/kg	0.68 X mg/kg	0.31 X mg/kg	0.18 X mg/kg	--
C2-Naphthalenes	NA	Lab			--	--	--	6.7 X mg/kg	6.5 X mg/kg	0.62 X mg/kg	0.19 X mg/kg	0.98 X mg/kg	--
C2-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	13 X mg/kg	18 X mg/kg	3.5 X mg/kg	1.2 X mg/kg	4.9 X mg/kg	--
C3-Chrysenes	NA	Lab			--	--	--	2.7 X mg/kg	7.9 X mg/kg	1.5 X mg/kg	0.56 X mg/kg	1.9 X mg/kg	--
C3-Fluorenes	NA	Lab			--	--	--	0.85 X mg/kg	1.1 X mg/kg	0.065 X mg/kg	0.25 X mg/kg	0.67 X mg/kg	--
C3-Naphthalenes	NA	Lab			--	--	--	4 X mg/kg	3.7 X mg/kg	0.54 X mg/kg	0.23 X mg/kg	0.72 X mg/kg	--
C3-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	4.6 X mg/kg	6.4 X mg/kg	1.5 X mg/kg	0.64 X mg/kg	1.9 X mg/kg	--
C4-Chrysenes	NA	Lab			--	--	--	0.81 X mg/kg	2.3 X mg/kg	0.56 X mg/kg	0.22 X mg/kg	0.63 X mg/kg	--
C4-Napthalenes	NA	Lab			--	--	--	0.85 X mg/kg	0.69 X mg/kg	0.22 X mg/kg	0.13 X mg/kg	0.22 X mg/kg	--
C4-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	0.022 X mg/kg	1.6 X mg/kg	0.49 X mg/kg	0.28 X mg/kg	0.56 X mg/kg	--
Sum of ESBPAH17@ 0.5DL	NA	Lab			2.1 a mg/kg	667 a mg/kg	0.337 a mg/kg	1950 a mg/kg	2710 a mg/kg	393 a mg/kg	116 a mg/kg	491 a mg/kg	212 mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.048 a tu	9.1 a tu	0.065 a tu	21.3 a BQX tu	30.4 a BQX tu	4.1 a tu	1.6 a tu	5.2 a tu	2.47 a BQX tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			--	--	--	2200 a mg/kg	3080 a mg/kg	453 a mg/kg	136 a mg/kg	580 a mg/kg	--
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [1]		--	--	--	**23.9 a BQX tu**	**34.2 a BQX tu**	**4.73 a tu**	**1.82 a tu**	**6.13 a tu**	--
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [1]		0.339 a tu	**15.8 a tu**	0.368 a tu	--	--	--	--	--	**4.48 a BQX tu**

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II	UC-76	UC-77	UC-77	UC-77	UC-78	UC-78	UC-78	UC-79	UC-79
Sys Loc Code					UC-76	UC-77	UC-77	UC-77	UC-78	UC-78	UC-78	UC-79	UC-79
Sample Date					6/8/2011	6/9/2011	6/9/2011	6/9/2011	6/9/2011	6/9/2011	6/9/2011	6/9/2011	6/9/2011
Depth Interval					1 - 1.5 ft	0 - 0.5 ft	0.5 - 1 ft	1 - 1.5 ft	0 - 0.5 ft	0.5 - 1 ft	1 - 1.7 ft	0 - 0.5 ft	0.5 - 1 ft
Sys Sample Code					UC-76-3_1.0-1.5_06082011	UC-77-1_0.0-0.5_06092011	UC-77-2_0.5-1.0_06092011	UC-77-3_1.0-1.5_06092011	UC-78-1_0.0-0.5_06092011	UC-78-2_0.5-1.0_06092011	UC-78-3_1.0-1.7_06092011	UC-79-1_0.0-0.5_06092011	UC-79-2_0.5-1.0_06092011
Sample Type Code					N	N	N	N	N	N	N	N	N
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
SVOCs													
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	**0.052 mg/kg**	**0.059 j mg/kg**	**0.014 j mg/kg**	**0.15 j mg/kg**	**0.081 j mg/kg**	**0.24 mg/kg**	**0.42 mg/kg**	**0.62 j mg/kg**	**0.17 mg/kg**
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	**0.51 mg/kg**	**0.9 j mg/kg**	**0.11 mg/kg**	**4.9 j mg/kg**	**1.4 j mg/kg**	**2.6 mg/kg**	**6.4 mg/kg**	**6.4 j mg/kg**	**1.4 mg/kg**
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	**1.4 mg/kg**	**1.7 j mg/kg**	**0.23 mg/kg**	**14 mg/kg**	**2.8 j mg/kg**	**8.2 mg/kg**	**15 mg/kg**	**46 mg/kg**	**4.4 mg/kg**
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	**2.5 mg/kg**	**3.8 j mg/kg**	**0.68 j mg/kg**	**11 mg/kg**	**6.9 mg/kg**	**14 mg/kg**	**16 mg/kg**	**30 mg/kg**	**6.4 mg/kg**
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	**2.3 mg/kg**	**7 j mg/kg**	**0.31 j mg/kg**	**12 j mg/kg**	**8.2 j mg/kg**	**12 mg/kg**	**13 mg/kg**	**32 mg/kg**	**4.3 mg/kg**
Benzo(b)fluoranthene	NA	Lab			2.2 mg/kg	< 5.5 mg/kg	0.29 mg/kg	11 mg/kg	6 mg/kg	10 mg/kg	11 mg/kg	33 mg/kg	3.6 mg/kg
Benzo(g,h,i)perylene	NA	Lab			1.4 mg/kg	22 j mg/kg	2.1 mg/kg	28 j mg/kg	23 j mg/kg	6.1 mg/kg	7 mg/kg	94 mg/kg	2.3 mg/kg
Benzo(k)fluoranthene	NA	Lab			1.8 mg/kg	2.7 j mg/kg	0.34 mg/kg	9.2 mg/kg	6.1 mg/kg	8.8 mg/kg	9.9 mg/kg	29 mg/kg	3.6 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	**2.5 mg/kg**	**6.5 mg/kg**	**0.39 mg/kg**	**15 mg/kg**	**9.5 mg/kg**	**13 mg/kg**	**15 mg/kg**	**46 mg/kg**	**6.2 mg/kg**
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	**0.44 mg/kg**	**12 mg/kg**	**0.18 mg/kg**	**9.6 mg/kg**	**7.9 mg/kg**	**1.5 mg/kg**	**2.1 mg/kg**	**43 mg/kg**	**0.79 j mg/kg**
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	**8.1 mg/kg**	**11 mg/kg**	**0.79 mg/kg**	**37 mg/kg**	**16 mg/kg**	**43 mg/kg**	**48 mg/kg**	**95 mg/kg**	**17 mg/kg**
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	**0.54 mg/kg**	**0.41 mg/kg**	0.072 mg/kg	**2.6 j mg/kg**	**0.96 j mg/kg**	**2.9 mg/kg**	**8 mg/kg**	**13 j mg/kg**	**2.2 mg/kg**
Indeno(1,2,3-cd)pyrene	NA	Lab			1.4 mg/kg	12 mg/kg	0.3 mg/kg	14 mg/kg	11 mg/kg	6.7 mg/kg	7.5 mg/kg	48 mg/kg	2.4 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	**0.26 mg/kg**	**0.088 mg/kg**	**0.022 mg/kg**	**0.29 mg/kg**	**0.2 mg/kg**	**0.45 mg/kg**	**1.5 mg/kg**	**1.7 mg/kg**	**0.5 mg/kg**
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	**0.68 mg/kg**	**0.23 mg/kg**	0.074 mg/kg	**0.33 mg/kg**	**0.47 mg/kg**	**0.99 mg/kg**	**1.9 mg/kg**	**2 mg/kg**	**0.98 mg/kg**
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	**4 mg/kg**	**5.3 j mg/kg**	**0.44 mg/kg**	**30 mg/kg**	**7.9 mg/kg**	**26 mg/kg**	**42 mg/kg**	**86 mg/kg**	**15 mg/kg**
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	**4.2 mg/kg**	**7.2 mg/kg**	**0.39 mg/kg**	**19 mg/kg**	**11 mg/kg**	**22 mg/kg**	**23 mg/kg**	**56 mg/kg**	**9.2 mg/kg**
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	**27.5 mg/kg**	**56.2 a mg/kg**	**3.7 a mg/kg**	**156 a mg/kg**	**73.3 a mg/kg**	**147 mg/kg**	**192 mg/kg**	**458 a mg/kg**	**68.5 a mg/kg**
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	**1.19 mg/kg**	**2.44 mg/kg**	**0.161 mg/kg**	**6.78 mg/kg**	**3.19 mg/kg**	**6.39 mg/kg**	**8.36 mg/kg**	**19.9 mg/kg**	**2.98 mg/kg**
1-Methylnaphthalene	NA	Lab			--	0.019 j mg/kg	0.0064 mg/kg	0.12 mg/kg	0.089 mg/kg	--	--	0.94 mg/kg	--
Benzo(e)pyrene	NA	Lab			--	2.2 j mg/kg	0.17 mg/kg	6 mg/kg	4.9 j mg/kg	--	--	10 j mg/kg	--
Perylene	NA	Lab			--	0.81 j mg/kg	0.11 mg/kg	1.3 j mg/kg	1.4 j mg/kg	--	--	4 mg/kg	--
C1-Chrysenes	NA	Lab			--	1.4 X mg/kg	0.17 X mg/kg	1.9 X mg/kg	2.4 X mg/kg	--	--	6.8 X mg/kg	--
C1-Fluoranthenes/Pyrenes	NA	Lab			--	4 X mg/kg	0.27 X mg/kg	7.7 X mg/kg	8.2 X mg/kg	--	--	28 X mg/kg	--
C1-Fluorenes	NA	Lab			--	0.14 X mg/kg	0.018 X mg/kg	0.51 X mg/kg	0.3 X mg/kg	--	--	1.4 X mg/kg	--
C1-Naphthalenes	NA	Lab			--	0.062 X mg/kg	0.018 X mg/kg	0.21 X mg/kg	0.15 X mg/kg	--	--	1.2 X mg/kg	--
C1-Phenanthrenes/Anthracenes	NA	Lab			--	1.3 X mg/kg	0.1 X mg/kg	3.2 X mg/kg	2.7 X mg/kg	--	--	12 X mg/kg	--
C2-Chrysenes	NA	Lab			--	0.85 X mg/kg	0.11 X mg/kg	1.1 X mg/kg	1.5 X mg/kg	--	--	3.9 X mg/kg	--
C2-Fluorenes	NA	Lab			--	0.15 X mg/kg	< 0.0049 X mg/kg	0.38 X mg/kg	0.41 X mg/kg	--	--	0.84 X mg/kg	--
C2-Naphthalenes	NA	Lab			--	0.067 X mg/kg	0.016 X mg/kg	0.27 X mg/kg	0.15 X mg/kg	--	--	1.6 X mg/kg	--
C2-Phenanthrenes/Anthracenes	NA	Lab			--	0.64 X mg/kg	0.059 X mg/kg	1.3 X mg/kg	1.4 X mg/kg	--	--	4.9 X mg/kg	--
C3-Chrysenes	NA	Lab			--	0.44 X mg/kg	0.084 X mg/kg	0.47 X mg/kg	0.67 X mg/kg	--	--	1.7 X mg/kg	--
C3-Fluorenes	NA	Lab			--	0.11 X mg/kg	0.023 X mg/kg	0.29 X mg/kg	0.35 X mg/kg	--	--	0.71 X mg/kg	--
C3-Naphthalenes	NA	Lab			--	0.07 X mg/kg	0.016 X mg/kg	0.23 X mg/kg	0.15 X mg/kg	--	--	0.88 X mg/kg	--
C3-Phenanthrenes/Anthracenes	NA	Lab			--	0.27 X mg/kg	0.032 X mg/kg	0.52 X mg/kg	0.66 X mg/kg	--	--	2 X mg/kg	--
C4-Chrysenes	NA	Lab			--	0.19 X mg/kg	< 0.0049 X mg/kg	0.15 X mg/kg	0.24 X mg/kg	--	--	0.48 X mg/kg	--
C4-Napthalenes	NA	Lab			--	0.043 X mg/kg	0.01 X mg/kg	0.11 X mg/kg	0.082 X mg/kg	--	--	0.25 X mg/kg	--
C4-Phenanthrenes/Anthracenes	NA	Lab			--	< 0.055 X mg/kg	< 0.0049 X mg/kg	0.14 X mg/kg	0.055 X mg/kg	--	--	0.26 X mg/kg	--
Sum of ESBPAH17@ 0.5DL	NA	Lab			34.3 mg/kg	95.7 a mg/kg	6.7 a mg/kg	218 a mg/kg	119 a mg/kg	178 mg/kg	228 mg/kg	662 a mg/kg	80.4 a mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.494 tu	1.3 a tu	0.157 a tu	9.7 a tu	1.6 a tu	2.9 tu	3.8 tu	7 a tu	1.7 a tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			--	108 a mg/kg	7.92 a mg/kg	244 a mg/kg	145 a mg/kg	--	--	741 a mg/kg	--
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [1]		--	**1.45 a tu**	0.185 a tu	**10.8 a tu**	**1.91 a tu**	--	--	**7.82 a tu**	--
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [1]		**1.1 a tu**	--	--	--	--	**5.21 a tu**	**6.75 a tu**	--	**3.16 a tu**

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

					Sys Loc Code	UC-80		UC-80	UC-81	UC-81	UC-81	UC-82	UC-82	UC-82
					Sample Date	6/10/2011		6/10/2011	6/10/2011	6/10/2011	6/10/2011	6/10/2011	6/10/2011	6/10/2011
					Depth Interval	0 - 0.5 ft	0 - 0.5 ft	0.5 - 1.3 ft	0 - 0.5 ft	0.5 - 1 ft	1 - 1.5 ft	0 - 0.5 ft	1 - 1.5 ft	2 - 2.5 ft
					Sys Sample Code	UC-80-1_0.0-0.5_06102011	UC-80-1_0.0-0.5_06102011_FD	UC-80-2_0.5-1.3_06102011	UC-81-1_0.0-0.5_06102011	UC-81-2_0.5-1.0_06102011	UC-81-3_1.0-1.5_06102011	UC-82-1_0.0-0.5_06102011	UC-82-2_1.0-1.5_06102011	UC-82-3_2.0-2.5_06102011
					Sample Type Code	N	FD	N	N	N	N	N	N	N
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II										
Effective Date			2/1/2007	2/1/2007										
Exceedance Key			**Bold**	Underline										
SVOCs														
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	**0.21 j mg/kg**	**0.69 mg/kg**	**0.35 mg/kg**	**0.25 j mg/kg**	**6.7 j mg/kg**	**8.7 j mg/kg**	**2.3 j mg/kg**	**8.1 mg/kg**	**0.51 mg/kg**
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	**10 j mg/kg**	**12 mg/kg**	**3.5 mg/kg**	**3.5 mg/kg**	**120 mg/kg**	**160 mg/kg**	**77 mg/kg**	**400 mg/kg**	**9.4 mg/kg**
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	**32 mg/kg**	**29 mg/kg**	**11 mg/kg**	**12 mg/kg**	**200 mg/kg**	**240 mg/kg**	**150 mg/kg**	**460 mg/kg**	**24 mg/kg**
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	**25 mg/kg**	**26 mg/kg**	**12 mg/kg**	**12 mg/kg**	**97 mg/kg**	**160 j mg/kg**	**94 mg/kg**	**340 mg/kg**	**28 mg/kg**
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	**22 mg/kg**	**18 mg/kg**	**9.7 mg/kg**	**12 j mg/kg**	**93 mg/kg**	**190 j mg/kg**	**96 mg/kg**	**320 mg/kg**	**21 mg/kg**
Benzo(b)fluoranthene	NA	Lab			24 mg/kg	15 mg/kg	8.8 mg/kg	13 mg/kg	53 mg/kg	140 mg/kg	53 j mg/kg	300 mg/kg	20 mg/kg
Benzo(g,h,i)perylene	NA	Lab			52 mg/kg	7.9 mg/kg	3.6 mg/kg	25 j mg/kg	240 mg/kg	400 mg/kg	260 mg/kg	220 mg/kg	12 mg/kg
Benzo(k)fluoranthene	NA	Lab			20 mg/kg	16 mg/kg	8.1 mg/kg	9.8 mg/kg	84 mg/kg	170 mg/kg	85 mg/kg	250 mg/kg	16 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	**36 mg/kg**	**25 mg/kg**	**11 mg/kg**	**17 mg/kg**	**140 mg/kg**	**250 mg/kg**	**130 mg/kg**	**350 mg/kg**	**26 mg/kg**
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	**18 mg/kg**	**3 j mg/kg**	**1.4 mg/kg**	**3.5 mg/kg**	**41 mg/kg**	**56 mg/kg**	**81 mg/kg**	**28 mg/kg**	**3.8 mg/kg**
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	**77 mg/kg**	**83 mg/kg**	**44 mg/kg**	**34 mg/kg**	**320 mg/kg**	**420 mg/kg**	**330 mg/kg**	**1400 mg/kg**	**76 mg/kg**
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	**13 mg/kg**	**23 mg/kg**	**6.7 mg/kg**	**3.9 mg/kg**	**130 mg/kg**	**170 mg/kg**	**69 mg/kg**	**370 mg/kg**	**15 mg/kg**
Indeno(1,2,3-cd)pyrene	NA	Lab			26 mg/kg	8.8 mg/kg	5.5 mg/kg	13 mg/kg	130 mg/kg	210 mg/kg	130 mg/kg	210 mg/kg	12 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	**1.6 mg/kg**	**3 mg/kg**	**1.1 mg/kg**	**1.5 mg/kg**	**90 mg/kg**	**110 mg/kg**	**13 j mg/kg**	**92 j mg/kg**	**2.9 mg/kg**
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	**2.8 mg/kg**	**4.7 mg/kg**	**3.1 mg/kg**	**1.9 mg/kg**	**200 mg/kg**	**310 mg/kg**	**69 mg/kg**	**610 mg/kg**	**8.5 mg/kg**
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	**70 mg/kg**	**92 mg/kg**	**39 mg/kg**	**27 mg/kg**	**410 mg/kg**	**520 mg/kg**	**330 mg/kg**	**1600 mg/kg**	**65 mg/kg**
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	**45 mg/kg**	**34 mg/kg**	**19 mg/kg**	**19 mg/kg**	**190 mg/kg**	**250 mg/kg**	**190 mg/kg**	**700 mg/kg**	**39 mg/kg**
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	**353 a mg/kg**	**353 a mg/kg**	**162 mg/kg**	**148 a mg/kg**	**2040 a mg/kg**	**2840 a mg/kg**	**1630 a mg/kg**	**6680 a mg/kg**	**319 mg/kg**
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	**15.3 mg/kg**	**15.4 mg/kg**	**7.04 mg/kg**	**6.42 mg/kg**	**88.6 mg/kg**	**124 mg/kg**	**70.9 mg/kg**	**290 mg/kg**	**13.9 mg/kg**
1-Methylnaphthalene	NA	Lab			0.53 mg/kg	--	--	0.68 mg/kg	37 mg/kg	48 mg/kg	5.1 mg/kg	--	--
Benzo(e)pyrene	NA	Lab			12 mg/kg	--	--	6.8 mg/kg	43 mg/kg	110 mg/kg	54 j mg/kg	--	--
Perylene	NA	Lab			2.4 mg/kg	--	--	1.8 mg/kg	19 mg/kg	28 mg/kg	14 j mg/kg	--	--
C1-Chrysenes	NA	Lab			5 X mg/kg	--	--	2.4 X mg/kg	32 X mg/kg	47 X mg/kg	7.4 X mg/kg	--	--
C1-Fluoranthenes/Pyrenes	NA	Lab			22 X mg/kg	--	--	11 X mg/kg	100 X mg/kg	120 X mg/kg	91 X mg/kg	--	--
C1-Fluorenes	NA	Lab			1.7 X mg/kg	--	--	0.61 X mg/kg	2.4 X mg/kg	3 X mg/kg	2 X mg/kg	--	--
C1-Naphthalenes	NA	Lab			0.81 X mg/kg	--	--	1.1 X mg/kg	42 X mg/kg	47 X mg/kg	7.4 X mg/kg	--	--
C1-Phenanthrenes/Anthracenes	NA	Lab			12 X mg/kg	--	--	3.9 X mg/kg	52 X mg/kg	57 X mg/kg	27 X mg/kg	--	--
C2-Chrysenes	NA	Lab			3.4 X mg/kg	--	--	1.4 X mg/kg	18 X mg/kg	28 X mg/kg	4.1 X mg/kg	--	--
C2-Fluorenes	NA	Lab			1.2 X mg/kg	--	--	0.39 X mg/kg	1.3 X mg/kg	1.9 X mg/kg	1.1 X mg/kg	--	--
C2-Naphthalenes	NA	Lab			1.2 X mg/kg	--	--	0.87 X mg/kg	19 X mg/kg	20 X mg/kg	3.1 X mg/kg	--	--
C2-Phenanthrenes/Anthracenes	NA	Lab			5.3 X mg/kg	--	--	1.6 X mg/kg	17 X mg/kg	21 X mg/kg	9 X mg/kg	--	--
C3-Chrysenes	NA	Lab			1.6 X mg/kg	--	--	0.59 X mg/kg	7.7 X mg/kg	11 X mg/kg	1.5 X mg/kg	--	--
C3-Fluorenes	NA	Lab			0.98 X mg/kg	--	--	0.4 X mg/kg	0.57 X mg/kg	0.77 X mg/kg	0.83 X mg/kg	--	--
C3-Naphthalenes	NA	Lab			1 X mg/kg	--	--	0.42 X mg/kg	6.9 X mg/kg	7.7 X mg/kg	1.5 X mg/kg	--	--
C3-Phenanthrenes/Anthracenes	NA	Lab			2.1 X mg/kg	--	--	0.65 X mg/kg	6.8 X mg/kg	7.7 X mg/kg	3.6 X mg/kg	--	--
C4-Chrysenes	NA	Lab			0.52 X mg/kg	--	--	0.21 X mg/kg	2.3 X mg/kg	3.3 X mg/kg	0.41 X mg/kg	--	--
C4-Napthalenes	NA	Lab			0.32 X mg/kg	--	--	0.11 X mg/kg	1.5 X mg/kg	1.4 X mg/kg	0.26 X mg/kg	--	--
C4-Phenanthrenes/Anthracenes	NA	Lab			0.56 X mg/kg	--	--	0.21 X mg/kg	1.6 X mg/kg	1.8 X mg/kg	0.87 X mg/kg	--	--
Sum of ESBPAH17@ 0.5DL	NA	Lab			475 a mg/kg	401 a mg/kg	188 mg/kg	208 a mg/kg	2540 a mg/kg	3760 a mg/kg	2160 a mg/kg	7660 a mg/kg	379 mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			7.3 a tu	8.6 a tu	2.2 tu	5.1 a tu	41.3 a tu	46.4 a BQX tu	43.3 a tu	123 a tu	4.49 a BQX tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			547 a mg/kg	--	--	241 a mg/kg	2830 a mg/kg	4170 a mg/kg	2380 a mg/kg	--	--
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		**8.37 a tu**	--	--	**5.91 a tu**	**44.7 a tu**	**50.1 a BQX tu**	**47.1 a tu**	--	--
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		--	**15 a tu**	**4.02 a tu**	--	--	--	--	**210 a tu**	**7.93 a BQX tu**

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

					Sys Loc Code	**UC-82**	**UC-83**	**UC-83**	**UC-83**	**UC-83**	**WM-84**	**WM-84**	**WM-84**
					Sample Date	**6/10/2011**	**6/13/2011**	**6/13/2011**	**6/13/2011**	**6/13/2011**	**6/13/2011**	**6/13/2011**	**6/13/2011**
					Depth Interval	**2.9 - 3.4 ft**	**0.5 - 1 ft**	**1 - 1.5 ft**	**2 - 2.5 ft**	**0 - 0.5 ft**	**0 - 0.5 ft**	**0.5 - 1 ft**	**0.5 - 1 ft**	**1 - 1.5 ft**
					Sys Sample Code	**UC-82-4_2.9-3.4_06102011**	**UC-83-2_0.5-1.0_06132011**	**UC-83-3_1.0-1.5_06132011**	**UC-83-4_2.0-2.5_06132011**	**UC-83-1_0.0-0.5_06132011**	**WM-84-1_0.0-0.5_06132011**	**WM-84-2_0.5-1.0_06132011**	**WM-84-2_0.5-1.0_06132011_FD**	**WM-84-3_1.0-1.5_06132011**
					Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**FD**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II										
Effective Date			2/1/2007	2/1/2007										
Exceedance Key			**Bold**	Underline										
SVOCs														
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg		**2.8 mg/kg**	**1 mg/kg**	**0.82 mg/kg**	**0.64 mg/kg**	**1.5 j mg/kg**	**0.35 mg/kg**	**4.2 mg/kg**	**6.5 mg/kg**	**25 mg/kg**
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg		**83 mg/kg**	**14 mg/kg**	**13 mg/kg**	**13 mg/kg**	**11 j mg/kg**	**0.1 mg/kg**	**0.45 mg/kg**	**0.65 mg/kg**	**4.3 mg/kg**
Anthracene	NA	Lab	**0.057 mg/kg**	0.085 mg/kg		**99 mg/kg**	**27 mg/kg**	**22 mg/kg**	**17 mg/kg**	**80 mg/kg**	**0.26 mg/kg**	**3 mg/kg**	**7.2 mg/kg**	**23 mg/kg**
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg		**71 mg/kg**	**29 mg/kg**	**24 mg/kg**	**20 mg/kg**	**54 mg/kg**	**0.29 mg/kg**	**2.3 mg/kg**	**3.7 mg/kg**	**16 mg/kg**
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg		**63 mg/kg**	**23 mg/kg**	**19 mg/kg**	**17 mg/kg**	**57 mg/kg**	**0.23 mg/kg**	**1.7 mg/kg**	**2.8 mg/kg**	**14 mg/kg**
Benzo(b)fluoranthene	NA	Lab				55 mg/kg	22 mg/kg	18 mg/kg	15 mg/kg	16 j mg/kg	0.19 mg/kg	1.2 mg/kg	3 mg/kg	16 mg/kg
Benzo(g,h,i)perylene	NA	Lab				32 mg/kg	13 mg/kg	10 mg/kg	11 mg/kg	180 mg/kg	0.37 mg/kg	2.7 mg/kg	14 mg/kg	40 mg/kg
Benzo(k)fluoranthene	NA	Lab				40 mg/kg	18 mg/kg	14 mg/kg	14 mg/kg	20 j mg/kg	0.18 mg/kg	1.5 mg/kg	3 mg/kg	13 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg		**71 mg/kg**	**26 mg/kg**	**22 mg/kg**	**19 mg/kg**	**82 mg/kg**	**0.69 mg/kg**	**2.3 mg/kg**	**3.8 mg/kg**	**17 mg/kg**
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg		**11 mg/kg**	**5.1 mg/kg**	**3.6 mg/kg**	**3.2 mg/kg**	**57 mg/kg**	**0.13 mg/kg**	**0.81 mg/kg**	**1.3 mg/kg**	**14 mg/kg**
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg		**280 mg/kg**	**89 mg/kg**	**85 mg/kg**	**61 mg/kg**	**170 mg/kg**	**0.93 mg/kg**	**10 mg/kg**	**14 mg/kg**	**71 mg/kg**
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg		**73 mg/kg**	**18 mg/kg**	**19 mg/kg**	**13 mg/kg**	**16 j mg/kg**	**0.3 mg/kg**	**3.4 mg/kg**	**5.9 mg/kg**	**23 mg/kg**
Indeno(1,2,3-cd)pyrene	NA	Lab				37 mg/kg	15 mg/kg	11 mg/kg	11 mg/kg	89 mg/kg	0.19 j mg/kg	6.8 mg/kg	2.5 j mg/kg	22 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg		**27 mg/kg**	**3.3 mg/kg**	**4.4 mg/kg**	**5.7 mg/kg**	**2.5 mg/kg**	**0.17 mg/kg**	**1.3 mg/kg**	**2.3 mg/kg**	**8.5 mg/kg**
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg		**180 mg/kg**	**8.5 mg/kg**	**11 mg/kg**	**24 mg/kg**	**3.8 mg/kg**	**0.37 mg/kg**	**6.3 mg/kg**	**17 mg/kg**	**64 mg/kg**
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg		**290 mg/kg**	**76 mg/kg**	**74 mg/kg**	**46 mg/kg**	**150 mg/kg**	**0.88 mg/kg**	**9.3 mg/kg**	**14 mg/kg**	**61 mg/kg**
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg		**130 mg/kg**	**42 mg/kg**	**36 mg/kg**	**30 mg/kg**	**99 mg/kg**	**0.81 mg/kg**	**7.6 mg/kg**	**8.9 mg/kg**	**34 mg/kg**
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg		**1380 mg/kg**	**362 mg/kg**	**334 mg/kg**	**270 mg/kg**	**784 a mg/kg**	**5.51 a mg/kg**	**52.7 mg/kg**	**88.1 a mg/kg**	**375 mg/kg**
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg		**60 mg/kg**	**15.7 mg/kg**	**14.5 mg/kg**	**11.7 mg/kg**	**34.1 mg/kg**	**0.24 mg/kg**	**2.29 mg/kg**	**3.83 mg/kg**	**16.3 mg/kg**
1-Methylnaphthalene	NA	Lab				--	--	--	--	1.7 mg/kg	0.14 mg/kg	1.1 mg/kg	1.7 mg/kg	6.6 mg/kg
Benzo(e)pyrene	NA	Lab				--	--	--	--	15 j mg/kg	0.16 mg/kg	0.81 mg/kg	1.2 mg/kg	7 mg/kg
Perylene	NA	Lab				--	--	--	--	6.4 mg/kg	0.05 mg/kg	0.55 mg/kg	0.65 mg/kg	5.4 mg/kg
C1-Chrysenes	NA	Lab				--	--	--	--	6.1 X mg/kg	0.4 X mg/kg	2 X mg/kg	4 X mg/kg	17 X mg/kg
C1-Fluoranthenes/Pyrenes	NA	Lab				--	--	--	--	58 X mg/kg	0.89 X mg/kg	4 X mg/kg	7 X mg/kg	18 X mg/kg
C1-Fluorenes	NA	Lab				--	--	--	--	1.7 X mg/kg	0.14 X mg/kg	0.53 X mg/kg	0.93 X mg/kg	1.5 X mg/kg
C1-Naphthalenes	NA	Lab				--	--	--	--	2 X mg/kg	0.18 X mg/kg	1.2 X mg/kg	2.2 X mg/kg	6.8 X mg/kg
C1-Phenanthrenes/Anthracenes	NA	Lab				--	--	--	--	17 X mg/kg	1.1 X mg/kg	4 X mg/kg	7.9 X mg/kg	14 X mg/kg
C2-Chrysenes	NA	Lab				--	--	--	--	3.8 X mg/kg	0.6 X mg/kg	1.7 X mg/kg	3.1 X mg/kg	13 X mg/kg
C2-Fluorenes	NA	Lab				--	--	--	--	1.1 X mg/kg	0.52 X mg/kg	0.83 X mg/kg	1.6 X mg/kg	1.4 X mg/kg
C2-Naphthalenes	NA	Lab				--	--	--	--	2.1 X mg/kg	0.18 X mg/kg	0.79 X mg/kg	1.5 X mg/kg	4.1 X mg/kg
C2-Phenanthrenes/Anthracenes	NA	Lab				--	--	--	--	7.3 X mg/kg	1.2 X mg/kg	3 X mg/kg	6.2 X mg/kg	8 X mg/kg
C3-Chrysenes	NA	Lab				--	--	--	--	1.5 X mg/kg	0.45 X mg/kg	1.2 X mg/kg	2 X mg/kg	6.9 X mg/kg
C3-Fluorenes	NA	Lab				--	--	--	--	0.91 X mg/kg	0.74 X mg/kg	1.3 X mg/kg	2.2 X mg/kg	2.2 X mg/kg
C3-Naphthalenes	NA	Lab				--	--	--	--	1.2 X mg/kg	0.39 X mg/kg	0.9 X mg/kg	1.9 X mg/kg	3.7 X mg/kg
C3-Phenanthrenes/Anthracenes	NA	Lab				--	--	--	--	3.1 X mg/kg	1.3 X mg/kg	2.2 X mg/kg	4 X mg/kg	5.8 X mg/kg
C4-Chrysenes	NA	Lab				--	--	--	--	0.47 X mg/kg	0.35 X mg/kg	0.5 X mg/kg	0.82 X mg/kg	3.2 X mg/kg
C4-Napthalenes	NA	Lab				--	--	--	--	0.33 X mg/kg	0.35 X mg/kg	0.74 X mg/kg	1.5 X mg/kg	2.3 X mg/kg
C4-Phenanthrenes/Anthracenes	NA	Lab				--	--	--	--	0.87 X mg/kg	1.2 X mg/kg	2.1 X mg/kg	3.7 X mg/kg	3.1 X mg/kg
Sum of ESBPAH17@ 0.5DL	NA	Lab				1540 mg/kg	430 mg/kg	387 mg/kg	321 mg/kg	1090 a mg/kg	6.4 a mg/kg	64.9 mg/kg	111 a mg/kg	466 mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab				22.7 tu	5.12 a BQX tu	4.72 a BQX tu	4.8 tu	11.6 a BQX tu	1.8 a tu	5.9 tu	11.8 a tu	30.4 tu
Sum of ESBPAH34@ 0.5DL	NA	Lab				--	--	--	--	1220 a mg/kg	16.5 a mg/kg	91.9 a mg/kg	161 a mg/kg	581 a mg/kg
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]			--	--	--	--	**12.9 a BQX tu**	**4.07 a tu**	**7.93 a tu**	**16.1 a tu**	**36.3 a tu**
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]			**39.1 a tu**	**9.01 a BQX tu**	**8.32 a BQX tu**	**8.46 a tu**	--	--	--	--	--

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

					Sys Loc Code	**WM-85**	**WM-85**	**WM-85**	**WM-85**	**WM-86**	**WM-86**	**WM-86**	**WM-87**	**WM-87**
					Sample Date	**6/13/2011**	**6/13/2011**	**6/13/2011**	**6/13/2011**	**6/15/2011**	**6/15/2011**	**6/15/2011**	**6/15/2011**	**6/15/2011**
					Depth Interval	**0 - 0.5 ft**	**1 - 1.5 ft**	**2 - 2.5 ft**	**2.9 - 3.4 ft**	**0 - 0.5 ft**	**0.5 - 1 ft**	**1 - 1.5 ft**	**0 - 0.5 ft**	**0.5 - 1 ft**
					Sys Sample Code	**WM-85-1_0.0-0.5_06132011**	**WM-85-2_1.0-1.5_06132011**	**WM-85-3_2.0-2.5_06132011**	**WM-85-4_2.9-3.4_06132011**	**WM-86-1_0.0-0.5_06152011**	**WM-86-2_0.5-1.0_06152011**	**WM-86-3_1.0-1.5_06152011**	**WM-87-1_0.0-0.5_06152011**	**WM-87-2_0.5-1.0_06152011**
					Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II										
Effective Date			2/1/2007	2/1/2007										
Exceedance Key			**Bold**	Underline										
SVOCs														
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	**0.011 j mg/kg**	< 0.012 mg/kg	< 0.0054 mg/kg	< 0.0051 mg/kg	**8.3 mg/kg**	< 0.018 mg/kg	< 0.022 mg/kg	< 0.028 mg/kg	< 0.033 j mg/kg
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	**0.09 mg/kg**	< 0.012 mg/kg	**0.0060 mg/kg**	**0.018 mg/kg**	**0.55 mg/kg**	**0.032 mg/kg**	< 0.022 mg/kg	**0.028 mg/kg**	< 0.033 j mg/kg
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	**0.093 mg/kg**	< 0.012 mg/kg	< 0.0054 mg/kg	0.0067 mg/kg	**7.6 mg/kg**	0.032 mg/kg	< 0.022 mg/kg	0.018 j mg/kg	< 0.033 j mg/kg
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	**0.44 mg/kg**	0.033 mg/kg	0.013 mg/kg	0.068 mg/kg	**5.3 j mg/kg**	0.088 mg/kg	< 0.022 mg/kg	0.046 mg/kg	< 0.033 j mg/kg
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	**0.38 mg/kg**	0.023 mg/kg	0.0097 mg/kg	0.032 mg/kg	**5.2 j mg/kg**	0.11 mg/kg	< 0.022 mg/kg	0.054 mg/kg	< 0.033 j mg/kg
Benzo(b)fluoranthene	NA	Lab			0.32 mg/kg	0.027 mg/kg	0.0094 mg/kg	0.031 mg/kg	6.6 j mg/kg	0.083 mg/kg	< 0.022 mg/kg	0.032 mg/kg	< 0.033 j mg/kg
Benzo(g,h,i)perylene	NA	Lab			0.71 mg/kg	0.036 mg/kg	0.017 mg/kg	0.04 mg/kg	11 j mg/kg	0.12 mg/kg	< 0.022 mg/kg	0.16 mg/kg	< 0.033 j mg/kg
Benzo(k)fluoranthene	NA	Lab			0.35 mg/kg	0.016 mg/kg	0.0071 mg/kg	0.026 mg/kg	2.8 j mg/kg	0.069 mg/kg	< 0.022 mg/kg	0.043 mg/kg	< 0.033 j mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	**0.56 mg/kg**	0.038 mg/kg	0.016 mg/kg	0.084 mg/kg	**6.9 j mg/kg**	0.099 mg/kg	0.022 j mg/kg	0.061 mg/kg	0.041 j mg/kg
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	**0.25 mg/kg**	< 0.012 mg/kg	< 0.0054 mg/kg	0.015 mg/kg	**4.2 j mg/kg**	< 0.018 mg/kg	< 0.022 mg/kg	**0.046 mg/kg**	< 0.033 j mg/kg
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	**0.7 mg/kg**	0.027 mg/kg	0.012 mg/kg	0.094 mg/kg	**15 j mg/kg**	0.24 mg/kg	0.04 mg/kg	0.072 mg/kg	0.052 j mg/kg
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	0.026 mg/kg	< 0.012 mg/kg	< 0.0054 mg/kg	< 0.0051 mg/kg	**7.3 mg/kg**	< 0.018 mg/kg	< 0.022 mg/kg	< 0.028 mg/kg	< 0.033 j mg/kg
Indeno(1,2,3-cd)pyrene	NA	Lab			0.4 j mg/kg	0.018 mg/kg	0.0088 mg/kg	0.022 mg/kg	6 j mg/kg	0.07 mg/kg	< 0.022 mg/kg	0.087 mg/kg	< 0.033 j mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	**0.022 mg/kg**	< 0.012 mg/kg	< 0.0054 mg/kg	< 0.0051 mg/kg	**2.3 j mg/kg**	< 0.018 mg/kg	< 0.022 mg/kg	**0.023 j mg/kg**	< 0.033 j mg/kg
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	0.069 mg/kg	< 0.012 mg/kg	< 0.0054 mg/kg	0.0054 mg/kg	**20 mg/kg**	< 0.018 mg/kg	< 0.022 mg/kg	0.077 mg/kg	< 0.033 j mg/kg
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	**0.21 mg/kg**	< 0.012 mg/kg	< 0.0054 mg/kg	0.019 mg/kg	**15 j mg/kg**	0.12 mg/kg	0.026 mg/kg	0.048 mg/kg	< 0.033 j mg/kg
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	**0.55 mg/kg**	0.023 mg/kg	0.011 mg/kg	0.047 mg/kg	**11 j mg/kg**	0.12 mg/kg	0.027 mg/kg	0.051 mg/kg	0.042 j mg/kg
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	**3.4 a mg/kg**	0.192 mg/kg	0.0866 mg/kg	0.397 mg/kg	**109 a mg/kg**	0.886 mg/kg	0.214 a mg/kg	0.552 a mg/kg	0.305 a mg/kg
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	**0.148 mg/kg**	0.00835 mg/kg	0.00377 mg/kg	0.0173 mg/kg	**4.72 mg/kg**	0.0385 mg/kg	0.0093 mg/kg	0.024 mg/kg	0.0133 mg/kg
1-Methylnaphthalene	NA	Lab			< 0.012 mg/kg	--	--	--	1.4 j mg/kg	--	--	< 0.028 mg/kg	--
Benzo(e)pyrene	NA	Lab			0.27 mg/kg	--	--	--	1.4 j mg/kg	--	--	0.039 mg/kg	--
Perylene	NA	Lab			0.12 mg/kg	--	--	--	0.56 mg/kg	--	--	0.068 mg/kg	--
C1-Chrysenes	NA	Lab			0.44 X mg/kg	--	--	--	4.8 X mg/kg	--	--	0.099 X mg/kg	--
C1-Fluoranthenes/Pyrenes	NA	Lab			0.72 X mg/kg	--	--	--	7 X mg/kg	--	--	0.079 X mg/kg	--
C1-Fluorenes	NA	Lab			0.05 X mg/kg	--	--	--	1 X mg/kg	--	--	0.015 X mg/kg	--
C1-Naphthalenes	NA	Lab			0.023 X mg/kg	--	--	--	2 X mg/kg	--	--	0.018 X mg/kg	--
C1-Phenanthrenes/Anthracenes	NA	Lab			0.28 X mg/kg	--	--	--	7.3 X mg/kg	--	--	0.062 X mg/kg	--
C2-Chrysenes	NA	Lab			0.52 X mg/kg	--	--	--	3.5 X mg/kg	--	--	< 0.028 X mg/kg	--
C2-Fluorenes	NA	Lab			0.061 X mg/kg	--	--	--	1.9 X mg/kg	--	--	< 0.028 X mg/kg	--
C2-Naphthalenes	NA	Lab			0.028 X mg/kg	--	--	--	1.4 X mg/kg	--	--	0.024 X mg/kg	--
C2-Phenanthrenes/Anthracenes	NA	Lab			0.24 X mg/kg	--	--	--	5.6 X mg/kg	--	--	0.06 X mg/kg	--
C3-Chrysenes	NA	Lab			0.56 X mg/kg	--	--	--	2.9 X mg/kg	--	--	0.016 X mg/kg	--
C3-Fluorenes	NA	Lab			0.28 X mg/kg	--	--	--	3.1 X mg/kg	--	--	< 0.028 X mg/kg	--
C3-Naphthalenes	NA	Lab			0.044 X mg/kg	--	--	--	1.8 X mg/kg	--	--	0.04 X mg/kg	--
C3-Phenanthrenes/Anthracenes	NA	Lab			0.59 X mg/kg	--	--	--	4.7 X mg/kg	--	--	0.13 X mg/kg	--
C4-Chrysenes	NA	Lab			0.33 X mg/kg	--	--	--	1.7 X mg/kg	--	--	< 0.028 X mg/kg	--
C4-Napthalenes	NA	Lab			0.062 X mg/kg	--	--	--	1.5 X mg/kg	--	--	0.037 X mg/kg	--
C4-Phenanthrenes/Anthracenes	NA	Lab			0.33 X mg/kg	--	--	--	5.1 X mg/kg	--	--	0.073 X mg/kg	--
Sum of ESBPAH17@ 0.5DL	NA	Lab			5.2 a mg/kg	0.289 mg/kg	0.129 mg/kg	0.516 mg/kg	135 a mg/kg	1.2 mg/kg	0.258 a mg/kg	0.874 a mg/kg	0.373 a mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.052 a BQX tu	0.003 a BQX tu	0.004 tu	0.013 tu	1.77 a BQX tu	0.013 a BQX tu	0.0032 a BQX	0.0098 a BQX tu	0.0045 a BQX tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			10.1 a mg/kg	--	--	--	190 a mg/kg	--	--	1.67 a mg/kg	--
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		0.099 a BQX tu	--	--	--	**2.34 a BQX tu**	--	--	0.018 a BQX tu	--
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		--	0.260 a BQX tu	0.264 a tu	0.279 a tu	--	0.280 a BQX tu	0.260 aBQX	--	0.260 a BQX tu

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

					Sys Loc Code	**WM-88**	**WM-88**		**WM-88**	**WM-88**	**WM-89**	**WM-89**	**WM-89**	**WM-89**
					Sample Date	**11/15/2011**	**11/15/2011**		**11/15/2011**	**11/15/2011**	**11/15/2011**	**11/15/2011**	**11/15/2011**	**11/15/2011**
					Depth Interval	**0 - 0.5 ft**	**2 - 2.5 ft**	**2 - 2.5 ft**	**3.25 - 3.75 ft**	**4 - 4.5 ft**	**0 - 0.5 ft**	**2 - 2.5 ft**	**3.5 - 4 ft**	**5 - 5.5 ft**
					Sys Sample Code	**WM-88-1_0.0-0.5_11152011**	**WM-88-2_2.0-2.5_11152011**	**WM-88-2_2.0-2.5_11152011_FD**	**WM-88-3_3.25-3.75_11152011**	**WM-88-4_4.0-4.5_11152011**	**WM-89-1_0.0-0.5_11152011**	**WM-89-2_2.0-2.5_11152011**	**WM-89-3_3.5-4.0_11152011**	**WM-89-4_5.0-5.5_11152011**
					Sample Type Code	**N**	**N**	**FD**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II										
Effective Date			2/1/2007	2/1/2007										
Exceedance Key			**Bold**	Underline										
SVOCs														
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	< 0.012 j mg/kg	**0.011 mg/kg**	**0.019 mg/kg**	< 0.46 mg/kg	< 0.13 mg/kg	< 0.01 mg/kg	**0.013 mg/kg**	**0.79 mg/kg**	< 0.0088 mg/kg
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	< 0.012 j mg/kg	**0.012 mg/kg**	**0.018 mg/kg**	**0.061 mg/kg**	**0.017 mg/kg**	< 0.01 mg/kg	**0.012 mg/kg**	< 0.15 mg/kg	< 0.0088 mg/kg
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	< 0.012 j mg/kg	0.03 mg/kg	0.052 mg/kg	**0.85 mg/kg**	**0.19 mg/kg**	< 0.01 mg/kg	0.029 mg/kg	**1.2 mg/kg**	< 0.0088 mg/kg
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	0.011 j mg/kg	0.055 mg/kg	0.074 mg/kg	**1.2 mg/kg**	**0.24 mg/kg**	< 0.01 mg/kg	0.08 mg/kg	**1.3 mg/kg**	< 0.0088 mg/kg
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	0.013 j mg/kg	0.056 mg/kg	0.077 mg/kg	**1.1 mg/kg**	**0.23 mg/kg**	< 0.01 mg/kg	0.07 mg/kg	**1.2 mg/kg**	< 0.0088 mg/kg
Benzo(b)fluoranthene	NA	Lab			0.018 j mg/kg	0.068 mg/kg	0.077 mg/kg	1.3 mg/kg	0.27 mg/kg	0.011 mg/kg	0.077 mg/kg	1.7 mg/kg	< 0.0088 mg/kg
Benzo(g,h,i)perylene	NA	Lab			< 0.012 j mg/kg	0.03 mg/kg	0.036 mg/kg	0.61 mg/kg	0.13 j mg/kg	< 0.01 mg/kg	0.045 mg/kg	1.1 mg/kg	< 0.0088 mg/kg
Benzo(k)fluoranthene	NA	Lab			< 0.012 j mg/kg	0.022 mg/kg	0.034 mg/kg	0.53 mg/kg	0.11 j mg/kg	< 0.01 mg/kg	0.029 mg/kg	1.4 mg/kg	< 0.0088 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	0.013 j mg/kg	0.059 mg/kg	0.082 mg/kg	**0.86 mg/kg**	**0.18 mg/kg**	< 0.01 mg/kg	0.088 mg/kg	**1.2 mg/kg**	< 0.0088 mg/kg
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	< 0.012 j mg/kg	0.011 mg/kg	0.015 mg/kg	< 0.46 mg/kg	**0.044 mg/kg**	< 0.01 mg/kg	0.013 mg/kg	**0.29 mg/kg**	< 0.0088 mg/kg
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	0.021 j mg/kg	0.094 mg/kg	0.14 mg/kg	**2.3 mg/kg**	**0.53 mg/kg**	0.012 mg/kg	0.15 mg/kg	**4.3 mg/kg**	0.011 mg/kg
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	< 0.012 j mg/kg	0.015 mg/kg	0.022 mg/kg	< 0.46 mg/kg	< 0.13 mg/kg	< 0.01 mg/kg	0.02 mg/kg	**1.2 mg/kg**	< 0.0088 mg/kg
Indeno(1,2,3-cd)pyrene	NA	Lab			< 0.012 j mg/kg	0.023 mg/kg	0.03 mg/kg	0.65 mg/kg	0.13 mg/kg	< 0.01 mg/kg	0.034 mg/kg	1.1 mg/kg	< 0.0088 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	< 0.012 j mg/kg	< 0.0096 mg/kg	0.011 mg/kg	**0.055 mg/kg**	0.017 mg/kg	< 0.01 mg/kg	0.011 mg/kg	**0.21 mg/kg**	< 0.0088 mg/kg
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	0.017 j mg/kg	0.027 mg/kg	0.051 mg/kg	< 0.46 mg/kg	0.044 mg/kg	0.012 mg/kg	0.033 mg/kg	**0.35 mg/kg**	< 0.0088 mg/kg
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	< 0.012 j mg/kg	0.075 mg/kg	0.094 mg/kg	**1.5 mg/kg**	**0.34 mg/kg**	< 0.01 mg/kg	0.098 mg/kg	**3.8 mg/kg**	0.01 mg/kg
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	0.018 j mg/kg	0.073 mg/kg	0.12 mg/kg	**1.8 j mg/kg**	**0.45 mg/kg**	0.0099 j mg/kg	0.12 mg/kg	**4.3 mg/kg**	0.014 mg/kg
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	0.135 a mg/kg	0.523 mg/kg	0.775 mg/kg	**10.6 a mg/kg**	**2.41 a mg/kg**	0.0839 a mg/kg	0.737 mg/kg	**20.2 mg/kg**	0.079 mg/kg
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	0.00587 mg/kg	0.0227 mg/kg	0.0337 mg/kg	**0.463 mg/kg**	**0.105 mg/kg**	0.00365 mg/kg	0.032 mg/kg	**0.879 mg/kg**	0.00343 mg/kg
1-Methylnaphthalene	NA	Lab			< 0.012 j mg/kg	< 0.0096 mg/kg	< 0.0093 mg/kg	0.043 mg/kg	0.012 mg/kg	< 0.01 mg/kg	--	--	--
Benzo(e)pyrene	NA	Lab			< 0.012 j mg/kg	0.043 mg/kg	0.056 mg/kg	0.44 j mg/kg	< 0.13 mg/kg	< 0.01 mg/kg	--	--	--
Perylene	NA	Lab			< 0.012 j mg/kg	0.014 mg/kg	0.022 mg/kg	< 0.46 mg/kg	< 0.13 mg/kg	< 0.01 mg/kg	--	--	--
C1-Chrysenes	NA	Lab			< 0.012 X mg/kg	0.058 X mg/kg	0.083 X mg/kg	0.38 X mg/kg	0.11 X mg/kg	< 0.01 X mg/kg	--	--	--
C1-Fluoranthenes/Pyrenes	NA	Lab			0.012 X mg/kg	0.088 X mg/kg	0.18 X mg/kg	2.1 X mg/kg	0.4 X mg/kg	< 0.01 X mg/kg	--	--	--
C1-Fluorenes	NA	Lab			< 0.012 X mg/kg	0.019 X mg/kg	0.033 X mg/kg	0.21 X mg/kg	0.051 X mg/kg	< 0.01 X mg/kg	--	--	--
C1-Naphthalenes	NA	Lab			< 0.012 X mg/kg	< 0.0096 X mg/kg	0.012 X mg/kg	0.053 X mg/kg	0.012 X mg/kg	< 0.01 X mg/kg	--	--	--
C1-Phenanthrenes/Anthracenes	NA	Lab			< 0.012 X mg/kg	0.09 X mg/kg	0.17 X mg/kg	0.98 X mg/kg	0.23 X mg/kg	< 0.01 X mg/kg	--	--	--
C2-Chrysenes	NA	Lab			< 0.012 X mg/kg	0.055 X mg/kg	0.11 X mg/kg	0.22 X mg/kg	0.069 X mg/kg	< 0.01 X mg/kg	--	--	--
C2-Fluorenes	NA	Lab			< 0.012 X mg/kg	0.033 X mg/kg	0.077 X mg/kg	0.13 X mg/kg	0.027 X mg/kg	< 0.01 X mg/kg	--	--	--
C2-Naphthalenes	NA	Lab			< 0.012 X mg/kg	0.013 X mg/kg	0.028 X mg/kg	0.14 X mg/kg	0.039 X mg/kg	< 0.01 X mg/kg	--	--	--
C2-Phenanthrenes/Anthracenes	NA	Lab			< 0.012 X mg/kg	0.14 X mg/kg	0.31 X mg/kg	0.66 X mg/kg	0.12 X mg/kg	< 0.01 X mg/kg	--	--	--
C3-Chrysenes	NA	Lab			< 0.012 X mg/kg	0.029 X mg/kg	0.086 X mg/kg	0.074 X mg/kg	0.023 X mg/kg	< 0.01 X mg/kg	--	--	--
C3-Fluorenes	NA	Lab			< 0.012 X mg/kg	0.038 X mg/kg	0.097 X mg/kg	0.092 X mg/kg	0.026 X mg/kg	< 0.01 X mg/kg	--	--	--
C3-Naphthalenes	NA	Lab			< 0.012 X mg/kg	0.022 X mg/kg	0.051 X mg/kg	0.14 X mg/kg	0.037 X mg/kg	< 0.01 X mg/kg	--	--	--
C3-Phenanthrenes/Anthracenes	NA	Lab			< 0.012 X mg/kg	0.12 X mg/kg	0.34 X mg/kg	0.41 X mg/kg	0.081 X mg/kg	< 0.01 X mg/kg	--	--	--
C4-Chrysenes	NA	Lab			< 0.012 X mg/kg	0.014 X mg/kg	0.023 X mg/kg	0.019 X mg/kg	0.011 X mg/kg	< 0.01 X mg/kg	--	--	--
C4-Napthalenes	NA	Lab			< 0.012 X mg/kg	0.023 X mg/kg	0.065 X mg/kg	0.073 X mg/kg	0.02 X mg/kg	< 0.01 X mg/kg	--	--	--
C4-Phenanthrenes/Anthracenes	NA	Lab			< 0.012 X mg/kg	0.1 X mg/kg	0.28 X mg/kg	0.33 X mg/kg	0.071 X mg/kg	< 0.01 X mg/kg	--	--	--
Sum of ESBPAH17@ 0.5DL	NA	Lab			0.171 a mg/kg	0.666 mg/kg	0.952 mg/kg	13.7 a mg/kg	3.1 a mg/kg	0.11 a mg/kg	0.922 mg/kg	25.5 mg/kg	0.097 mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.005 a tu	0.014 tu	0.021 tu	0.258 a tu	0.121 a tu	0.004 a tu	0.016 tu	0.637 tu	0.002 tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			0.279 a mg/kg	1.56 a mg/kg	2.96 a mg/kg	20.4 a mg/kg	4.49 a mg/kg	0.195 a mg/kg	--	--	--
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		0.0078 a tu	0.0315 a tu	0.0596 a tu	0.379 a tu	0.176 a tu	0.006 a tu	--	--	--
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]		--	--	--	--	--	--	0.284 a tu	**1.35 a tu**	0.260 a tu

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II	UC-90	UC-90	UC-90	UC-90	UC-91	UC-91	UC-91	UC-91	UC-96
					11/16/2011	11/16/2011	11/16/2011	11/16/2011	11/16/2011	11/16/2011	11/16/2011	11/16/2011	11/1/2011
					0 - 0.5 ft	0.5 - 1 ft	2 - 2.5 ft	3 - 3.5 ft	0 - 0.5 ft	2.5 - 3 ft	4 - 4.5 ft	5 - 5.5 ft	0 - 0.5 ft
					UC-90-1_0.0-0.5_11162011	UC-90-2_0.5-1.0_11162011	UC-90-3_2.0-2.5_11162011	UC-90-4_3.0-3.5_11162011	UC-91-1_0.0-0.5_11162011	UC-91-2_2.5-3.0_11162011	UC-91-3_4.0-4.5_11162011	UC-91-4_5.0-5.5_11162011	UC-96-1_0.0-0.5_11012011
					N	N	N	N	N	N	N	N	N
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
SVOCs													
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	< 0.0078 mg/kg	< 0.0070 mg/kg	< 0.0049 mg/kg	< 0.0055 mg/kg	< 0.0091 mg/kg	**0.029 mg/kg**	**0.31 mg/kg**	< 0.01 mg/kg	**0.55 j mg/kg**
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	**0.015 mg/kg**	**0.013 mg/kg**	< 0.0049 mg/kg	< 0.0055 mg/kg	< 0.0091 mg/kg	**0.038 mg/kg**	**0.12 mg/kg**	< 0.01 mg/kg	< 12 mg/kg
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	0.018 mg/kg	0.022 mg/kg	< 0.0049 mg/kg	< 0.0055 mg/kg	< 0.0091 mg/kg	**0.11 mg/kg**	**0.86 mg/kg**	0.027 mg/kg	**25 mg/kg**
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	0.06 mg/kg	0.058 mg/kg	0.0054 mg/kg	< 0.0055 mg/kg	< 0.0091 mg/kg	**0.27 mg/kg**	**2.2 mg/kg**	0.045 mg/kg	**26 mg/kg**
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	0.072 mg/kg	0.07 mg/kg	0.0052 mg/kg	< 0.0055 mg/kg	0.01 mg/kg	**0.23 mg/kg**	**2.2 j mg/kg**	0.056 mg/kg	**22 mg/kg**
Benzo(b)fluoranthene	NA	Lab			0.069 mg/kg	0.089 mg/kg	0.0073 mg/kg	< 0.0055 mg/kg	0.013 mg/kg	0.32 mg/kg	3.5 j mg/kg	0.064 mg/kg	26 mg/kg
Benzo(g,h,i)perylene	NA	Lab			0.041 mg/kg	0.05 mg/kg	< 0.0049 mg/kg	< 0.0055 mg/kg	< 0.0091 mg/kg	0.15 mg/kg	1.1 j mg/kg	0.029 mg/kg	< 12 mg/kg
Benzo(k)fluoranthene	NA	Lab			0.029 mg/kg	0.04 mg/kg	< 0.0049 mg/kg	< 0.0055 mg/kg	< 0.0091 mg/kg	0.089 mg/kg	2 j mg/kg	0.019 mg/kg	< 12 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	0.062 mg/kg	0.054 mg/kg	0.0052 mg/kg	< 0.0055 mg/kg	< 0.0091 mg/kg	**0.25 mg/kg**	**1.9 mg/kg**	0.038 mg/kg	**21 mg/kg**
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	0.014 mg/kg	0.017 mg/kg	< 0.0049 mg/kg	< 0.0055 mg/kg	< 0.0091 mg/kg	**0.055 mg/kg**	**0.48 mg/kg**	< 0.01 mg/kg	**2.9 mg/kg**
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	0.075 mg/kg	0.092 mg/kg	0.0087 mg/kg	< 0.0055 mg/kg	0.015 mg/kg	**0.43 mg/kg**	**5.2 mg/kg**	0.099 mg/kg	**63 mg/kg**
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	0.0094 mg/kg	0.012 mg/kg	< 0.0049 mg/kg	< 0.0055 mg/kg	< 0.0091 mg/kg	0.057 mg/kg	**0.51 mg/kg**	0.014 mg/kg	**13 mg/kg**
Indeno(1,2,3-cd)pyrene	NA	Lab			0.037 mg/kg	0.052 mg/kg	< 0.0049 mg/kg	< 0.0055 mg/kg	< 0.0091 mg/kg	0.14 mg/kg	1.1 j mg/kg	0.029 mg/kg	< 12 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	0.0095 mg/kg	0.011 mg/kg	< 0.0049 mg/kg	< 0.0055 mg/kg	< 0.0091 mg/kg	0.014 mg/kg	**0.056 mg/kg**	< 0.01 mg/kg	**2.6 mg/kg**
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	0.13 mg/kg	0.14 mg/kg	0.0049 mg/kg	< 0.0055 mg/kg	0.015 mg/kg	0.071 mg/kg	**0.26 mg/kg**	0.02 mg/kg	< 12 mg/kg
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	0.028 mg/kg	0.03 mg/kg	< 0.0049 mg/kg	< 0.0055 mg/kg	0.01 mg/kg	**0.28 mg/kg**	**1.6 mg/kg**	0.048 mg/kg	**63 mg/kg**
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	0.076 mg/kg	0.088 mg/kg	0.0075 mg/kg	< 0.0055 mg/kg	0.013 mg/kg	**0.38 mg/kg**	**7.1 j mg/kg**	0.088 mg/kg	**39 j mg/kg**
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	0.573 mg/kg	0.61 mg/kg	0.0544 mg/kg	0.0364 mg/kg	0.0998 mg/kg	**2.21 mg/kg**	**22.8 a mg/kg**	0.455 mg/kg	**290 a mg/kg**
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	0.0249 mg/kg	0.0265 mg/kg	0.00237 mg/kg	0.00158 mg/kg	0.00434 mg/kg	0.0963 mg/kg	**0.991 mg/kg**	0.0198 mg/kg	**12.6 mg/kg**
1-Methylnaphthalene	NA	Lab			< 0.0078 mg/kg	< 0.0070 mg/kg	< 0.0049 mg/kg	< 0.0055 mg/kg	< 0.0091 mg/kg	--	--	--	1.2 mg/kg
Benzo(e)pyrene	NA	Lab			0.043 mg/kg	0.044 mg/kg	0.0038 j mg/kg	< 0.0055 mg/kg	0.0060 j mg/kg	--	--	--	< 12 mg/kg
Perylene	NA	Lab			0.019 mg/kg	0.022 mg/kg	0.028 mg/kg	0.052 mg/kg	< 0.0091 mg/kg	--	--	--	< 12 mg/kg
C1-Chrysenes	NA	Lab			0.027 X mg/kg	0.031 X mg/kg	< 0.0049 X mg/kg	< 0.0055 X mg/kg	< 0.0091 X mg/kg	--	--	--	6 X mg/kg
C1-Fluoranthenes/Pyrenes	NA	Lab			0.047 X mg/kg	0.066 X mg/kg	0.0048 X mg/kg	< 0.0055 X mg/kg	< 0.0091 X mg/kg	--	--	--	19 X mg/kg
C1-Fluorenes	NA	Lab			< 0.0078 X mg/kg	0.0089 X mg/kg	< 0.0049 X mg/kg	< 0.0055 X mg/kg	< 0.0091 X mg/kg	--	--	--	2.3 X mg/kg
C1-Naphthalenes	NA	Lab			0.0095 X mg/kg	0.012 X mg/kg	< 0.0049 X mg/kg	< 0.0055 X mg/kg	< 0.0091 X mg/kg	--	--	--	2.4 X mg/kg
C1-Phenanthrenes/Anthracenes	NA	Lab			0.018 X mg/kg	0.027 X mg/kg	< 0.0049 X mg/kg	< 0.0055 X mg/kg	< 0.0091 X mg/kg	--	--	--	11 X mg/kg
C2-Chrysenes	NA	Lab			0.015 X mg/kg	0.017 X mg/kg	< 0.0049 X mg/kg	< 0.0055 X mg/kg	< 0.0091 X mg/kg	--	--	--	1.1 X mg/kg
C2-Fluorenes	NA	Lab			< 0.0078 X mg/kg	< 0.0070 X mg/kg	< 0.0049 X mg/kg	< 0.0055 X mg/kg	< 0.0091 X mg/kg	--	--	--	< 0.3 X mg/kg
C2-Naphthalenes	NA	Lab			< 0.0078 X mg/kg	0.0086 X mg/kg	< 0.0049 X mg/kg	< 0.0055 X mg/kg	< 0.0091 X mg/kg	--	--	--	1.6 X mg/kg
C2-Phenanthrenes/Anthracenes	NA	Lab			0.018 X mg/kg	0.02 X mg/kg	< 0.0049 X mg/kg	< 0.0055 X mg/kg	< 0.0091 X mg/kg	--	--	--	2.7 X mg/kg
C3-Chrysenes	NA	Lab			< 0.0078 X mg/kg	< 0.0070 X mg/kg	< 0.0049 X mg/kg	< 0.0055 X mg/kg	< 0.0091 X mg/kg	--	--	--	0.56 X mg/kg
C3-Fluorenes	NA	Lab			< 0.0078 X mg/kg	< 0.0070 X mg/kg	< 0.0049 X mg/kg	< 0.0055 X mg/kg	< 0.0091 X mg/kg	--	--	--	< 0.3 X mg/kg
C3-Naphthalenes	NA	Lab			< 0.0078 X mg/kg	< 0.0070 X mg/kg	< 0.0049 X mg/kg	< 0.0055 X mg/kg	< 0.0091 X mg/kg	--	--	--	0.57 X mg/kg
C3-Phenanthrenes/Anthracenes	NA	Lab			0.018 X mg/kg	0.02 X mg/kg	< 0.0049 X mg/kg	< 0.0055 X mg/kg	< 0.0091 X mg/kg	--	--	--	0.96 X mg/kg
C4-Chrysenes	NA	Lab			< 0.0078 X mg/kg	< 0.0070 X mg/kg	< 0.0049 X mg/kg	< 0.0055 X mg/kg	< 0.0091 X mg/kg	--	--	--	< 0.3 X mg/kg
C4-Napthalenes	NA	Lab			< 0.0078 X mg/kg	< 0.0070 X mg/kg	< 0.0049 X mg/kg	< 0.0055 X mg/kg	< 0.0091 X mg/kg	--	--	--	0.26 X mg/kg
C4-Phenanthrenes/Anthracenes	NA	Lab			0.027 X mg/kg	0.019 X mg/kg	< 0.0049 X mg/kg	< 0.0055 X mg/kg	< 0.0091 X mg/kg	--	--	--	0.44 X mg/kg
Sum of ESBPAH17@ 0.5DL	NA	Lab			0.749 mg/kg	0.841 mg/kg	0.069 mg/kg	0.048 mg/kg	0.127 mg/kg	2.9 mg/kg	30.5 a mg/kg	0.596 mg/kg	334 a mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			0.024 tu	0.026 tu	0.005 tu	0.003 tu	0.005 tu	0.086 tu	0.637 a tu	0.022 tu	3.98 a BQX tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			1.01 a mg/kg	1.17 a mg/kg	0.198 a mg/kg	0.234 a mg/kg	0.206 a mg/kg	--	--	--	393 a mg/kg
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** (1)		0.030 a tu	0.034 a tu	0.013 a tu	0.011 a tu	0.007 a tu	--	--	--	**4.61 a BQX tu**
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** (1)		--	--	--	--	--	0.404 a tu	**1.35 a tu**	0.295 a tu	--

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II	UC-96	UC-96	UC-96	UC-97	UC-97	UC-97	UC-97	WM-101	WM-101
Sys Loc Code					**UC-96**	**UC-96**	**UC-96**	**UC-97**	**UC-97**	**UC-97**	**UC-97**	**WM-101**	**WM-101**
Sample Date					**11/2/2011**	**11/2/2011**	**11/2/2011**	**11/2/2011**	**11/2/2011**	**11/2/2011**	**11/2/2011**	**11/16/2011**	**11/16/2011**
Depth Interval					**5 - 7.5 ft**	**7.5 - 10 ft**	**10 - 12.5 ft**	**0 - 2.5 ft**	**5 - 7.5 ft**	**7.5 - 10 ft**	**15 - 17.5 ft**	**0 - 1 ft**	**5 - 7.5 ft**
Sys Sample Code					**UC-96-2_5.0-7.5_11022011**	**UC-96-3_7.5-10.0_11022011**	**UC-96-4_10.0-12.5_11022011**	**UC-97-1_0.0-2.5_11022011**	**UC-97-2_5.0-7.5_11022011**	**UC-97-3_7.5-10.0_11022011**	**UC-97-4_15.0-17.5_11022011**	**WM-101-1_0.0-1.0_11162011**	**WM-101-2_5.0-7.5_11162011**
Sample Type Code					**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
SVOCs													
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg	< 76 mg/kg	**0.28 mg/kg**	**0.024 j mg/kg**	**3.5 mg/kg**	**0.56 mg/kg**	**0.068 j mg/kg**	< 0.0041 mg/kg	< 0.11 mg/kg	**0.0099 mg/kg**
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg	**68 j mg/kg**	**2.5 mg/kg**	**0.17 mg/kg**	**79 mg/kg**	< 12 mg/kg	**0.37 mg/kg**	< 0.0041 mg/kg	< 0.11 mg/kg	**0.011 mg/kg**
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg	**120 mg/kg**	**6.5 mg/kg**	**0.31 mg/kg**	**130 mg/kg**	**24 mg/kg**	**0.57 mg/kg**	< 0.0041 mg/kg	**0.1 j mg/kg**	0.016 mg/kg
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg	**180 mg/kg**	**7.2 mg/kg**	**0.57 mg/kg**	**130 mg/kg**	**25 mg/kg**	**0.99 mg/kg**	< 0.0041 mg/kg	**0.13 mg/kg**	0.02 mg/kg
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg	**130 mg/kg**	**4.7 mg/kg**	**0.41 mg/kg**	**110 mg/kg**	**20 mg/kg**	**0.6 mg/kg**	< 0.0041 mg/kg	0.1 j mg/kg	0.018 mg/kg
Benzo(b)fluoranthene	NA	Lab			180 mg/kg	5.4 mg/kg	0.56 mg/kg	130 mg/kg	23 mg/kg	1.3 mg/kg	< 0.0041 mg/kg	0.12 mg/kg	0.025 mg/kg
Benzo(g,h,i)perylene	NA	Lab			85 mg/kg	2.2 mg/kg	0.2 mg/kg	51 mg/kg	< 12 mg/kg	0.3 mg/kg	< 0.0041 mg/kg	0.034 mg/kg	0.0080 mg/kg
Benzo(k)fluoranthene	NA	Lab			73 j mg/kg	2.9 mg/kg	0.34 mg/kg	< 51 mg/kg	< 12 mg/kg	0.29 mg/kg	< 0.0041 mg/kg	0.048 mg/kg	0.0073 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg	**170 mg/kg**	**6.8 mg/kg**	**0.48 mg/kg**	**100 mg/kg**	**20 mg/kg**	**0.67 mg/kg**	< 0.0041 mg/kg	0.16 mg/kg	0.02 mg/kg
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg	**23 j mg/kg**	**0.93 mg/kg**	**0.07 mg/kg**	< 51 mg/kg	**2.5 mg/kg**	**0.095 mg/kg**	< 0.0041 mg/kg	0.011 mg/kg	< 0.0042 mg/kg
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg	**450 mg/kg**	**18 mg/kg**	**1.3 mg/kg**	**350 mg/kg**	**61 mg/kg**	**2.6 mg/kg**	< 0.0041 mg/kg	0.28 mg/kg	0.038 mg/kg
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg	**160 mg/kg**	**4.9 mg/kg**	**0.26 mg/kg**	**120 mg/kg**	**13 mg/kg**	**0.56 mg/kg**	< 0.0041 mg/kg	< 0.11 mg/kg	0.0091 mg/kg
Indeno(1,2,3-cd)pyrene	NA	Lab			82 mg/kg	2.2 mg/kg	0.2 mg/kg	50 j mg/kg	< 12 mg/kg	0.29 mg/kg	< 0.0041 mg/kg	0.037 mg/kg	0.0077 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg	**54 j mg/kg**	**0.89 mg/kg**	**0.04 mg/kg**	< 51 mg/kg	**2.6 mg/kg**	**0.2 mg/kg**	< 0.0041 mg/kg	**0.021 mg/kg**	0.0036 j mg/kg
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg	**69 j mg/kg**	**2.2 mg/kg**	0.095 mg/kg	< 51 mg/kg	< 12 mg/kg	**2.9 mg/kg**	< 0.0041 mg/kg	0.17 mg/kg	0.022 mg/kg
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg	**570 mg/kg**	**21 mg/kg**	**1.2 mg/kg**	**430 mg/kg**	**63 mg/kg**	**2.8 mg/kg**	< 0.0041 mg/kg	**0.22 mg/kg**	0.035 mg/kg
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg	**270 mg/kg**	**13 mg/kg**	**0.87 mg/kg**	**220 mg/kg**	**39 mg/kg**	**1.6 mg/kg**	< 0.0041 mg/kg	**0.23 mg/kg**	0.028 mg/kg
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg	**2300 mg/kg**	**88.9 mg/kg**	**5.8 mg/kg**	**1750 mg/kg**	**283 mg/kg**	**14 mg/kg**	0.0273 mg/kg	1.59 a mg/kg	0.233 a mg/kg
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg	**100 mg/kg**	**3.87 mg/kg**	**0.252 mg/kg**	**76 mg/kg**	**12.3 mg/kg**	**0.61 mg/kg**	0.00119 mg/kg	0.069 mg/kg	0.0101 mg/kg
1-Methylnaphthalene	NA	Lab			--	--	--	< 51 mg/kg	1.2 mg/kg	0.089 mg/kg	< 0.0041 mg/kg	0.031 mg/kg	0.0044 mg/kg
Benzo(e)pyrene	NA	Lab			--	--	--	60 mg/kg	< 12 mg/kg	0.35 mg/kg	< 0.0041 mg/kg	< 0.11 mg/kg	0.013 mg/kg
Perylene	NA	Lab			--	--	--	< 51 mg/kg	< 12 mg/kg	0.16 mg/kg	0.014 mg/kg	0.025 mg/kg	0.0080 mg/kg
C1-Chrysenes	NA	Lab			--	--	--	16 X mg/kg	4.5 X mg/kg	0.21 X mg/kg	< 0.0041 X mg/kg	0.21 X mg/kg	0.025 X mg/kg
C1-Fluoranthenes/Pyrenes	NA	Lab			--	--	--	81 X mg/kg	20 X mg/kg	0.74 X mg/kg	< 0.0041 X mg/kg	0.39 X mg/kg	0.057 X mg/kg
C1-Fluorenes	NA	Lab			--	--	--	8.1 X mg/kg	2.4 X mg/kg	0.12 X mg/kg	< 0.0041 X mg/kg	0.091 X mg/kg	0.01 X mg/kg
C1-Naphthalenes	NA	Lab			--	--	--	16 X mg/kg	2.4 X mg/kg	0.18 X mg/kg	< 0.0041 X mg/kg	0.033 X mg/kg	0.0061 X mg/kg
C1-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	42 X mg/kg	11 X mg/kg	0.57 X mg/kg	< 0.0041 X mg/kg	0.59 X mg/kg	0.073 X mg/kg
C2-Chrysenes	NA	Lab			--	--	--	3.8 X mg/kg	1.1 X mg/kg	0.078 X mg/kg	< 0.0041 X mg/kg	0.25 X mg/kg	0.025 X mg/kg
C2-Fluorenes	NA	Lab			--	--	--	< 0.51 X mg/kg	< 0.3 X mg/kg	< 0.069 X mg/kg	< 0.0041 X mg/kg	0.27 X mg/kg	0.1 X mg/kg
C2-Naphthalenes	NA	Lab			--	--	--	7.8 X mg/kg	1.5 X mg/kg	0.1 X mg/kg	< 0.0041 X mg/kg	0.075 X mg/kg	0.015 X mg/kg
C2-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	8.7 X mg/kg	2.7 X mg/kg	0.4 X mg/kg	< 0.0041 X mg/kg	1.3 X mg/kg	0.13 X mg/kg
C3-Chrysenes	NA	Lab			--	--	--	1.9 X mg/kg	0.44 X mg/kg	< 0.069 X mg/kg	< 0.0041 X mg/kg	0.28 X mg/kg	0.014 X mg/kg
C3-Fluorenes	NA	Lab			--	--	--	< 0.51 X mg/kg	< 0.3 X mg/kg	< 0.069 X mg/kg	< 0.0041 X mg/kg	0.6 X mg/kg	0.035 X mg/kg
C3-Naphthalenes	NA	Lab			--	--	--	2.2 X mg/kg	0.66 X mg/kg	0.088 X mg/kg	< 0.0041 X mg/kg	0.22 X mg/kg	0.021 X mg/kg
C3-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	2.5 X mg/kg	0.93 X mg/kg	0.21 X mg/kg	< 0.0041 X mg/kg	0.94 X mg/kg	0.12 X mg/kg
C4-Chrysenes	NA	Lab			--	--	--	< 0.51 X mg/kg	< 0.3 X mg/kg	< 0.069 X mg/kg	< 0.0041 X mg/kg	0.06 X mg/kg	0.0065 X mg/kg
C4-Napthalenes	NA	Lab			--	--	--	0.49 X mg/kg	0.27 X mg/kg	0.1 X mg/kg	< 0.0041 X mg/kg	0.3 X mg/kg	0.023 X mg/kg
C4-Phenanthrenes/Anthracenes	NA	Lab			--	--	--	0.66 X mg/kg	0.3 X mg/kg	0.15 X mg/kg	< 0.0041 X mg/kg	0.64 X mg/kg	0.1 X mg/kg
Sum of ESBPAH17@ 0.5DL	NA	Lab			2720 a mg/kg	102 mg/kg	7.1 a mg/kg	2000 a mg/kg	324 mg/kg	16.2 a mg/kg	0.036 mg/kg	1.8 a mg/kg	0.281 a mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab			40.3 a tu	2.5 tu	0.247 a tu	26.7 a tu	6.8 tu	0.357 a tu	0.035 tu	0.051 a tu	0.026 a tu
Sum of ESBPAH34@ 0.5DL	NA	Lab			--	--	--	2260 a mg/kg	382 a mg/kg	19.6 a mg/kg	0.083 a mg/kg	8.13 a mg/kg	1.06 a mg/kg
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** (1)		--	--	--	**29.5 a tu**	**7.94 a tu**	0.417 a tu	0.074 a tu	0.199 a tu	0.0899 a tu
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** (1)		**69.1 a tu**	**4.53 a tu**	0.679 a tu	--	--	--	--	--	--

Table 5
PAH Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

					Sys Loc Code	**WM-101**	**WM-101**	**WM-102**	**WM-102**		**WM-102**		**WM-102**
					Sample Date	**11/16/2011**	**11/16/2011**	**11/16/2011**	**11/16/2011**		**11/16/2011**		**11/16/2011**
					Depth Interval	**15 - 17.5 ft**	**20 - 22.5 ft**	**0 - 2.5 ft**	**2.5 - 5 ft**	**2.5 - 5 ft**	**15 - 17.5 ft**	**15 - 17.5 ft**	**27.5 - 30 ft**
					Sys Sample Code	**WM-101-3_15.0-17.5_11162011**	**WM-101-4_20.0-22.5_11162011**	**WM-102-1_0.0-2.5_11162011**	**WM-102-2_2.5-5.0_11162011**	**WM-102-2_2.5-5.0_11162011_FD**	**WM-102-3_15.0-17.5_11162011**	**WM-102-3_15.0-17.5_11162011_FD**	**WM-102-4_27.5-30.0_11162011**
					Sample Type Code	**N**	**N**	**N**	**N**	**FD**	**N**	**FD**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
SVOCs													
Acenaphthene	NA	Lab	**0.0067 mg/kg**	0.089 mg/kg		< 0.0043 mg/kg	< 0.0044 mg/kg	**0.014 mg/kg**	**0.027 mg/kg**	0.0061 mg/kg	< 0.0046 mg/kg	< 0.0039 mg/kg	< 0.0043 mg/kg
Acenaphthylene	NA	Lab	**0.0059 mg/kg**	0.13 mg/kg		< 0.0043 mg/kg	< 0.0044 mg/kg	< 0.0046 mg/kg	< 0.0071 mg/kg	< 0.0041 mg/kg	**0.01 mg/kg**	< 0.0039 mg/kg	< 0.0043 mg/kg
Anthracene	NA	Lab	**0.057 mg/kg**	0.85 mg/kg		< 0.0043 mg/kg	< 0.0044 mg/kg	0.035 mg/kg	**0.062 mg/kg**	0.0068 mg/kg	0.024 mg/kg	0.01 mg/kg	0.011 mg/kg
Benzo(a)anthracene	NA	Lab	**0.11 mg/kg**	1.1 mg/kg		< 0.0043 mg/kg	< 0.0044 mg/kg	0.041 mg/kg	0.092 mg/kg	0.0079 mg/kg	0.037 mg/kg	0.013 mg/kg	0.014 mg/kg
Benzo(a)pyrene	NA	Lab	**0.15 mg/kg**	1.5 mg/kg		< 0.0043 mg/kg	< 0.0044 mg/kg	0.039 mg/kg	0.08 mg/kg	0.0075 mg/kg	0.036 mg/kg	0.017 mg/kg	0.017 mg/kg
Benzo(b)fluoranthene	NA	Lab				< 0.0043 mg/kg	< 0.0044 mg/kg	0.044 mg/kg	0.091 mg/kg	0.0081 mg/kg	0.038 mg/kg	0.016 mg/kg	0.015 mg/kg
Benzo(g,h,i)perylene	NA	Lab				< 0.0043 mg/kg	< 0.0044 mg/kg	0.02 mg/kg	0.059 mg/kg	< 0.0041 mg/kg	0.018 mg/kg	0.0076 mg/kg	0.0077 mg/kg
Benzo(k)fluoranthene	NA	Lab				< 0.0043 mg/kg	< 0.0044 mg/kg	0.02 mg/kg	0.049 mg/kg	< 0.0041 mg/kg	0.018 mg/kg	0.0060 mg/kg	0.0073 mg/kg
Chrysene	NA	Lab	**0.17 mg/kg**	1.3 mg/kg		< 0.0043 mg/kg	< 0.0044 mg/kg	0.028 mg/kg	0.069 mg/kg	0.0061 mg/kg	0.03 mg/kg	0.01 mg/kg	0.011 mg/kg
Dibenz(a,h)anthracene	NA	Lab	**0.033 mg/kg**	0.14 mg/kg		< 0.0043 mg/kg	< 0.0044 mg/kg	0.0066 mg/kg	0.015 mg/kg	< 0.0041 mg/kg	0.0057 mg/kg	< 0.0039 mg/kg	< 0.0043 mg/kg
Fluoranthene	NA	Lab	**0.42 mg/kg**	2.2 mg/kg		0.0045 mg/kg	< 0.0044 mg/kg	0.063 mg/kg	0.21 mg/kg	0.019 mg/kg	0.081 mg/kg	0.032 mg/kg	0.037 mg/kg
Fluorene	NA	Lab	**0.077 mg/kg**	0.54 mg/kg		< 0.0043 mg/kg	< 0.0044 mg/kg	0.018 mg/kg	0.032 mg/kg	< 0.0041 mg/kg	0.014 mg/kg	< 0.0039 mg/kg	0.0047 mg/kg
Indeno(1,2,3-cd)pyrene	NA	Lab				< 0.0043 mg/kg	< 0.0044 mg/kg	0.022 mg/kg	0.057 mg/kg	0.0042 mg/kg	0.019 mg/kg	0.0082 mg/kg	0.0085 mg/kg
2-Methylnaphthalene	NA	Lab	**0.02 mg/kg**	0.20 mg/kg		< 0.0043 mg/kg	< 0.0044 mg/kg	< 0.0046 mg/kg	< 0.0071 mg/kg	< 0.0041 mg/kg	0.0053 mg/kg	< 0.0039 mg/kg	< 0.0043 mg/kg
Naphthalene	NA	Lab	**0.18 mg/kg**	0.56 mg/kg		< 0.0043 mg/kg	< 0.0044 mg/kg	< 0.0046 mg/kg	< 0.0071 mg/kg	< 0.0041 mg/kg	0.0087 mg/kg	< 0.0039 mg/kg	< 0.0043 mg/kg
Phenanthrene	NA	Lab	**0.20 mg/kg**	1.2 mg/kg		< 0.0043 mg/kg	< 0.0044 mg/kg	0.044 mg/kg	0.098 mg/kg	0.01 mg/kg	0.06 mg/kg	0.013 mg/kg	0.016 mg/kg
Pyrene	NA	Lab	**0.20 mg/kg**	1.5 mg/kg		< 0.0043 mg/kg	< 0.0044 mg/kg	0.05 mg/kg	0.15 mg/kg	0.016 j mg/kg	0.06 mg/kg	0.024 mg/kg	0.028 mg/kg
Sum (PEC) PAH13 @ 0.5DL	NA	Lab	**1.6 mg/kg**	23 mg/kg		0.0309 mg/kg	0.0286 mg/kg	0.345 mg/kg	0.846 mg/kg	0.0899 mg/kg	0.374 mg/kg	0.131 mg/kg	0.15 mg/kg
PEC-QPAH13 @0.5DL	NA	Lab	**0.1 mg/kg**	0.6 mg/kg		0.00134 mg/kg	0.00124 mg/kg	0.015 mg/kg	0.0368 mg/kg	0.00391 mg/kg	0.0163 mg/kg	0.0057 mg/kg	0.00651 mg/kg
1-Methylnaphthalene	NA	Lab				< 0.0043 mg/kg	< 0.0044 mg/kg	< 0.0046 mg/kg	--	--	--	--	--
Benzo(e)pyrene	NA	Lab				< 0.0043 mg/kg	< 0.0044 mg/kg	0.015 mg/kg	--	--	--	--	--
Perylene	NA	Lab				0.014 mg/kg	0.0072 mg/kg	0.029 mg/kg	--	--	--	--	--
C1-Chrysenes	NA	Lab				< 0.0043 X mg/kg	< 0.0044 X mg/kg	0.014 X mg/kg	--	--	--	--	--
C1-Fluoranthenes/Pyrenes	NA	Lab				< 0.0043 X mg/kg	< 0.0044 X mg/kg	0.038 X mg/kg	--	--	--	--	--
C1-Fluorenes	NA	Lab				< 0.0043 X mg/kg	< 0.0044 X mg/kg	< 0.0046 X mg/kg	--	--	--	--	--
C1-Naphthalenes	NA	Lab				< 0.0043 X mg/kg	< 0.0044 X mg/kg	< 0.0046 X mg/kg	--	--	--	--	--
C1-Phenanthrenes/Anthracenes	NA	Lab				< 0.0043 X mg/kg	< 0.0044 X mg/kg	0.024 X mg/kg	--	--	--	--	--
C2-Chrysenes	NA	Lab				< 0.0043 X mg/kg	< 0.0044 X mg/kg	0.0069 X mg/kg	--	--	--	--	--
C2-Fluorenes	NA	Lab				< 0.0043 X mg/kg	< 0.0044 X mg/kg	< 0.0046 X mg/kg	--	--	--	--	--
C2-Naphthalenes	NA	Lab				< 0.0043 X mg/kg	< 0.0044 X mg/kg	0.0046 X mg/kg	--	--	--	--	--
C2-Phenanthrenes/Anthracenes	NA	Lab				< 0.0043 X mg/kg	< 0.0044 X mg/kg	0.013 X mg/kg	--	--	--	--	--
C3-Chrysenes	NA	Lab				< 0.0043 X mg/kg	< 0.0044 X mg/kg	< 0.0046 X mg/kg	--	--	--	--	--
C3-Fluorenes	NA	Lab				< 0.0043 X mg/kg	< 0.0044 X mg/kg	< 0.0046 X mg/kg	--	--	--	--	--
C3-Naphthalenes	NA	Lab				< 0.0043 X mg/kg	< 0.0044 X mg/kg	< 0.0046 X mg/kg	--	--	--	--	--
C3-Phenanthrenes/Anthracenes	NA	Lab				< 0.0043 X mg/kg	< 0.0044 X mg/kg	0.0060 X mg/kg	--	--	--	--	--
C4-Chrysenes	NA	Lab				< 0.0043 X mg/kg	< 0.0044 X mg/kg	< 0.0046 X mg/kg	--	--	--	--	--
C4-Napthalenes	NA	Lab				< 0.0043 X mg/kg	< 0.0044 X mg/kg	< 0.0046 X mg/kg	--	--	--	--	--
C4-Phenanthrenes/Anthracenes	NA	Lab				< 0.0043 X mg/kg	< 0.0044 X mg/kg	0.0058 X mg/kg	--	--	--	--	--
Sum of ESBPAH17@ 0.5DL	NA	Lab				0.040 mg/kg	0.037 mg/kg	0.451 mg/kg	1.1 mg/kg	0.106 a mg/kg	0.467 mg/kg	0.169 mg/kg	0.188 mg/kg
EPA-ESBTUfcv17 @ 0.5DL	NA	Lab				0.004 tu	0.003 tu	0.034 tu	0.539 tu	0.056 a tu	0.086 tu	0.030 tu	0.110 tu
Sum of ESBPAH34@ 0.5DL	NA	Lab				0.089 a mg/kg	0.0798 a mg/kg	0.624 a mg/kg	--	--	--	--	--
EPA-ESBTUfcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]			0.0075 a tu	0.0057 a tu	0.045 a tu	--	--	--	--	--
EST. EPA-ESBTUFcv34 @ 0.5DL	NA	Lab	**1 tu** [(1)]			--	--	--	**1.18 a tu**	0.353 a tu	0.404 a tu	0.308 a tu	0.445 a tu

Data Qualifiers/Footnotes	
Qualifier	**Definition**
--	Not analyzed/not available.
a	Estimated value, calculated using some or all values that are estimates.
b	Potential false positive value based on blank data validation procedures.
c	Coeluting compound.
e	Estimated value, exceeded the instrument calibration range.
h	EPA recommended sample preservation, extraction or analysis holding time was exceeded.
I	Indeterminate value based on failure of blind duplicate data to meet quality assurance criteria.
j	Reported value is less than the stated laboratory quantitation limit and is considered an estimated value.
p	Relative percent difference is >40% (25% CLP pesticides) between primary and confirmation GC columns.
pp	Small peak in chromatogram below method detection limit.
r	The presence of the compound is suspect based on the ID criteria of the retention time and relative retention time obtained from the examination of the chromatograms.
s	Potential false positive value based on statistical analysis of blank sample data.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
N	Sample Type: Normal
FD	Sample Type: Field Duplicate
AT	Sample chromatogram is noted to be atypical of a petroleum product.
DLND	Not detected, detection limit not determined.
DF	Did not flash
EMPC	Estimated maximum possible concentration.
X	Estimated value.
ND	Not detected.
TIC	Tentatively identified compound
BQX	Barr-applied project specific qualifier, indicating the TOC of the sample was outside 0.2-12% range. Samples with TOC results >12% were recalculated using a maximum TOC of 12% (120000 mg/kg). Samples UC-35-4 and WM-72-1 had TOC results <0.2% and were therefore removed from the data set.
tu	toxic units
qu	quotient units

Table 6
Summary of PAH Ratios
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

Sys Sample Code	Sample Date	Analysis Location	Sample Type Code	Sum [EPA] 34 PAHS mg/kg	Sum [MPCA] 13 PAHS mg/kg	Sum [EPA] 17 PAHS mg/kg	Ratio 13 to 34 PAHs %	Ratio 17 to 34 PAHs %
WM-1-1_0.0-0.7_02172011	02/17/2011	N	LB	0.437	0.0798	0.0982	18.3	22.5
WM-1-2_0.7-1.9_02172011	02/17/2011	N	LB	0.308	0.0939	0.121	30.5	39.3
WM-1-3_1.9-2.1_02172011	02/17/2011	N	LB	986	295	393	29.9	39.8
WM-1-4_2.5-3.0_02172011	02/17/2011	N	LB	0.603	0.316	0.391	52.4	64.8
WM-2-1_0.0-0.5_02192011	02/19/2011	N	LB	0.207	0.0941	0.121	45.5	58.6
WM-3-1_0.0-1.0_02202011	02/20/2011	N	LB	0.187	0.0621	0.0761	33.2	40.7
WM-3-2_2.0-4.0_02202011	02/20/2011	N	LB	0.147	0.0436	0.0536	29.7	36.5
WM-3-3_4.2-4.75_02202011	02/20/2011	N	LB	0.564	0.115	0.258	20.4	45.8
WM-3-4_4.75-5.25_02202011	02/20/2011	N	LB	0.0868	0.0332	0.0416	38.2	47.9
WM-4-1_0.0-0.5_02212011	02/21/2011	N	LB	13.7	4.05	6.67	29.6	48.6
WM-4-2_0.5-1.0_02212011	02/21/2011	N	LB	29.3	11.8	17.3	40.3	58.9
WM-5-1_0.0-0.5_02222011	02/22/2011	N	LB	0.705	0.26	0.365	36.9	51.8
WM-6-1_0.0-1.0_02222011	02/22/2011	N	LB	10.6	4.33	6.44	40.8	60.8
WM-6-1_0.0-1.0_02222011_FD	02/22/2011	FD	LB	7.94	3.06	4.45	38.5	56.0
WM-6-2_1.4-1.8_02222011	02/22/2011	N	LB	4.57	1.78	2.25	38.9	49.2
WM-7-1_0.0-0.5_02222011	02/22/2011	N	LB	0.916	0.417	0.567	45.5	61.9
WM-8-1_0.0-0.5_02242011	02/24/2011	N	LB	3.42	1.32	1.89	38.6	55.4
WM-8-2_0.75-1.25_02242011	02/24/2011	N	LB	35.8	14.3	20	39.9	55.7
WM-8-3_1.25-1.75_02242011	02/24/2011	N	LB	0.347	0.096	0.115	27.7	33.2
WM-9-1_0.0-0.5_03072011	03/07/2011	N	LB	12.9	6.29	9.19	48.8	71.2
WM-10-1_0.0-1.0_02252011	02/25/2011	N	LB	30.8	8.17	9.43	26.5	30.6
WM-10-2_1.0-2.0_02252011	02/25/2011	N	LB	496	263	321	53.0	64.7
WM-10-3_2.0-2.8_02252011	02/25/2011	N	LB	4.04	2.27	2.54	56.2	62.8
UC-11-1_0.0-1.0_02262011	02/26/2011	N	LB	463	122	167	26.3	36.0
UC-11-2_1.0-2.0_02262011	02/26/2011	N	LB	61.7	33.2	40.4	53.8	65.5
UC-11-3_2.0-3.0_02262011	02/26/2011	N	LB	50.6	19.2	22.9	37.9	45.2
UC-11-4_3.0-3.5_02262011	02/26/2011	N	LB	10.1	4.3	5.55	42.6	54.9
UC-12-1_0.0-0.5_02272011	02/27/2011	N	LB	18.5	10.2	14.1	55.1	76.2
WM-13-1_0.0-0.5_03042011	03/04/2011	N	LB	0.146	0.0535	0.0842	36.6	57.7
WM-14-1_0.0-0.5_02272011	02/27/2011	N	LB	0.324	0.0945	0.124	29.2	38.1
UC-15-1_0.0-1.0_02272011	02/27/2011	N	LB	0.912	0.408	0.543	44.7	59.6
UC-15-2_1.0-2.0_02272011	02/27/2011	N	LB	1.92	0.842	1.17	43.9	61.1
UC-15-3_2.0-3.0_02272011	02/27/2011	N	LB	11.9	3.65	4.9	30.7	41.2
UC-15-3_2.0-3.0_02272011_FD	02/27/2011	FD	LB	68.7	17.9	23.4	26.1	34.1
UC-15-4_3.0-4.0_02272011	02/27/2011	N	LB	8.72	4.03	5.49	46.2	62.9
UC-16-1_0.0-0.5_02282011	02/28/2011	N	LB	11	6.09	8.06	55.4	73.2
UC-17-1_0.0-0.5_03012011	03/01/2011	N	LB	10.4	5.17	7.01	49.7	67.4
UC-17-2_1.0-1.5_03012011	03/01/2011	N	LB	44	15	20.2	34.1	45.9
UC-17-3_2.0-2.5_03012011	03/01/2011	N	LB	35.4	12.7	16	35.9	45.3
UC-17-4_2.5-3.0_03012011	03/01/2011	N	LB	24.1	6.89	9.03	28.6	37.5
WM-18-1_0.0-0.7_03012011	03/01/2011	N	LB	2.06	0.65	0.841	31.6	40.8
WM-18-2_0.7-1.7_03012011	03/01/2011	N	LB	944	364	434	38.6	46.0
WM-18-3_1.7-2.7_03012011	03/01/2011	N	LB	11.4	5.36	6.88	47.0	60.3
WM-19-1_0.0-0.5_03022011	03/02/2011	N	LB	1.16	0.833	0.899	71.8	77.5
UC-20-1_0.0-0.5_03022011	03/02/2011	N	LB	38.5	11.9	16.4	30.9	42.6
WM-21-1_0.0-0.5_03042011	03/04/2011	N	LB	0.461	0.211	0.301	45.8	65.2
WM-21-2_2.0-2.5_03042011	03/04/2011	N	LB	2.08	0.827	1.22	39.8	58.8
WM-21-3_4.0-4.5_03042011	03/04/2011	N	LB	1850	1150	1410	62.2	76.2
WM-21-4_5.0-5.5_03042011	03/04/2011	N	LB	1.07	0.534	0.681	49.9	63.6
WM-22-1_0.0-0.5_03062011	03/06/2011	N	LB	0.202	0.0674	0.102	33.4	50.6
WM-22-2_1.5-2.0_03062011	03/06/2011	N	LB	0.924	0.268	0.403	29.0	43.6
WM-22-3_4.0-4.5_03062011	03/06/2011	N	LB	0.237	0.0527	0.185	22.2	77.8
WM-22-4_5.5-6.0_03062011	03/06/2011	N	LB	1.5	0.249	0.333	16.6	22.2
UC-23-1_0.0-0.5_03022011	03/02/2011	N	LB	84.1	28.7	38.8	34.1	46.1
UC-23-2_1.5-2.0_03022011	03/02/2011	N	LB	318	119	144	37.4	45.2
UC-23-3_2.5-3.0_03022011	03/02/2011	N	LB	62	21.9	25.8	35.3	41.6
UC-23-4_3.75-4.25_03022011	03/02/2011	N	LB	0.609	0.296	0.359	48.6	58.9
WM-24-1_0.0-0.5_03072011	03/07/2011	N	LB	12.1	4.78	6.74	39.5	55.7
WM-26-1_0.0-0.5_03112011	03/11/2011	N	LB	0.329	0.132	0.184	40.1	56.0
WM-27-1_0.0-0.5_03132011	03/13/2011	N	LB	0.606	0.232	0.34	38.3	56.1
WM-28-1_0.0-0.5_03132011	03/13/2011	N	LB	0.808	0.269	0.432	33.3	53.5
UC-29-1_0.0-0.5_03032011	03/03/2011	N	LB	52.9	24.1	33	45.6	62.4
UC-29-2_1.0-1.5_03032011	03/03/2011	N	LB	247	137	167	55.5	67.6
UC-29-2_1.0-1.5_03032011_FD	03/03/2011	FD	LB	188	113	135	60.1	72.0

Table 6
Summary of PAH Ratios
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

Sys Sample Code	Sample Date	Analysis Location	Sample Type Code	Sum [EPA] 34 PAHS mg/kg	Sum [MPCA] 13 PAHS mg/kg	Sum [EPA] 17 PAHS mg/kg	Ratio 13 to 34 PAHs %	Ratio 17 to 34 PAHs %
UC-29-3_2.0-2.5_03032011	03/03/2011	N	LB	25.2	11.9	17.3	47.2	68.5
UC-29-4_2.5-3.0_03032011	03/03/2011	N	LB	0.262	0.1	0.146	38.2	55.8
WM-30-1_0.0-0.5_03082011	03/08/2011	N	LB	0.748	0.192	0.314	25.7	42.0
WM-30-2_1.0-1.5_03082011	03/08/2011	N	LB	0.194	0.0302	0.152	15.6	78.5
WM-30-3_2.0-2.5_03082011	03/08/2011	N	LB	0.301	0.0577	0.118	19.2	39.1
WM-30-4_3.5-4.0_03082011	03/08/2011	N	LB	25.5	20.4	20.9	80.0	81.8
UC-31-1_0.0-0.5_03092011	03/09/2011	N	LB	153	102	142	66.7	92.8
UC-31-4_2.0-2.5_03092011	03/09/2011	N	LB	1.091	0.154	0.234	14.1	21.5
WM-32-1_0.0-0.5_03132011	03/13/2011	N	LB	1.03	0.825	0.871	80.1	84.6
WM-32-2_0.5-1.0_03132011	03/13/2011	N	LB	0.751	0.303	0.435	40.3	57.9
WM-32-3_1.0-1.5_03132011	03/13/2011	N	LB	0.0988	0.0423	0.0503	42.8	50.9
WM-32-4_3.5-4.0_03132011	03/13/2011	N	LB	0.068	0.0278	0.0354	40.9	52.1
WM-33-1_0.0-0.5_03082011	03/08/2011	N	LB	25.9	4.92	6.77	19.0	26.1
WM-34-1_0.0-0.5_03142011	03/14/2011	N	LB	91.7	48.3	64.1	52.7	69.9
UC-35-1_0.0-0.5_03092011	03/09/2011	N	LB	28.2	15.5	21	55.0	74.4
UC-36-1_0.0-0.5_03092011	03/09/2011	N	LB	19.8	10.8	15.1	54.5	76.0
UC-36-2_1.0-1.5_03092011	03/09/2011	N	LB	24.8	14.6	21.5	58.9	86.7
UC-36-3_2.0-2.5_03092011	03/09/2011	N	LB	0.839	0.268	0.403	31.9	48.1
UC-36-4_2.5-3.0_03092011	03/09/2011	N	LB	0.695	0.312	0.451	44.9	64.9
UC-37-1_0.0-0.5_03102011	03/10/2011	N	LB	11.7	5.27	8.15	45.0	69.6
UC-38-1_0.0-0.5_03112011	03/11/2011	N	LB	19.8	11.9	16.3	60.1	82.1
UC-39-1_0.0-0.5_03032011	03/03/2011	N	LB	8.35	4.85	6.78	58.1	81.2
UC-40-1_0.0-0.5_03102011	03/10/2011	N	LB	4.09	2.03	3.02	49.6	73.8
WM-41-1_0.0-0.5_03152011	03/15/2011	N	LB	1.09	0.364	0.557	33.4	51.1
WM-42-1_0.0-0.5_03152011	03/15/2011	N	LB	6.272	3.28	4.16	52.3	66.4
WM-43-1_0.0-0.5_03152011	03/15/2011	N	LB	0.263	0.105	0.16	39.9	60.7
WM-44-1_0.0-0.5_03162011	03/16/2011	N	LB	0.192	0.0634	0.11	33.0	57.4
WM-45-1_0.0-0.5_03162011	03/16/2011	N	LB	0.172	0.0575	0.0897	33.4	52.2
WM-46-1_0.0-0.5_03162011	03/16/2011	N	LB	0.349	0.129	0.186	37.0	53.3
WM-47-1_0.0-0.5_03162011	03/16/2011	N	LB	0.219	0.093	0.14	42.5	63.9
WM-48-1_0.0-0.5_03172011	03/17/2011	N	LB	0.178	0.068	0.108	38.2	60.4
WM-49-1_0.0-0.5_03172011	03/17/2011	N	LB	0.176	0.0723	0.104	41.1	59.0
WM-50-1_0.0-0.5_03172011	03/17/2011	N	LB	0.358	0.167	0.243	46.6	67.8
WM-51-1_0.0-0.5_03182011	03/18/2011	N	LB	0.261	0.109	0.165	41.8	63.1
UC-52-1_0.0-0.5_03182011	03/18/2011	N	LB	1.71	0.686	1.2	40.1	70.0
UC-53-1_0.0-0.5_03182011	03/18/2011	N	LB	16	9.69	12.7	60.6	79.7
UC-54-1_0.0-0.5_03182011	03/18/2011	N	LB	11	6.88	8.96	62.5	81.4
UC-55-1_0.0-0.5_03182011	03/18/2011	N	LB	106	65.9	80.5	62.2	76.0
UC-56-1_0.0-0.5_03192011	03/19/2011	N	LB	14.7	8.03	11	54.6	74.9
UC-57-1_0.0-0.5_03192011	03/19/2011	N	LB	245	174	188	71.0	76.8
WM-58-1_0.0-0.5_03192011	03/19/2011	N	LB	18.3	4.3	5.88	23.5	32.1
WM-59-1_0.0-0.5_03212011	03/21/2011	N	LB	0.849	0.65	0.749	76.6	88.2
WM-60-1_0.0-0.5_03212011	03/21/2011	N	LB	0.113	0.0412	0.0636	36.5	56.3
WM-61-1_0.0-0.5_03212011	03/21/2011	N	LB	0.422	0.0949	0.143	22.5	33.9
WM-61-1_0.0-0.5_03212011_FD	03/21/2011	FD	LB	0.403	0.0944	0.131	23.4	32.5
WM-62-1_0.0-0.5_03212011	03/21/2011	N	LB	0.159	0.0532	0.0907	33.5	57.0
WM-63-1_0.0-0.5_03212011	03/21/2011	N	LB	16.1	6.26	7.66	38.9	47.6
WM-64-1_0.0-0.5_03102011	03/10/2011	N	LB	0.26	0.109	0.157	41.9	60.4
WM-64-2_1.0-1.5_03102011	03/10/2011	N	LB	13.6	2.79	3.32	20.5	24.4
WM-64-3_2.0-2.5_03102011	03/10/2011	N	LB	888	529	642	59.6	72.3
WM-64-4_3.0-3.5_03102011	03/10/2011	N	LB	0.266	0.139	0.155	52.3	58.3
WM-65-1_0.0-0.5_03212011	03/21/2011	N	LB	0.425	0.135	0.204	31.8	48.0
WM-66-1_0.0-0.5_03222011	03/22/2011	N	LB	0.263	0.0842	0.126	32.0	47.9
WM-67-1_0.0-0.5_03222011	03/22/2011	N	LB	0.171	0.0615	0.0923	36.0	54.0
WM-68-1_0.0-0.5_03232011	03/23/2011	N	LB	0.146	0.0547	0.0864	37.5	59.2
WM-69-1_0.0-0.5_03232011	03/23/2011	N	LB	0.122	0.0448	0.0692	36.7	56.7
WM-70-1_0.0-0.5_03232011	03/23/2011	N	LB	0.328	0.116	0.19	35.4	57.9
WM-71-1_0.0-0.5_03232011	03/23/2011	N	LB	0.185	0.0511	0.0789	27.6	42.6
WM-72-1_0.0-0.5_03232011	03/23/2011	N	LB	0.832	0.31	0.512	37.3	61.5
WM-73-1_0.0-0.5_03242011	03/24/2011	N	LB	11	3.05	4.11	27.7	37.4
WM-74-1_0.0-0.5_03242011	03/24/2011	N	LB	0.447	0.185	0.268	41.4	60.0
UC-75-1_0.0-0.5_06082011	06/08/2011	N	LB	2200	1420	1950	64.5	88.6
UC-75-2_0.5-1.0_06082011	06/08/2011	N	LB	3080	2060	2710	66.9	88.0
UC-75-3_1.0-1.5_06082011	06/08/2011	N	LB	453	271	393	59.8	86.8

Table 6
Summary of PAH Ratios
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works Site

Sys Sample Code	Sample Date	Analysis Location	Sample Type Code	Sum [EPA] 34 PAHS mg/kg	Sum [MPCA] 13 PAHS mg/kg	Sum [EPA] 17 PAHS mg/kg	Ratio 13 to 34 PAHs %	Ratio 17 to 34 PAHs %
UC-75-4_1.5-2.0_06082011	06/08/2011	N	LB	136	66.4	116	48.8	85.3
UC-76-1_0.0-0.5_06082011	06/08/2011	N	LB	580	352	491	60.7	84.7
UC-77-1_0.0-0.5_06092011	06/09/2011	N	LB	108	56.2	95.7	52.0	88.6
UC-77-2_0.5-1.0_06092011	06/09/2011	N	LB	7.92	3.7	6.73	46.7	85.0
UC-77-3_1.0-1.5_06092011	06/09/2011	N	LB	244	156	218	63.9	89.3
UC-78-1_0.0-0.5_06092011	06/09/2011	N	LB	145	73.3	119	50.6	82.1
UC-79-1_0.0-0.5_06092011	06/09/2011	N	LB	741	458	662	61.8	89.3
UC-80-1_0.0-0.5_06102011	06/10/2011	N	LB	547	353	475	64.5	86.8
UC-81-1_0.0-0.5_06102011	06/10/2011	N	LB	241	148	208	61.4	86.3
UC-81-2_0.5-1.0_06102011	06/10/2011	N	LB	2830	2040	2540	72.1	89.8
UC-81-3_1.0-1.5_06102011	06/10/2011	N	LB	4170	2840	3760	68.1	90.2
UC-82-1_0.0-0.5_06102011	06/10/2011	N	LB	2380	1630	2160	68.5	90.8
UC-83-1_0.0-0.5_06132011	06/13/2011	N	LB	1220	784	1090	64.3	89.3
WM-84-1_0.0-0.5_06132011	06/13/2011	N	LB	16.5	5.51	6.44	33.4	39.0
WM-84-2_0.5-1.0_06132011	06/13/2011	N	LB	91.9	52.7	64.9	57.3	70.6
WM-84-3_1.0-1.5_06132011	06/13/2011	N	LB	581	375	466	64.5	80.2
WM-84-2_0.5-1.0_06132011_FD	06/13/2011	FD	LB	161	88.1	111	54.7	68.9
WM-85-1_0.0-0.5_06132011	06/13/2011	N	LB	10.1	3.4	5.18	33.7	51.3
WM-86-1_0.0-0.5_06152011	06/15/2011	N	LB	190	109	135	57.4	71.1
WM-87-1_0.0-0.5_06152011	06/15/2011	N	LB	1.67	0.552	0.874	33.1	52.3
WM-88-1_0.0-0.5_11152011	11/15/2011	N	LB	0.279	0.135	0.171	48.4	61.3
WM-88-2_2.0-2.5_11152011	11/15/2011	N	LB	1.56	0.523	0.666	33.5	42.7
WM-88-2_2.0-2.5_11152011_FD	11/15/2011	FD	LB	2.96	0.775	0.952	26.2	32.2
WM-88-3_3.25-3.75_11152011	11/15/2011	N	LB	20.4	10.6	13.7	52.0	67.2
WM-88-4_4.0-4.5_11152011	11/15/2011	N	LB	4.49	2.41	3.05	53.7	67.9
WM-89-1_0.0-0.5_11152011	11/15/2011	N	LB	0.195	0.0839	0.11	43.0	56.4
UC-90-1_0.0-0.5_11162011	11/16/2011	N	LB	1.01	0.573	0.749	56.7	74.2
UC-90-2_0.5-1.0_11162011	11/16/2011	N	LB	1.17	0.611	0.842	52.2	72.0
UC-90-3_2.0-2.5_11162011	11/16/2011	N	LB	0.198	0.0544	0.0692	27.5	34.9
UC-90-4_3.0-3.5_11162011	11/16/2011	N	LB	0.234	0.0364	0.0476	15.6	20.3
UC-91-1_0.0-0.5_11162011	11/16/2011	N	LB	0.206	0.0998	0.127	48.4	61.7
UC-96-1_0.0-0.5_11012011	11/01/2011	N	LB	393	290	334	73.8	85.0
UC-97-1_0.0-2.5_11022011	11/02/2011	N	LB	2260	1750	2000	77.4	88.5
UC-97-2_5.0-7.5_11022011	11/02/2011	N	LB	382	283	324	74.1	84.8
UC-97-3_7.5-10.0_11022011	11/02/2011	N	LB	19.6	14	16.2	71.4	82.7
UC-97-4_15.0-17.5_11022011	11/02/2011	N	LB	0.0833	0.0273	0.0357	32.8	42.9
WM-101-1_0.0-1.0_11162011	11/16/2011	N	LB	8.13	1.59	1.83	19.6	22.5
WM-101-2_5.0-7.5_11162011	11/16/2011	N	LB	1.06	0.233	0.281	22.0	26.5
WM-101-3_15.0-17.5_11162011	11/16/2011	N	LB	0.0889	0.0309	0.0397	34.8	44.7
WM-101-4_20.0-22.5_11162011	11/16/2011	N	LB	0.0798	0.0286	0.0374	35.8	46.9
WM-102-1_0.0-2.5_11162011	11/16/2011	N	LB	0.624	0.346	0.452	55.4	72.4

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	WM-1	WM-1	WM-1	WM-1	WM-2	WM-2	WM-2	WM-3	WM-3
				Sample Date	2/17/2011	2/17/2011	2/17/2011	2/17/2011	2/19/2011	2/19/2011	2/19/2011	2/20/2011	2/20/2011
				Depth Interval	0 - 0.7	0.7 - 1.9	1.9 - 2.1	2.5 - 3	0 - 0.5	1.2 - 1.4	1.4 - 1.9	0 - 1	2 - 4
				Depth Unit	ft	ft	ft	ft	ft	ft	ft	ft	ft
				Sys Sample Code	WM-1-1_0.0-0.7_02172011	WM-1-2_0.7-1.9_02172011	WM-1-3_1.9-2.1_02172011	WM-1-4_2.5-3.0_02172011	WM-2-1_0.0-0.5_02192011	WM-2-2_1.2-1.4_02192011	WM-2-3_1.4-1.9_02192011	WM-3-1_0.0-1.0_02202011	WM-3-2_2.0-4.0_02202011
				Sample Type Code	N	N	N	N	N	N	N	N	N
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Metals													
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	2.8 mg/kg	2.2 mg/kg	**9.8 mg/kg**	2.0 mg/kg	1.8 mg/kg	6.3 mg/kg	1.7 mg/kg	2.0 mg/kg	2.0 mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	< 0.81 mg/kg	< 0.73 mg/kg	**1.8 mg/kg**	< 0.72 mg/kg	< 0.66 mg/kg	**1.7 mg/kg**	< 0.65 mg/kg	< 0.75 mg/kg	< 0.75 mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	15.6 mg/kg	18.7 mg/kg	**45.4 mg/kg**	27.4 mg/kg	17.2 mg/kg	42.5 mg/kg	19.6 mg/kg	20.2 mg/kg	23.7 mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	14.3 mg/kg	15.3 mg/kg	**239 mg/kg**	21.3 mg/kg	16.7 mg/kg	**142 mg/kg**	15.2 mg/kg	13.8 mg/kg	17.1 mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	4.6 mg/kg	7.7 mg/kg	**201 mg/kg**	3.5 mg/kg	4.6 mg/kg	**135 mg/kg**	2.5 mg/kg	2.6 mg/kg	4.9 mg/kg
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	0.023 j mg/kg	0.048 j mg/kg	**0.37 mg/kg**	0.022 j mg/kg	0.025 j mg/kg	**0.33 mg/kg**	0.017 j mg/kg	0.017 j mg/kg	0.021 j mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	14.1 mg/kg	16.1 mg/kg	**47.7 mg/kg**	**23.8 mg/kg**	13.1 mg/kg	**40.6 mg/kg**	17.5 mg/kg	16.3 mg/kg	19.9 mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	48.5 mg/kg	60.0 mg/kg	**731 mg/kg**	62.0 mg/kg	47.2 mg/kg	**623 mg/kg**	45.2 mg/kg	45.2 mg/kg	55.6 mg/kg

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

			Sys Loc Code	WM-3	WM-3	WM-4	WM-4	WM-5	WM-5	WM-6		WM-6
			Sample Date	2/20/2011	2/20/2011	2/21/2011	2/21/2011	2/22/2011	2/22/2011	2/22/2011		2/22/2011
			Depth Interval	4.2 - 4.75	4.75 - 5.25	0 - 0.5	0.5 - 1	0 - 0.5	1 - 1.5	0 - 1	0 - 1	1.4 - 1.8
			Depth Unit	ft	ft	ft	ft	ft	ft	ft	ft	ft
			Sys Sample Code	WM-3-3_4.2-4.75_02202011	WM-3-4_4.75-5.25_02202011	WM-4-1_0.0-0.5_02212011	WM-4-2_0.5-1.0_02212011	WM-5-1_0.0-0.5_02222011	WM-5-2_1.0-1.5_02222011	WM-6-1_0.0-1.0_02222011	WM-6-1_0.0-1.0_02222011_FD	WM-6-2_1.4-1.8_02222011
			Sample Type Code	N	N	N	N	N	N	N	FD	N
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II								
Effective Date			2/1/2007	2/1/2007								
Exceedance Key			**Bold**	Underline								
Metals												
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	1.7 mg/kg	1.6 mg/kg	6.4 mg/kg	2.9 mg/kg	1.9 mg/kg	3.3 mg/kg	6.7 mg/kg	5.7 mg/kg	4.2 mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	< 0.70 mg/kg	< 0.62 mg/kg	**1.7 mg/kg**	< 0.82 mg/kg	< 0.76 mg/kg	**1.0 mg/kg**	**1.1 mg/kg**	**1.3 mg/kg**	< 0.78 mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	22.9 mg/kg	35.3 mg/kg	22.2 mg/kg	10.9 mg/kg	23.7 mg/kg	32.0 mg/kg	24.4 mg/kg	22.8 mg/kg	8.7 mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	19.1 mg/kg	19.8 mg/kg	**37.3 mg/kg**	22.5 mg/kg	16.3 mg/kg	**47.3 mg/kg**	**35.5 mg/kg**	30.6 mg/kg	21.4 mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	5.3 mg/kg	6.9 mg/kg	**103 mg/kg**	**45.8 mg/kg**	9.7 mg/kg	**64.3 mg/kg**	**191 mg/kg**	**90.7 mg/kg**	**63.3 mg/kg**
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	0.037 j mg/kg	0.017 j mg/kg	**0.53 mg/kg**	0.033 j mg/kg	0.052 j mg/kg	**0.35 mg/kg**	**0.25 mg/kg**	**0.22 mg/kg**	0.11 j mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	19.5 mg/kg	**24.8 mg/kg**	17.9 mg/kg	10.0 mg/kg	19.6 mg/kg	**26.2 mg/kg**	20.8 mg/kg	18.8 mg/kg	8.5 mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	55.3 mg/kg	57.7 mg/kg	**393 mg/kg**	**153 mg/kg**	69.5 mg/kg	**307 mg/kg**	**290 mg/kg**	**342 mg/kg**	**162 mg/kg**

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**WM-7**	**WM-7**	**WM-8**	**WM-8**	**WM-8**	**WM-9**	**WM-9**	**WM-9**	**WM-9**
				Sample Date	**2/22/2011**	**2/22/2011**	**2/24/2011**	**2/24/2011**	**2/24/2011**	**3/7/2011**	**3/7/2011**	**3/7/2011**	**3/7/2011**
				Depth Interval	**0 - 0.5**	**1.1 - 1.6**	**0 - 0.5**	**0.75 - 1.25**	**1.25 - 1.75**	**0 - 0.5**	**0.5 - 1**	**1.5 - 2**	**2 - 2.5**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**WM-7-1_0.0-0.5_02222011**	**WM-7-2_1.1-1.6_02222011**	**WM-8-1_0.0-0.5_02242011**	**WM-8-2_0.75-1.25_02242011**	**WM-8-3_1.25-1.75_02242011**	**WM-9-1_0.0-0.5_03072011**	**WM-9-2_0.5-1.0_03072011**	**WM-9-3_1.5-2.0_03072011**	**WM-9-4_2.0-2.5_03072011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Metals													
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	3.0 mg/kg	2.2 mg/kg	1.8 j mg/kg	4.4 j mg/kg	1.9 j mg/kg	2.7 j mg/kg	5.3 mg/kg	4.4 j mg/kg	3.7 mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	< 0.76 mg/kg	< 0.70 mg/kg	0.34 j mg/kg	**1.3 j mg/kg**	0.26 j mg/kg	< 0.70 mg/kg	**1.2 mg/kg**	**1.4 j mg/kg**	0.76 mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	20.0 mg/kg	7.0 mg/kg	17.1 j mg/kg	25.3 j mg/kg	22.5 j mg/kg	9.7 j mg/kg	13.1 mg/kg	15.6 j mg/kg	11.8 mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	15.3 mg/kg	9.9 mg/kg	13.7 j mg/kg	**44.2 j mg/kg**	16.3 j mg/kg	12.3 j mg/kg	21.4 mg/kg	25.6 j mg/kg	18.4 mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	11.2 mg/kg	2.3 mg/kg	12.2 j mg/kg	**76.3 j mg/kg**	3.0 j mg/kg	29.9 j mg/kg	**99.3 mg/kg**	**108 j mg/kg**	**60.2 mg/kg**
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	0.034 j mg/kg	0.023 j mg/kg	< 0.11 mg/kg	**0.43 mg/kg**	< 0.13 mg/kg	0.089 j mg/kg	**0.31 mg/kg**	**0.33 mg/kg**	0.11 j mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	17.3 mg/kg	5.9 mg/kg	13.8 j mg/kg	19.8 j mg/kg	17.6 j mg/kg	7.9 j mg/kg	9.8 mg/kg	11.2 j mg/kg	9.6 mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	64.5 mg/kg	18.0 mg/kg	75.7 j mg/kg	**348 j mg/kg**	48.0 j mg/kg	112 j mg/kg	**373 mg/kg**	**377 j mg/kg**	**176 mg/kg**

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**WM-10**	**WM-10**	**WM-10**	**UC-11**	**UC-11**	**UC-11**	**UC-11**	**UC-12**	**UC-12**
				Sample Date	**2/25/2011**	**2/25/2011**	**2/25/2011**	**2/26/2011**	**2/26/2011**	**2/26/2011**	**2/26/2011**	**2/27/2011**	**2/27/2011**
				Depth Interval	**0 - 1**	**1 - 2**	**2 - 2.8**	**0 - 1**	**1 - 2**	**2 - 3**	**3 - 3.5**	**0 - 0.5**	**1.5 - 2**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**WM-10-1_0.0-1.0_02252011**	**WM-10-2_1.0-2.0_02252011**	**WM-10-3_2.0-2.8_02252011**	**UC-11-1_0.0-1.0_02262011**	**UC-11-2_1.0-2.0_02262011**	**UC-11-3_2.0-3.0_02262011**	**UC-11-4_3.0-3.5_02262011**	**UC-12-1_0.0-0.5_02272011**	**UC-12-2_1.5-2.0_02272011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Metals													
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	**11.7 j mg/kg**	**17.1 j mg/kg**	2.7 j mg/kg	4.3 j mg/kg	**10.2 j mg/kg**	5.9 j mg/kg	2.0 j mg/kg	3.3 j mg/kg	**11.4 j mg/kg**
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	**3.5 j mg/kg**	**2.5 j mg/kg**	0.20 j mg/kg	0.74 j mg/kg	**1.2 j mg/kg**	**1.3 j mg/kg**	0.25 j mg/kg	0.50 j mg/kg	**2.1 j mg/kg**
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	**154 j mg/kg**	**76.9 j mg/kg**	15.7 j mg/kg	19.4 j mg/kg	16.2 j mg/kg	11.2 j mg/kg	6.1 j mg/kg	23.1 j mg/kg	26.6 j mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	**393 j mg/kg**	**481 j mg/kg**	15.0 j mg/kg	22.4 j mg/kg	28.6 j mg/kg	20.9 j mg/kg	9.7 j mg/kg	19.3 j mg/kg	**42.4 j mg/kg**
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	**318 j mg/kg**	**322 j mg/kg**	2.1 j mg/kg	**70.1 j mg/kg**	**131 j mg/kg**	**170 j mg/kg**	13.3 j mg/kg	23.6 j mg/kg	**201 j mg/kg**
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	**0.43 mg/kg**	**0.49 mg/kg**	< 0.13 mg/kg	0.15 mg/kg	**0.19 mg/kg**	**0.22 mg/kg**	< 0.14 mg/kg	< 0.14 mg/kg	**0.52 mg/kg**
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	**202 j mg/kg**	**102 j mg/kg**	11.5 j mg/kg	14.4 j mg/kg	12.0 j mg/kg	9.6 j mg/kg	6.4 j mg/kg	15.7 j mg/kg	18.9 j mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	**1090 j mg/kg**	**1030 j mg/kg**	29.7 j mg/kg	**273 j mg/kg**	**430 j mg/kg**	**414 j mg/kg**	51.2 j mg/kg	**124 j mg/kg**	**733 j mg/kg**

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**UC-12**	**UC-12**	**WM-13**	**WM-13**	**WM-13**	**WM-13**	**WM-14**	**WM-14**	**WM-14**
				Sample Date	**2/27/2011**	**2/27/2011**	**3/4/2011**	**3/4/2011**	**3/4/2011**	**3/4/2011**	**2/27/2011**	**2/27/2011**	**2/27/2011**
				Depth Interval	**2.5 - 3.1**	**3.1 - 3.6**	**0 - 0.5**	**1.5 - 2**	**3.25 - 3.75**	**3.75 - 4.25**	**0 - 0.5**	**0.5 - 1**	**1 - 1.5**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**UC-12-3_2.5-3.1_02272011**	**UC-12-4_3.1-3.6_02272011**	**WM-13-1_0.0-0.5_03042011**	**WM-13-2_1.5-2.0_03042011**	**WM-13-3_3.25-3.75_03042011**	**WM-13-4_3.75-4.25_03042011**	**WM-14-1_0.0-0.5_02272011**	**WM-14-2_0.5-1.0_02272011**	**WM-14-3_1.0-1.5_02272011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Metals													
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	7.3 j mg/kg	1.9 j mg/kg	2.6 mg/kg	2.2 mg/kg	1.8 mg/kg	2.2 mg/kg	1.8 j mg/kg	2.2 j mg/kg	8.6 j mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	**2.7 j mg/kg**	0.32 j mg/kg	0.22 j mg/kg	0.19 j mg/kg	0.29 j mg/kg	0.15 j mg/kg	0.22 j mg/kg	0.34 j mg/kg	**1.6 j mg/kg**
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	20.7 j mg/kg	25.9 j mg/kg	21.4 j mg/kg	21.9 j mg/kg	25.5 j mg/kg	32.6 j mg/kg	17.0 j mg/kg	21.9 j mg/kg	**43.0 j mg/kg**
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	31.6 j mg/kg	17.6 j mg/kg	15.2 j mg/kg	17.0 j mg/kg	14.3 j mg/kg	18.7 j mg/kg	13.2 j mg/kg	19.4 j mg/kg	**228 j mg/kg**
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	**215 j mg/kg**	5.9 j mg/kg	2.8 mg/kg	2.9 mg/kg	3.1 mg/kg	3.2 mg/kg	4.4 j mg/kg	9.4 j mg/kg	**174 j mg/kg**
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	**0.60 mg/kg**	< 0.14 mg/kg	0.030 j mg/kg	0.015 j mg/kg	0.017 j mg/kg	0.016 j mg/kg	< 0.13 mg/kg	< 0.13 mg/kg	**0.32 mg/kg**
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	17.6 j mg/kg	20.3 j mg/kg	16.7 j mg/kg	18.0 j mg/kg	19.1 j mg/kg	**23.1 j mg/kg**	13.9 j mg/kg	17.9 j mg/kg	**48.0 j mg/kg**
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	**676 j mg/kg**	64.5 j mg/kg	49.5 mg/kg	45.3 mg/kg	54.6 mg/kg	47.8 mg/kg	48.3 j mg/kg	78.8 j mg/kg	**549 j mg/kg**

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

			Sys Loc Code	WM-14	UC-15	UC-15	UC-15		UC-15		UC-16	UC-16
			Sample Date	2/27/2011	2/27/2011	2/27/2011	2/27/2011		2/27/2011		2/28/2011	2/28/2011
			Depth Interval	1.5 - 2	0 - 1	1 - 2	2 - 3	2 - 3	3 - 4	3 - 4	0 - 0.5	2 - 2.5
			Depth Unit	ft	ft	ft	ft	ft	ft	ft	ft	ft
			Sys Sample Code	WM-14-4_1.5-2.0_02272011	UC-15-1_0.0-1.0_02272011	UC-15-2_1.0-2.0_02272011	UC-15-3_2.0-3.0_02272011	UC-15-3_2.0-3.0_02272011_FD	UC-15-4_3.0-4.0_02272011	UC-15-4_3.0-4.0_02272011_FD	UC-16-1_0.0-0.5_02282011	UC-16-2_2.0-2.5_02282011
			Sample Type Code	N	N	N	N	FD	N	FD	N	N
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II								
Effective Date			2/1/2007	2/1/2007								
Exceedance Key			**Bold**	Underline								
Metals												
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	1.7 j mg/kg	1.6 j mg/kg	2.5 j mg/kg	3.8 mg/kg	4.2 mg/kg	2.8 mg/kg	2.4 mg/kg	2.2 mg/kg	**10.2 mg/kg**
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	0.13 j mg/kg	0.23 j mg/kg	0.41 j mg/kg	**1.1 mg/kg**	**1.2 mg/kg**	< 0.67 mg/kg	< 0.66 mg/kg	< 0.68 mg/kg	**1.7 mg/kg**
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	15.6 j mg/kg	18.0 j mg/kg	20.4 j mg/kg	29.6 mg/kg	29.3 mg/kg	31.8 mg/kg	31.4 mg/kg	20.3 mg/kg	28.0 mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	12.2 j mg/kg	12.5 j mg/kg	17.2 j mg/kg	**35.5 mg/kg**	**35.5 mg/kg**	19.8 mg/kg	17.3 mg/kg	14.2 mg/kg	**39.6 mg/kg**
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	1.8 j mg/kg	4.9 j mg/kg	11.6 j mg/kg	**73.8 mg/kg**	**85.3 mg/kg**	11.3 mg/kg	8.7 mg/kg	14.5 mg/kg	**185 mg/kg**
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	< 0.12 mg/kg	< 0.13 mg/kg	< 0.11 mg/kg	**0.41 mg/kg**	**0.43 mg/kg**	0.067 j mg/kg	0.048 j mg/kg	0.073 j mg/kg	**0.50 mg/kg**
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	11.8 j mg/kg	14.2 j mg/kg	15.8 j mg/kg	20.7 mg/kg	20.7 mg/kg	**24.3 mg/kg**	**23.0 mg/kg**	15.5 mg/kg	20.2 mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	32.8 j mg/kg	50.2 j mg/kg	86.8 j mg/kg	**301 mg/kg**	**319 mg/kg**	76.1 mg/kg	69.4 mg/kg	74.0 mg/kg	**622 mg/kg**

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**UC-16**	**UC-16**	**UC-17**	**UC-17**	**UC-17**	**UC-17**	**WM-18**	**WM-18**	**WM-18**
				Sample Date	**2/28/2011**	**2/28/2011**	**3/1/2011**	**3/1/2011**	**3/1/2011**	**3/1/2011**	**3/1/2011**	**3/1/2011**	**3/1/2011**
				Depth Interval	**3 - 3.5**	**4 - 4.5**	**0 - 0.5**	**1 - 1.5**	**2 - 2.5**	**2.5 - 3**	**0 - 0.7**	**0.7 - 1.7**	**1.7 - 2.7**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**UC-16-3_3.0-3.5_02282011**	**UC-16-4_4.0-4.5_02282011**	**UC-17-1_0.0-0.5_03012011**	**UC-17-2_1.0-1.5_03012011**	**UC-17-3_2.0-2.5_03012011**	**UC-17-4_2.5-3.0_03012011**	**WM-18-1_0.0-0.7_03012011**	**WM-18-2_0.7-1.7_03012011**	**WM-18-3_1.7-2.7_03012011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Metals													
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	8.2 mg/kg	1.9 mg/kg	3.0 mg/kg	3.9 mg/kg	8.3 mg/kg	5.5 mg/kg	4.3 mg/kg	**12.4 mg/kg**	1.8 mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	**2.6 mg/kg**	< 0.65 mg/kg	< 0.77 mg/kg	0.72 mg/kg	**2.0 mg/kg**	**1.8 mg/kg**	< 0.94 mg/kg	**2.3 mg/kg**	< 0.65 mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	25.6 mg/kg	28.8 mg/kg	23.2 mg/kg	26.9 mg/kg	37.2 mg/kg	27.2 mg/kg	42.9 mg/kg	**59.5 mg/kg**	18.3 mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	**34.7 mg/kg**	14.9 mg/kg	16.3 mg/kg	27.6 mg/kg	**47.1 mg/kg**	**34.9 mg/kg**	**55.9 mg/kg**	**374 mg/kg**	13.9 mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	**221 mg/kg**	5.0 mg/kg	19.1 mg/kg	**46.2 mg/kg**	**187 mg/kg**	**154 mg/kg**	**45.0 mg/kg**	**241 mg/kg**	5.0 mg/kg
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	**0.49 mg/kg**	0.041 j mg/kg	0.086 j mg/kg	0.15 mg/kg	**0.53 mg/kg**	**0.31 mg/kg**	0.14 j mg/kg	**0.55 mg/kg**	0.031 j mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	20.6 mg/kg	20.5 mg/kg	17.6 mg/kg	20.1 mg/kg	**28.9 mg/kg**	21.3 mg/kg	**35.3 mg/kg**	**65.1 mg/kg**	14.3 mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	**682 mg/kg**	59.4 mg/kg	95.5 mg/kg	**199 mg/kg**	**587 mg/kg**	**461 mg/kg**	**227 mg/kg**	**930 mg/kg**	40.6 mg/kg

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**WM-19**	**WM-19**	**WM-19**	**UC-20**	**UC-20**	**UC-20**	**UC-20**	**WM-21**	**WM-21**
				Sample Date	**3/2/2011**	**3/2/2011**	**3/2/2011**	**3/2/2011**	**3/2/2011**	**3/2/2011**	**3/2/2011**	**3/4/2011**	**3/4/2011**
				Depth Interval	**0 - 0.5**	**0.75 - 1.25**	**1.25 - 1.75**	**0 - 0.5**	**1.5 - 2**	**2.5 - 3**	**3.5 - 4**	**0 - 0.5**	**2 - 2.5**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**WM-19-1_0.0-0.5_03022011**	**WM-19-2_0.75-1.25_03022011**	**WM-19-3_1.25-1.75_03022011**	**UC-20-1_0.0-0.5_03022011**	**UC-20-2_1.5-2.0_03022011**	**UC-20-3_2.5-3.0_03022011**	**UC-20-4_3.5-4.0_03022011**	**WM-21-1_0.0-0.5_03042011**	**WM-21-2_2.0-2.5_03042011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Metals													
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	2.2 mg/kg	**10.1 mg/kg**	2.4 mg/kg	2.5 mg/kg	**13.1 mg/kg**	6.5 mg/kg	1.8 mg/kg	1.8 mg/kg	3.1 mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	< 0.62 mg/kg	**2.1 mg/kg**	0.30 j mg/kg	< 0.66 mg/kg	**2.3 mg/kg**	**2.3 mg/kg**	< 0.72 mg/kg	0.22 j mg/kg	0.49 j mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	23.4 mg/kg	**53.7 j mg/kg**	25.4 j mg/kg	21.9 mg/kg	40.4 mg/kg	25.0 mg/kg	18.5 mg/kg	19.4 j mg/kg	26.5 j mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	15.9 mg/kg	**203 j mg/kg**	19.0 j mg/kg	18.7 mg/kg	**63.4 mg/kg**	**33.2 mg/kg**	11.5 mg/kg	13.8 j mg/kg	23.9 j mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	5.3 mg/kg	**169 mg/kg**	6.3 mg/kg	21.7 mg/kg	**277 mg/kg**	**207 mg/kg**	4.1 mg/kg	4.7 mg/kg	14.8 mg/kg
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	0.037 j mg/kg	**0.45 mg/kg**	0.049 j mg/kg	0.083 j mg/kg	**0.77 mg/kg**	**0.39 mg/kg**	0.014 j mg/kg	0.031 j mg/kg	0.090 j mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	18.2 mg/kg	**49.3 j mg/kg**	20.6 j mg/kg	15.7 mg/kg	**31.2 mg/kg**	19.8 mg/kg	14.0 mg/kg	15.2 j mg/kg	21.7 j mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	49.6 mg/kg	**680 mg/kg**	68.8 mg/kg	99.3 mg/kg	**942 mg/kg**	**606 mg/kg**	34.2 mg/kg	51.7 mg/kg	107 mg/kg

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**WM-21**	**WM-21**	**WM-22**	**WM-22**	**WM-22**	**WM-22**	**UC-23**	**UC-23**	**UC-23**
				Sample Date	**3/4/2011**	**3/4/2011**	**3/6/2011**	**3/6/2011**	**3/6/2011**	**3/6/2011**	**3/2/2011**	**3/2/2011**	**3/2/2011**
				Depth Interval	**4 - 4.5**	**5 - 5.5**	**0 - 0.5**	**1.5 - 2**	**4 - 4.5**	**5.5 - 6**	**0 - 0.5**	**1.5 - 2**	**2.5 - 3**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**WM-21-3_4.0-4.5_03042011**	**WM-21-4_5.0-5.5_03042011**	**WM-22-1_0.0-0.5_03062011**	**WM-22-2_1.5-2.0_03062011**	**WM-22-3_4.0-4.5_03062011**	**WM-22-4_5.5-6.0_03062011**	**UC-23-1_0.0-0.5_03022011**	**UC-23-2_1.5-2.0_03022011**	**UC-23-3_2.5-3.0_03022011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Metals													
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	**10.7 mg/kg**	2.3 mg/kg	1.7 mg/kg	2.0 mg/kg	1.3 j mg/kg	1.8 mg/kg	4.1 mg/kg	**10.0 mg/kg**	**11.7 mg/kg**
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	**1.4 mg/kg**	0.26 j mg/kg	0.15 j mg/kg	< 0.86 mg/kg	< 0.65 mg/kg	< 0.69 mg/kg	0.51 j mg/kg	**1.8 mg/kg**	**3.4 mg/kg**
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	25.8 j mg/kg	28.9 j mg/kg	14.5 j mg/kg	17.2 mg/kg	9.9 mg/kg	12.1 mg/kg	26.3 j mg/kg	25.6 j mg/kg	30.8 j mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	**146 j mg/kg**	20.5 j mg/kg	10.5 j mg/kg	17.2 mg/kg	6.9 mg/kg	10.6 mg/kg	23.5 j mg/kg	**47.6 j mg/kg**	**53.0 j mg/kg**
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	**117 mg/kg**	4.1 mg/kg	3.5 mg/kg	12.3 mg/kg	2.7 mg/kg	6.5 mg/kg	25.5 mg/kg	**222 mg/kg**	**363 mg/kg**
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	**0.26 mg/kg**	0.040 j mg/kg	0.024 j mg/kg	0.16 j mg/kg	0.0023 j mg/kg	0.053 j mg/kg	**0.24 mg/kg**	**0.38 mg/kg**	**0.49 mg/kg**
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	22.4 j mg/kg	22.6 j mg/kg	12.1 j mg/kg	13.9 mg/kg	9.3 mg/kg	11.0 mg/kg	19.4 j mg/kg	19.6 j mg/kg	**25.7 j mg/kg**
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	**264 mg/kg**	60.9 mg/kg	34.8 mg/kg	73.3 mg/kg	27.0 mg/kg	46.8 mg/kg	**140 mg/kg**	**756 mg/kg**	**939 mg/kg**

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

			Sys Loc Code	UC-23	WM-24	WM-24		WM-24	WM-24	WM-25	WM-25	WM-25
			Sample Date	3/2/2011	3/7/2011	3/7/2011		3/7/2011	3/7/2011	3/7/2011	3/7/2011	3/7/2011
			Depth Interval	3.75 - 4.25	0 - 0.5	1 - 1.5	1 - 1.5	2 - 2.5	3 - 3.5	0 - 0.5	2.5 - 3	5.5 - 6
			Depth Unit	ft	ft	ft	ft	ft	ft	ft	ft	ft
			Sys Sample Code	UC-23-4_3.75-4.25_03022011	WM-24-1_0.0-0.5_03072011	WM-24-2_1.0-1.5_03072011	WM-24-2_1.0-1.5_03072011_FD	WM-24-3_2.0-2.5_03072011	WM-24-4_3.0-3.5_03072011	WM-25-1_0.0-0.5_03072011	WM-25-2_2.5-3.0_03072011	WM-25-3_5.5-6.0_03072011
			Sample Type Code	N	N	N	FD	N	N	N	N	N
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II								
Effective Date			2/1/2007	2/1/2007								
Exceedance Key			**Bold**	Underline								
Metals												
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	1.7 mg/kg	2.3 mg/kg	3.7 mg/kg	4.3 mg/kg	1.7 mg/kg	1.5 mg/kg	1.5 j mg/kg	3.4 mg/kg	**11.7 j mg/kg**
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	0.17 j mg/kg	< 0.73 mg/kg	0.80 mg/kg	0.89 mg/kg	< 0.70 mg/kg	< 0.64 mg/kg	< 0.62 j mg/kg	< 0.84 mg/kg	**1.9 j mg/kg**
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	22.7 j mg/kg	24.7 mg/kg	22.1 mg/kg	22.8 mg/kg	18.8 mg/kg	14.7 mg/kg	16.5 j mg/kg	34.1 mg/kg	31.4 j mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	13.5 j mg/kg	26.7 mg/kg	**92.0 mg/kg**	**94.3 mg/kg**	14.5 mg/kg	12.6 mg/kg	11.7 j mg/kg	24.8 mg/kg	**181 j mg/kg**
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	2.9 mg/kg	23.8 mg/kg	**76.3 mg/kg**	**84.7 mg/kg**	4.8 mg/kg	3.6 mg/kg	4.3 j mg/kg	16.7 mg/kg	**155 j mg/kg**
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	0.020 j mg/kg	0.065 j mg/kg	0.16 mg/kg	0.12 j mg/kg	0.037 j mg/kg	0.030 j mg/kg	0.027 j mg/kg	0.092 j mg/kg	**0.30 mg/kg**
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	18.4 j mg/kg	19.1 mg/kg	19.2 mg/kg	20.6 mg/kg	14.2 mg/kg	10.7 mg/kg	12.6 j mg/kg	**24.5 mg/kg**	**27.5 j mg/kg**
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	46.3 mg/kg	**126 mg/kg**	**318 mg/kg**	**325 mg/kg**	40.5 mg/kg	30.4 mg/kg	42.7 j mg/kg	101 mg/kg	**385 j mg/kg**

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**WM-25**	**WM-26**	**WM-26**	**WM-26**	**WM-26**	**WM-27**	**WM-27**	**WM-27**	**WM-28**
				Sample Date	**3/7/2011**	**3/11/2011**	**3/11/2011**	**3/11/2011**	**3/11/2011**	**3/13/2011**	**3/13/2011**	**3/13/2011**	**3/13/2011**
				Depth Interval	**6 - 6.5**	**0 - 0.5**	**0.5 - 1**	**1.3 - 1.8**	**1.8 - 2.1**	**0 - 0.5**	**0.5 - 1**	**1.4 - 1.9**	**0 - 0.5**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**WM-25-4_6.0-6.5_03072011**	**WM-26-1_0.0-0.5_03112011**	**WM-26-2_0.5-1.0_03112011**	**WM-26-3_1.3-1.8_03112011**	**WM-26-4_1.8-2.1_03112011**	**WM-27-1_0.0-0.5_03132011**	**WM-27-2_0.5-1.0_03132011**	**WM-27-3_1.4-1.9_03132011**	**WM-28-1_0.0-0.5_03132011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Metals													
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	2.5 mg/kg	2.3 mg/kg	5.4 mg/kg	**10.2 mg/kg**	3.0 mg/kg	2.2 mg/kg	3.2 mg/kg	5.9 mg/kg	2.5 mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	< 0.72 mg/kg	0.27 j mg/kg	0.89 j mg/kg	**1.5 mg/kg**	0.31 j mg/kg	0.29 j mg/kg	< 1.0 mg/kg	**1.5 mg/kg**	0.32 j mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	34.1 mg/kg	20.8 j mg/kg	**47.8 mg/kg**	36.4 j mg/kg	37.8 mg/kg	22.8 j mg/kg	32.5 mg/kg	35.5 j mg/kg	21.5 j mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	21.1 mg/kg	16.0 j mg/kg	**52.7 mg/kg**	**117 j mg/kg**	26.6 mg/kg	16.6 j mg/kg	24.9 mg/kg	**91.8 j mg/kg**	19.0 j mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	6.8 mg/kg	8.4 mg/kg	**50.8 mg/kg**	**121 mg/kg**	8.8 mg/kg	8.3 mg/kg	13.7 mg/kg	**108 mg/kg**	12.2 mg/kg
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	0.040 j mg/kg	< 0.13 mg/kg	**0.23 mg/kg**	**0.45 mg/kg**	< 0.18 mg/kg	< 0.17 mg/kg	< 0.20 mg/kg	**0.65 mg/kg**	< 0.14 mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	**25.0 mg/kg**	15.5 j mg/kg	**38.0 mg/kg**	**31.0 j mg/kg**	**31.1 mg/kg**	17.4 j mg/kg	**26.2 mg/kg**	**28.0 j mg/kg**	17.5 j mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	69.6 mg/kg	61.0 j mg/kg	**252 mg/kg**	**442 j mg/kg**	81.3 mg/kg	65.7 j mg/kg	91.3 mg/kg	**435 j mg/kg**	78.3 j mg/kg

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

			Sys Loc Code	WM-28		WM-28	WM-28	UC-29	UC-29		UC-29	UC-29
			Sample Date	3/13/2011		3/13/2011	3/13/2011	3/3/2011	3/3/2011		3/3/2011	3/3/2011
			Depth Interval	2 - 2.5	2 - 2.5	2.5 - 3	3 - 3.5	0 - 0.5	1 - 1.5	1 - 1.5	2 - 2.5	2.5 - 3
			Depth Unit	ft	ft	ft	ft	ft	ft	ft	ft	ft
			Sys Sample Code	WM-28-2_2.0-2.5_03132011	WM-28-2_2.0-2.5_03132011_FD	WM-28-3_2.5-3.0_03132011	WM-28-4_3.0-3.5_03132011	UC-29-1_0.0-0.5_03032011	UC-29-2_1.0-1.5_03032011	UC-29-2_1.0-1.5_03032011_FD	UC-29-3_2.0-2.5_03032011	UC-29-4_2.5-3.0_03032011
			Sample Type Code	N	FD	N	N	N	N	FD	N	N
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II								
Effective Date			2/1/2007	2/1/2007								
Exceedance Key			**Bold**	Underline								
Metals												
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	9.4 mg/kg	8.6 mg/kg	8.5 mg/kg	3.4 mg/kg	4.2 mg/kg	9.0 mg/kg	**10.4 mg/kg**	6.3 mg/kg	1.6 mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	**2.9 mg/kg**	**2.8 mg/kg**	0.96 mg/kg	< 0.97 mg/kg	0.65 j mg/kg	**1.6 mg/kg**	**2.0 mg/kg**	**2.0 mg/kg**	0.096 j mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	**63.2 mg/kg**	**60.6 mg/kg**	33.5 j mg/kg	38.8 mg/kg	24.5 j mg/kg	19.5 j mg/kg	25.4 j mg/kg	22.9 j mg/kg	17.7 j mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	**160 mg/kg**	**160 mg/kg**	**54.8 j mg/kg**	**32.1 mg/kg**	23.5 j mg/kg	**35.1 j mg/kg**	**44.0 j mg/kg**	30.0 j mg/kg	13.0 j mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	**224 mg/kg**	**220 mg/kg**	**64.1 mg/kg**	9.6 mg/kg	**38.6 mg/kg**	**188 mg/kg**	**227 mg/kg**	**172 mg/kg**	2.4 mg/kg
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	**0.79 mg/kg**	**1.0 mg/kg**	< 0.17 mg/kg	< 0.19 mg/kg	0.16 mg/kg	**0.28 mg/kg**	**0.41 mg/kg**	**0.40 mg/kg**	0.015 j mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	**52.2 mg/kg**	**52.4 mg/kg**	**26.9 j mg/kg**	**32.3 mg/kg**	18.4 j mg/kg	15.1 j mg/kg	19.0 j mg/kg	17.9 j mg/kg	16.8 j mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	**949 mg/kg**	**940 mg/kg**	**196 j mg/kg**	83.7 mg/kg	**190 mg/kg**	**617 mg/kg**	**760 mg/kg**	**502 mg/kg**	33.7 mg/kg

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**WM-30**	**WM-30**	**WM-30**	**WM-30**	**UC-31**	**UC-31**	**UC-31**		**UC-31**
				Sample Date	**3/8/2011**	**3/8/2011**	**3/8/2011**	**3/8/2011**	**3/9/2011**	**3/9/2011**	**3/9/2011**		**3/9/2011**
				Depth Interval	**0 - 0.5**	**1 - 1.5**	**2 - 2.5**	**3.5 - 4**	**0 - 0.5**	**0.5 - 1**	**1 - 1.5**	**1 - 1.5**	**2 - 2.5**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**WM-30-1_0.0-0.5_03082011**	**WM-30-2_1.0-1.5_03082011**	**WM-30-3_2.0-2.5_03082011**	**WM-30-4_3.5-4.0_03082011**	**UC-31-1_0.0-0.5_03092011**	**UC-31-2_0.5-1.0_03092011**	**UC-31-3_1.0-1.5_03092011**	**UC-31-3_1.0-1.5_03092011_FD**	**UC-31-4_2.0-2.5_03092011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**FD**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Metals													
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	< 1.6 mg/kg	1.8 mg/kg	2.6 mg/kg	2.8 mg/kg	6.1 mg/kg	5.0 j mg/kg	6.0 mg/kg	7.0 j mg/kg	2.0 j mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	0.29 j mg/kg	0.13 j mg/kg	0.26 j mg/kg	0.25 j mg/kg	0.81 mg/kg	**1.4 j mg/kg**	**1.1 mg/kg**	**1.2 j mg/kg**	< 0.60 j mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	26.6 mg/kg	16.8 mg/kg	28.8 mg/kg	28.9 mg/kg	20.0 mg/kg	19.3 j mg/kg	28.2 mg/kg	26.9 j mg/kg	21.2 j mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	**32.7 mg/kg**	11.9 mg/kg	17.2 mg/kg	20.3 mg/kg	25.1 mg/kg	28.7 j mg/kg	25.0 mg/kg	25.4 j mg/kg	10.4 j mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	16.2 * mg/kg	2.1 * mg/kg	3.6 * mg/kg	3.6 * mg/kg	**113 mg/kg**	**134 j mg/kg**	**108 mg/kg**	**82.0 j mg/kg**	3.3 j mg/kg
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	< 0.16 mg/kg	< 0.13 mg/kg	< 0.14 mg/kg	< 0.13 mg/kg	0.066 j mg/kg	0.015 j mg/kg	**0.44 mg/kg**	0.16 j mg/kg	0.013 j mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	**24.7 j mg/kg**	13.5 j mg/kg	**23.9 j mg/kg**	**25.2 j mg/kg**	14.7 mg/kg	14.1 j mg/kg	20.3 mg/kg	20.7 j mg/kg	16.0 j mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	63.1 j mg/kg	34.5 j mg/kg	68.6 j mg/kg	59.8 j mg/kg	**356 mg/kg**	**424 j mg/kg**	**296 mg/kg**	**267 j mg/kg**	30.1 j mg/kg

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**WM-32**	**WM-32**	**WM-32**	**WM-32**	**WM-33**	**WM-33**	**WM-33**	**WM-33**	**WM-34**
				Sample Date	**3/13/2011**	**3/13/2011**	**3/13/2011**	**3/13/2011**	**3/8/2011**	**3/8/2011**	**3/8/2011**	**3/8/2011**	**3/14/2011**
				Depth Interval	**0 - 0.5**	**0.5 - 1**	**1 - 1.5**	**3.5 - 4**	**0 - 0.5**	**0.5 - 1**	**1.5 - 2**	**2.5 - 3**	**0 - 0.5**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**WM-32-1_0.0-0.5_03132011**	**WM-32-2_0.5-1.0_03132011**	**WM-32-3_1.0-1.5_03132011**	**WM-32-4_3.5-4.0_03132011**	**WM-33-1_0.0-0.5_03082011**	**WM-33-2_0.5-1.0_03082011**	**WM-33-3_1.5-2.0_03082011**	**WM-33-4_2.5-3.0_03082011**	**WM-34-1_0.0-0.5_03142011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Metals													
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	5.4 mg/kg	4.6 mg/kg	3 mg/kg	1.9 mg/kg	< 1.3 j mg/kg	0.82 j mg/kg	2.0 j mg/kg	3.2 mg/kg	6.4 mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	0.45 j mg/kg	0.4 j mg/kg	0.13 j mg/kg	0.085 j mg/kg	< 0.63 mg/kg	< 0.60 mg/kg	< 0.90 j mg/kg	< 0.83 mg/kg	< 1.3 mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	31.8 mg/kg	27.2 mg/kg	13.1 mg/kg	14.1 mg/kg	31.6 j mg/kg	7.0 mg/kg	24.6 j mg/kg	42.1 mg/kg	23.8 mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	**32 mg/kg**	25.8 mg/kg	10.8 mg/kg	14.9 mg/kg	**73.8 j mg/kg**	7.7 mg/kg	18.5 j mg/kg	17.4 mg/kg	**58.5 mg/kg**
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	9 * mg/kg	9.1 * mg/kg	2.1 * mg/kg	1.3 * mg/kg	29.8 j mg/kg	2.4 mg/kg	3.4 j mg/kg	8.0 mg/kg	**49.7 mg/kg**
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	< 0.16 mg/kg	< 0.14 mg/kg	< 0.13 mg/kg	< 0.11 mg/kg	0.067 j mg/kg	0.012 j mg/kg	0.024 j mg/kg	0.020 j mg/kg	< 0.26 mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	**30.2 j mg/kg**	**27 j mg/kg**	13.3 j mg/kg	14.9 j mg/kg	**34.4 j mg/kg**	4.9 mg/kg	19.2 j mg/kg	**23.3 mg/kg**	**25.9 mg/kg**
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	83.1 j mg/kg	74.5 j mg/kg	39.5 j mg/kg	46.5 j mg/kg	**155 j mg/kg**	12.9 mg/kg	52.3 j mg/kg	82.2 mg/kg	**294 mg/kg**

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**WM-34**	**WM-34**	**UC-35**	**UC-35**	**UC-35**	**UC-35**	**UC-36**	**UC-36**	**UC-36**
				Sample Date	**3/14/2011**	**3/14/2011**	**3/9/2011**	**3/9/2011**	**3/9/2011**	**3/9/2011**	**3/9/2011**	**3/9/2011**	**3/9/2011**
				Depth Interval	**0.5 - 1**	**1 - 1.5**	**0 - 0.5**	**0.5 - 1**	**2 - 2.5**	**4 - 4.5**	**1 - 1.5**	**2 - 2.5**	**2.5 - 3**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**WM-34-2_0.5-1.0_03142011**	**WM-34-3_1.0-1.5_03142011**	**UC-35-1_0.0-0.5_03092011**	**UC-35-2_0.5-1.0_03092011**	**UC-35-3_2.0-2.5_03092011**	**UC-35-4_4.0-4.5_03092011**	**UC-36-2_1.0-1.5_03092011**	**UC-36-3_2.0-2.5_03092011**	**UC-36-4_2.5-3.0_03092011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Metals													
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	2.2 mg/kg	4.2 mg/kg	4.5 j mg/kg	1.8 mg/kg	1.6 j mg/kg	1.4 mg/kg	3.7 mg/kg	2.2 j mg/kg	2.2 j mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	0.095 j mg/kg	< 1.3 mg/kg	**1.2 j mg/kg**	< 0.74 mg/kg	< 0.61 j mg/kg	< 0.58 mg/kg	0.89 mg/kg	< 0.65 j mg/kg	< 0.56 j mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	9.8 j mg/kg	30.0 mg/kg	20.1 j mg/kg	11.8 mg/kg	23.4 j mg/kg	23.6 mg/kg	18.9 mg/kg	20.9 j mg/kg	14.5 j mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	8.9 j mg/kg	19.0 mg/kg	25.7 j mg/kg	11.4 mg/kg	11.3 j mg/kg	15.5 mg/kg	20.2 mg/kg	16.5 j mg/kg	12.2 j mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	2.2 mg/kg	5.9 mg/kg	**99.8 j mg/kg**	18.6 mg/kg	3.0 j mg/kg	2.7 mg/kg	**73.9 mg/kg**	3.7 j mg/kg	2.4 j mg/kg
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	< 0.16 mg/kg	< 0.26 mg/kg	0.016 j mg/kg	0.056 j mg/kg	0.0032 j mg/kg	< 0.12 mg/kg	**0.19 mg/kg**	0.10 j mg/kg	0.0083 j mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	7.0 j mg/kg	20.7 mg/kg	14.8 j mg/kg	8.8 mg/kg	16.4 j mg/kg	**23.2 mg/kg**	13.3 mg/kg	16.3 j mg/kg	11.5 j mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	19.7 j mg/kg	50.3 mg/kg	**320 j mg/kg**	61.2 mg/kg	31.9 j mg/kg	38.5 mg/kg	**225 mg/kg**	43.1 j mg/kg	30.4 j mg/kg

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**UC-36**	**UC-37**	**UC-37**	**UC-37**	**UC-37**	**UC-38**	**UC-38**	**UC-38**	**UC-38**
				Sample Date	**3/9/2011**	**3/10/2011**	**3/10/2011**	**3/10/2011**	**3/10/2011**	**3/11/2011**	**3/11/2011**	**3/11/2011**	**3/11/2011**
				Depth Interval	**0 - 0.5**	**0 - 0.5**	**0.5 - 1**	**3 - 3.5**	**5.5 - 6**	**0 - 0.5**	**1.5 - 2**	**2 - 2.5**	**2.9 - 3.4**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**UC-36-1_0.0-0.5_03092011**	**UC-37-1_0.0-0.5_03102011**	**UC-37-2_0.5-1.0_03102011**	**UC-37-3_3.0-3.5_03102011**	**UC-37-4_5.5-6.0_03102011**	**UC-38-1_0.0-0.5_03112011**	**UC-38-2_1.5-2.0_03112011**	**UC-38-3_2.0-2.5_03112011**	**UC-38-4_2.9-3.4_03112011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Metals													
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	2.6 j mg/kg	3.5 j mg/kg	2.4 j mg/kg	1.9 j mg/kg	2.9 j mg/kg	3.6 mg/kg	**14.3 mg/kg**	**14.7 mg/kg**	2.7 mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	< 0.58 mg/kg	< 0.81 mg/kg	< 0.76 j mg/kg	< 0.69 j mg/kg	< 0.69 j mg/kg	0.41 j mg/kg	**3.2 mg/kg**	**6.5 mg/kg**	< 0.95 mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	18.4 j mg/kg	23.6 j mg/kg	19.7 j mg/kg	21.4 j mg/kg	22.9 j mg/kg	19.4 j mg/kg	36.9 mg/kg	28.8 j mg/kg	38.9 mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	17.7 j mg/kg	20.3 j mg/kg	11.4 j mg/kg	12.2 j mg/kg	12.7 j mg/kg	14.6 j mg/kg	**56.9 mg/kg**	**52.0 j mg/kg**	23.6 mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	28.1 j mg/kg	33.4 j mg/kg	3.6 j mg/kg	2.6 j mg/kg	2.7 j mg/kg	23.4 mg/kg	**354 mg/kg**	**590 mg/kg**	7.3 mg/kg
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	0.023 j mg/kg	**0.26 mg/kg**	0.0082 j mg/kg	**0.23 mg/kg**	**0.27 mg/kg**	0.14 mg/kg	**0.77 mg/kg**	**0.80 mg/kg**	< 0.19 mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	13.9 j mg/kg	18.6 j mg/kg	14.9 j mg/kg	16.7 j mg/kg	18.0 j mg/kg	14.2 j mg/kg	**30.1 mg/kg**	**24.2 j mg/kg**	**31.2 mg/kg**
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	**138 j mg/kg**	**144 j mg/kg**	45.8 j mg/kg	47.0 j mg/kg	50.5 j mg/kg	104 j mg/kg	**993 mg/kg**	**2190 j mg/kg**	82.5 mg/kg

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**UC-39**	**UC-39**	**UC-39**	**UC-39**	**UC-40**	**UC-40**	**UC-40**	
				Sample Date	**3/3/2011**	**3/3/2011**	**3/3/2011**	**3/3/2011**	**3/10/2011**	**3/10/2011**	**3/10/2011**	
				Depth Interval	**0 - 0.5**	**2 - 2.5**	**3 - 3.5**	**4 - 4.5**	**0 - 0.5**	**1.5 - 2**	**3 - 3.5**	**3 - 3.5**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**UC-39-1_0.0-0.5_03032011**	**UC-39-2_2.0-2.5_03032011**	**UC-39-3_3.0-3.5_03032011**	**UC-39-4_4.0-4.5_03032011**	**UC-40-1_0.0-0.5_03102011**	**UC-40-2_1.5-2.0_03102011**	**UC-40-3_3.0-3.5_03102011**	**UC-40-3_3.0-3.5_03102011_FD**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**FD**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II								
Effective Date			2/1/2007	2/1/2007								
Exceedance Key			**Bold**	Underline								
Metals												
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	5.1 mg/kg	**15.3 mg/kg**	7.4 mg/kg	3.5 mg/kg	5.2 mg/kg	3.8 mg/kg	8.5 mg/kg	4.9 mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	0.62 j mg/kg	**2.5 mg/kg**	**1.9 mg/kg**	< 1.1 mg/kg	0.57 j mg/kg	0.67 j mg/kg	**2.8 mg/kg**	**1.3 mg/kg**
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	31.3 j mg/kg	40.3 mg/kg	21.0 j mg/kg	**44.1 mg/kg**	**43.9 mg/kg**	20.6 j mg/kg	**50.2 mg/kg**	23.1 j mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	25.7 j mg/kg	**65.4 mg/kg**	31.5 j mg/kg	26.6 mg/kg	**33.3 mg/kg**	23.0 j mg/kg	**61.9 mg/kg**	29.8 j mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	29.0 mg/kg	**277 mg/kg**	**193 mg/kg**	14.1 mg/kg	27.6 mg/kg	**53.4 mg/kg**	**232 mg/kg**	**117 mg/kg**
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	**0.24 mg/kg**	**1.5 mg/kg**	**0.34 mg/kg**	< 0.21 mg/kg	< 0.27 mg/kg	**0.34 mg/kg**	**0.45 mg/kg**	**0.30 mg/kg**
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	**23.2 j mg/kg**	**30.4 mg/kg**	16.9 j mg/kg	**35.3 mg/kg**	**32.3 mg/kg**	15.7 j mg/kg	**37.9 mg/kg**	17.6 j mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	**141 j mg/kg**	**985 mg/kg**	**519 j mg/kg**	105 mg/kg	**149 mg/kg**	**208 j mg/kg**	**726 mg/kg**	**348 j mg/kg**

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**UC-40**		**WM-41**	**WM-41**	**WM-41**	**WM-41**	**WM-42**	**WM-42**
				Sample Date	**3/10/2011**		**3/15/2011**	**3/15/2011**	**3/15/2011**	**3/15/2011**	**3/15/2011**	**3/15/2011**
				Depth Interval	**4.5 - 5**	**4.5 - 5**	**0 - 0.5**	**1 - 1.5**	**2 - 2.5**	**3 - 3.4**	**0 - 0.5**	**1 - 1.5**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**UC-40-4_4.5-5.0_03102011**	**UC-40-4_4.5-5.0_03102011_FD**	**WM-41-1_0.0-0.5_03152011**	**WM-41-2_1.0-1.5_03152011**	**WM-41-3_2.0-2.5_03152011**	**WM-41-4_3.0-3.4_03152011**	**WM-42-1_0.0-0.5_03152011**	**WM-42-2_1.0-1.5_03152011**
				Sample Type Code	**N**	**FD**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II								
Effective Date			2/1/2007	2/1/2007								
Exceedance Key			**Bold**	Underline								
Metals												
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	2.2 mg/kg	3.5 mg/kg	2.1 mg/kg	3.1 mg/kg	2.3 mg/kg	2.1 mg/kg	3.1 mg/kg	1.3 j mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	0.31 j mg/kg	0.31 j mg/kg	0.19 j mg/kg	< 1.1 mg/kg	0.20 j mg/kg	< 0.78 mg/kg	0.29 j mg/kg	0.11 j mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	29.4 j mg/kg	40.1 mg/kg	20.2 j mg/kg	28.2 mg/kg	23.8 j mg/kg	32.4 mg/kg	12.8 mg/kg	8.3 mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	17.9 j mg/kg	25.2 mg/kg	14.4 j mg/kg	20.8 mg/kg	18.2 j mg/kg	19.8 mg/kg	18.3 mg/kg	6.7 mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	7.3 mg/kg	8.8 mg/kg	4.4 mg/kg	5.9 mg/kg	3.8 mg/kg	5.6 mg/kg	10.8 j mg/kg	1.4 j mg/kg
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	< 0.14 mg/kg	< 0.20 mg/kg	< 0.13 mg/kg	< 0.23 mg/kg	< 0.14 mg/kg	< 0.16 mg/kg	< 0.19 mg/kg	< 0.14 mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	**23.9 j mg/kg**	**33.3 mg/kg**	15.7 j mg/kg	**23.4 mg/kg**	19.3 j mg/kg	**24.1 mg/kg**	10.7 mg/kg	6.8 mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	70.0 j mg/kg	93.4 mg/kg	47.0 j mg/kg	59.8 mg/kg	49.8 j mg/kg	67.7 mg/kg	64.1 mg/kg	16.0 mg/kg

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**WM-42**	**WM-42**	**WM-43**	**WM-43**	**WM-43**	**WM-43**	**WM-44**	**WM-44**
				Sample Date	**3/15/2011**	**3/15/2011**	**3/15/2011**	**3/15/2011**	**3/15/2011**	**3/15/2011**	**3/16/2011**	**3/16/2011**
				Depth Interval	**2 - 2.5**	**2.5 - 3**	**0 - 0.5**	**1.7 - 2.2**	**2.2 - 2.7**	**5 - 5.5**	**0 - 0.5**	**0.5 - 1**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**WM-42-3_2.0-2.5_03152011**	**WM-42-4_2.5-3.0_03152011**	**WM-43-1_0.0-0.5_03152011**	**WM-43-2_1.7-2.2_03152011**	**WM-43-3_2.2-2.7_03152011**	**WM-43-4_5.0-5.5_03152011**	**WM-44-1_0.0-0.5_03162011**	**WM-44-2_0.5-1.0_03162011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II								
Effective Date			2/1/2007	2/1/2007								
Exceedance Key			**Bold**	Underline								
Metals												
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	1.5 mg/kg	2.0 mg/kg	2.4 mg/kg	8.1 mg/kg	**11.0 mg/kg**	2.3 mg/kg	2.6 mg/kg	2.5 mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	0.16 j mg/kg	0.20 j mg/kg	0.37 j mg/kg	**2.2 mg/kg**	**1.6 mg/kg**	0.10 j mg/kg	0.20 j mg/kg	0.42 j mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	20.5 mg/kg	25.5 mg/kg	25.4 mg/kg	**57.2 mg/kg**	25.1 mg/kg	20.3 mg/kg	17.0 mg/kg	18.9 mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	12.2 mg/kg	18.0 mg/kg	18.0 mg/kg	**228 mg/kg**	**142 mg/kg**	18.8 mg/kg	12.4 mg/kg	20.9 mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	2.9 j mg/kg	3.8 j mg/kg	8.5 j mg/kg	**222 j mg/kg**	**123 j mg/kg**	3.2 j mg/kg	4.9 j mg/kg	15.4 j mg/kg
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	< 0.15 mg/kg	< 0.14 mg/kg	< 0.20 mg/kg	**0.56 mg/kg**	**0.26 mg/kg**	< 0.12 mg/kg	< 0.13 mg/kg	< 0.16 mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	15.0 mg/kg	20.6 mg/kg	20.9 mg/kg	**54.7 mg/kg**	**24.9 mg/kg**	14.6 mg/kg	13.9 mg/kg	14.7 mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	37.8 mg/kg	54.0 mg/kg	70.9 mg/kg	**972 mg/kg**	**285 mg/kg**	27.3 mg/kg	43.1 mg/kg	99.5 mg/kg

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**WM-44**	**WM-44**	**WM-45**	**WM-45**		**WM-45**	**WM-45**	**WM-46**	**WM-46**
				Sample Date	**3/16/2011**	**3/16/2011**	**3/16/2011**	**3/16/2011**		**3/16/2011**	**3/16/2011**	**3/16/2011**	**3/16/2011**
				Depth Interval	**1 - 1.5**	**2 - 2.5**	**0 - 0.5**	**1.5 - 2**	**1.5 - 2**	**3 - 3.5**	**5 - 5.5**	**0 - 0.5**	**2.3 - 2.8**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**WM-44-3_1.0-1.5_03162011**	**WM-44-4_2.0-2.5_03162011**	**WM-45-1_0.0-0.5_03162011**	**WM-45-2_1.5-2.0_03162011**	**WM-45-2_1.5-2.0_03162011_FD**	**WM-45-3_3.0-3.5_03162011**	**WM-45-4_5.0-5.5_03162011**	**WM-46-1_0.0-0.5_03162011**	**WM-46-2_2.3-2.8_03162011**
				Sample Type Code	**N**	**N**	**N**	**N**	**FD**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Metals													
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	2.8 mg/kg	2.2 mg/kg	2.3 mg/kg	2.1 mg/kg	1.8 mg/kg	1.4 mg/kg	1.2 j mg/kg	1.9 mg/kg	7.6 mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	0.29 j mg/kg	0.13 j mg/kg	0.13 j mg/kg	0.17 j mg/kg	0.18 j mg/kg	0.097 j mg/kg	< 0.62 mg/kg	< 0.79 mg/kg	**2.6 mg/kg**
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	22.4 mg/kg	15.2 mg/kg	16.4 mg/kg	14.1 mg/kg	17.4 mg/kg	9.0 mg/kg	14.0 mg/kg	20.4 mg/kg	**61.6 mg/kg**
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	17.6 mg/kg	9.2 mg/kg	11.2 mg/kg	10.3 mg/kg	11.0 mg/kg	6.9 mg/kg	8.1 mg/kg	15.1 mg/kg	**223 mg/kg**
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	9.5 j mg/kg	2.1 j mg/kg	3.0 j mg/kg	2.6 j mg/kg	2.7 j mg/kg	1.7 j mg/kg	3.1 mg/kg	7.1 mg/kg	**240 mg/kg**
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	< 0.14 mg/kg	< 0.12 mg/kg	< 0.13 mg/kg	< 0.12 mg/kg	< 0.12 mg/kg	< 0.13 mg/kg	< 0.12 mg/kg	< 0.16 mg/kg	**0.83 mg/kg**
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	18.1 mg/kg	14.6 mg/kg	13.5 mg/kg	12.9 mg/kg	14.5 mg/kg	8.8 mg/kg	12.1 mg/kg	15.7 mg/kg	**57.7 mg/kg**
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	58.2 mg/kg	42.7 mg/kg	33.4 mg/kg	31.0 mg/kg	40.0 mg/kg	19.9 mg/kg	27.9 mg/kg	53.3 mg/kg	42.7 mg/kg

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**WM-46**	**WM-46**	**WM-47**	**WM-47**	**WM-47**	**WM-47**	**WM-48**	**WM-48**	**WM-48**
				Sample Date	**3/16/2011**	**3/16/2011**	**3/16/2011**	**3/16/2011**	**3/16/2011**	**3/16/2011**	**3/17/2011**	**3/17/2011**	**3/17/2011**
				Depth Interval	**2.8 - 3.3**	**4 - 4.5**	**0 - 0.5**	**2.5 - 3**	**3 - 3.5**	**3.5 - 4**	**0 - 0.5**	**2 - 2.5**	**2.5 - 3**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**WM-46-3_2.8-3.3_03162011**	**WM-46-4_4.0-4.5_03162011**	**WM-47-1_0.0-0.5_03162011**	**WM-47-2_2.5-3.0_03162011**	**WM-47-3_3.0-3.5_03162011**	**WM-47-4_3.5-4.0_03162011**	**WM-48-1_0.0-0.5_03172011**	**WM-48-2_2.0-2.5_03172011**	**WM-48-3_2.5-3.0_03172011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Metals													
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	**15.7 mg/kg**	0.74 j mg/kg	3.2 mg/kg	7.1 mg/kg	3.9 mg/kg	2.0 mg/kg	1.8 mg/kg	3.3 mg/kg	4.1 mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	**1.8 mg/kg**	< 0.63 mg/kg	< 0.78 mg/kg	**1.1 mg/kg**	< 0.81 mg/kg	< 0.64 mg/kg	< 0.67 mg/kg	0.89 mg/kg	< 0.86 mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	39.1 mg/kg	28.2 mg/kg	12.8 mg/kg	32.8 mg/kg	31.9 mg/kg	38.5 mg/kg	13.7 mg/kg	33.8 mg/kg	31.3 mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	**224 mg/kg**	15.7 mg/kg	11.4 mg/kg	**103 mg/kg**	**38.7 mg/kg**	20.2 mg/kg	9.6 mg/kg	**47.9 mg/kg**	**36.5 mg/kg**
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	**210 mg/kg**	5.3 mg/kg	4.9 mg/kg	**107 mg/kg**	31.8 mg/kg	6.5 mg/kg	5.6 mg/kg	**51.8 mg/kg**	26.8 mg/kg
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	**0.45 mg/kg**	< 0.13 mg/kg	< 0.16 mg/kg	**0.36 mg/kg**	**0.19 mg/kg**	< 0.13 mg/kg	< 0.13 mg/kg	**0.32 mg/kg**	< 0.17 mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	**36.7 mg/kg**	18.5 mg/kg	11.2 mg/kg	**28.2 mg/kg**	**25.2 mg/kg**	**28.1 mg/kg**	12.3 mg/kg	**25.6 mg/kg**	**24.8 mg/kg**
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	**498 mg/kg**	43.1 mg/kg	39.5 mg/kg	**335 mg/kg**	**150 mg/kg**	59.9 mg/kg	36.3 mg/kg	**256 mg/kg**	99.5 mg/kg

Table 7
Metals Data Summary
Spirit Lake Sediment Site
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			Sys Loc Code	WM-48	WM-49	WM-49		WM-49	WM-49	WM-50	WM-50	WM-50
			Sample Date	3/17/2011	3/17/2011	3/17/2011		3/17/2011	3/17/2011	3/17/2011	3/17/2011	3/17/2011
			Depth Interval	3 - 3.5	0 - 0.5	2.5 - 3	2.5 - 3	4.8 - 5.3	5.5 - 6	0 - 0.5	1 - 1.5	2.5 - 3
			Depth Unit	ft	ft	ft	ft	ft	ft	ft	ft	ft
			Sys Sample Code	WM-48-4_3.0-3.5_03172011	WM-49-1_0.0-0.5_03172011	WM-49-2_2.5-3.0_03172011	WM-49-2_2.5-3.0_03172011_FD	WM-49-3_4.8-5.3_03172011	WM-49-4_5.5-6.0_03172011	WM-50-1_0.0-0.5_03172011	WM-50-2_1.0-1.5_03172011	WM-50-3_2.5-3.0_03172011
			Sample Type Code	N	N	N	FD	N	N	N	N	N
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II								
Effective Date			2/1/2007	2/1/2007								
Exceedance Key			**Bold**	Underline								
Metals												
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	3.5 mg/kg	2.2 mg/kg	2.2 mg/kg	2.3 mg/kg	4.1 mg/kg	1.2 mg/kg	2.3 mg/kg	4.4 mg/kg	6.3 mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	< 0.90 mg/kg	0.18 j mg/kg	0.35 j mg/kg	0.39 j mg/kg	0.81 mg/kg	0.075 j mg/kg	0.28 j mg/kg	0.68 j mg/kg	**1.5 mg/kg**
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	30.9 mg/kg	13.5 j mg/kg	17.0 j mg/kg	15.9 j mg/kg	34.7 j mg/kg	10.2 j mg/kg	20.4 j mg/kg	27.2 j mg/kg	42.2 j mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	23.3 mg/kg	10.3 j mg/kg	16.4 j mg/kg	16.4 j mg/kg	**35.0 j mg/kg**	6.4 j mg/kg	13.9 j mg/kg	24.3 j mg/kg	**50.8 j mg/kg**
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	7.1 mg/kg	3.4 mg/kg	9.8 mg/kg	10.3 mg/kg	26.8 mg/kg	2.0 mg/kg	5.9 mg/kg	18.7 mg/kg	**90.0 mg/kg**
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	< 0.18 mg/kg	0.013 j mg/kg	0.076 j mg/kg	0.10 j mg/kg	**0.52 mg/kg**	0.0080 j mg/kg	0.038 j mg/kg	0.10 j mg/kg	**0.27 mg/kg**
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	**23.1 mg/kg**	12.1 mg/kg	14.1 mg/kg	13.6 mg/kg	**23.4 mg/kg**	9.0 mg/kg	16.7 mg/kg	21.8 mg/kg	**33.7 mg/kg**
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	61.2 mg/kg	35.5 mg/kg	74.7 mg/kg	80.6 mg/kg	**180 mg/kg**	27.1 mg/kg	56.9 mg/kg	**133 mg/kg**	**343 mg/kg**

Table 7
Metals Data Summary
Spirit Lake Sediment Site
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				Sys Loc Code	**WM-50**	**WM-51**	**WM-51**	**WM-51**	**WM-51**
				Sample Date	**3/17/2011**	**3/18/2011**	**3/18/2011**	**3/18/2011**	**3/18/2011**
				Depth Interval	**3 - 3.5**	**0 - 0.5**	**2 - 2.5**	**4 - 4.5**	**6 - 6.5**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**WM-50-4_3.0-3.5_03172011**	**WM-51-1_0.0-0.5_03182011**	**WM-51-2_2.0-2.5_03182011**	**WM-51-3_4.0-4.5_03182011**	**WM-51-4_6.0-6.5_03182011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II					
Effective Date			2/1/2007	2/1/2007					
Exceedance Key			**Bold**	Underline					
Metals									
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	3.2 mg/kg	3.0 mg/kg	3.9 mg/kg	2.1 mg/kg	2.3 mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	0.40 j mg/kg	0.27 j mg/kg	0.80 j mg/kg	0.23 j mg/kg	0.19 j mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	31.8 j mg/kg	21.5 j mg/kg	34.0 j mg/kg	21.0 j mg/kg	30.5 j mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	18.7 j mg/kg	15.8 j mg/kg	**36.9 j mg/kg**	14.0 j mg/kg	23.0 j mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	5.8 mg/kg	6.1 mg/kg	34.1 mg/kg	3.2 mg/kg	4.3 mg/kg
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	0.050 j mg/kg	0.032 j mg/kg	**0.25 mg/kg**	0.015 j mg/kg	0.018 j mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	**25.4 mg/kg**	17.1 mg/kg	**25.4 mg/kg**	17.4 mg/kg	**27.8 mg/kg**
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	78.0 mg/kg	54.6 mg/kg	**208 mg/kg**	47.0 mg/kg	50.3 mg/kg

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**UC-52**	**UC-52**	**UC-52**	**UC-52**	**UC-53**	**UC-53**	**UC-53**	**UC-53**	**UC-54**
				Sample Date	**3/18/2011**	**3/18/2011**	**3/18/2011**	**3/18/2011**	**3/18/2011**	**3/18/2011**	**3/18/2011**	**3/18/2011**	**3/18/2011**
				Depth Interval	**0 - 0.5**	**2 - 2.5**	**4 - 4.5**	**5 - 5.5**	**0 - 0.5**	**2 - 2.5**	**3 - 3.5**	**4.5 - 5**	**0 - 0.5**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**UC-52-1_0.0-0.5_03182011**	**UC-52-2_2.0-2.5_03182011**	**UC-52-3_4.0-4.5_03182011**	**UC-52-4_5.0-5.5_03182011**	**UC-53-1_0.0-0.5_03182011**	**UC-53-2_2.0-2.5_03182011**	**UC-53-3_3.0-3.5_03182011**	**UC-53-4_4.5-5.0_03182011**	**UC-54-1_0.0-0.5_03182011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Metals													
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	3.2 mg/kg	4.5 mg/kg	3.5 mg/kg	2.0 mg/kg	3.8 mg/kg	**11.3 mg/kg**	**11.1 mg/kg**	3.3 mg/kg	2.3 mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	0.43 j mg/kg	0.57 j mg/kg	< 0.82 mg/kg	< 0.63 mg/kg	< 0.88 mg/kg	**1.3 mg/kg**	**2.0 mg/kg**	< 0.81 mg/kg	< 0.68 mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	26.9 j mg/kg	36.2 j mg/kg	28.2 mg/kg	16.9 mg/kg	22.2 mg/kg	16.3 mg/kg	15.4 mg/kg	22.8 mg/kg	14.3 mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	21.8 j mg/kg	25.5 j mg/kg	17.2 mg/kg	8.7 mg/kg	18.7 mg/kg	29.2 mg/kg	**33.9 mg/kg**	17.0 mg/kg	12.7 mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	9.1 mg/kg	21.7 mg/kg	4.1 j mg/kg	3.1 j mg/kg	23.8 j mg/kg	**140 j mg/kg**	**262 j mg/kg**	6.6 j mg/kg	16.8 j mg/kg
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	0.057 j mg/kg	0.054 j mg/kg	0.045 j mg/kg	0.0018 j mg/kg	0.074 j mg/kg	**0.26 mg/kg**	0.11 j mg/kg	0.031 j mg/kg	0.022 j mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	21.5 mg/kg	**28.9 mg/kg**	**23.7 mg/kg**	13.3 mg/kg	16.8 mg/kg	13.5 mg/kg	15.3 mg/kg	19.9 mg/kg	12.4 mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	81.9 mg/kg	**120 mg/kg**	67.0 mg/kg	30.8 mg/kg	116 mg/kg	**449 mg/kg**	**576 mg/kg**	61.2 mg/kg	67.4 mg/kg

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**UC-54**	**UC-54**	**UC-55**	**UC-55**		**UC-55**	**UC-55**	**UC-56**	**UC-56**
				Sample Date	**3/18/2011**	**3/18/2011**	**3/18/2011**	**3/18/2011**		**3/18/2011**	**3/18/2011**	**3/19/2011**	**3/19/2011**
				Depth Interval	**0.5 - 1**	**1 - 1.5**	**0 - 0.5**	**2 - 2.5**	**2 - 2.5**	**3 - 3.5**	**4 - 4.5**	**0 - 0.5**	**1 - 1.5**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**UC-54-2_0.5-1.0_03182011**	**UC-54-3_1.0-1.5_03182011**	**UC-55-1_0.0-0.5_03182011**	**UC-55-2_2.0-2.5_03182011**	**UC-55-2_2.0-2.5_03182011_FD**	**UC-55-3_3.0-3.5_03182011**	**UC-55-4_4.0-4.5_03182011**	**UC-56-1_0.0-0.5_03192011**	**UC-56-2_1.0-1.5_03192011**
				Sample Type Code	**N**	**N**	**N**	**N**	**FD**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Metals													
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	1.7 mg/kg	3.1 mg/kg	4.7 mg/kg	1.6 mg/kg	2.7 mg/kg	1.6 mg/kg	1.9 mg/kg	2.3 mg/kg	3.2 mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	< 0.62 mg/kg	< 0.64 mg/kg	< 0.83 mg/kg	< 0.65 mg/kg	< 0.64 mg/kg	< 0.62 mg/kg	< 0.62 mg/kg	< 0.67 mg/kg	0.88 mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	11.9 mg/kg	**43.8 mg/kg**	8.9 mg/kg	15.5 mg/kg	16.9 mg/kg	21.1 mg/kg	22.2 mg/kg	4.7 mg/kg	11.1 j mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	9.1 mg/kg	**33.5 mg/kg**	14.4 mg/kg	8.0 mg/kg	9.8 mg/kg	16.7 mg/kg	18.8 mg/kg	7.9 mg/kg	18.6 j mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	18.9 j mg/kg	7.4 j mg/kg	**51.8 j mg/kg**	3.1 j mg/kg	2.8 j mg/kg	3.8 j mg/kg	3.9 j mg/kg	30.2 j mg/kg	**81.3 j mg/kg**
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	0.0040 j mg/kg	0.013 j mg/kg	< 0.17 mg/kg	0.0060 j mg/kg	0.0041 j mg/kg	0.013 j mg/kg	0.011 j mg/kg	**0.18 mg/kg**	0.11 j mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	10.8 mg/kg	**34.5 mg/kg**	10.0 mg/kg	11.5 mg/kg	12.7 mg/kg	18.8 mg/kg	17.3 mg/kg	< 5.4 mg/kg	9.5 mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	21.5 mg/kg	53.5 mg/kg	**175 mg/kg**	21.2 mg/kg	22.2 mg/kg	33.9 mg/kg	37.4 mg/kg	107 mg/kg	**212 j mg/kg**

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**UC-56**	**UC-56**	**UC-57**	**UC-57**	**UC-57**	**UC-57**	**WM-58**	**WM-58**	**WM-58**
				Sample Date	**3/19/2011**	**3/19/2011**	**3/19/2011**	**3/19/2011**	**3/19/2011**	**3/19/2011**	**3/19/2011**	**3/19/2011**	**3/19/2011**
				Depth Interval	**3 - 3.5**	**3.9 - 4.4**	**0 - 0.5**	**0.5 - 1**	**1.5 - 2**	**2 - 2.5**	**0 - 0.5**	**0.5 - 1**	**1 - 1.5**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**UC-56-3_3.0-3.5_03192011**	**UC-56-4_3.9-4.4_03192011**	**UC-57-1_0.0-0.5_03192011**	**UC-57-2_0.5-1.0_03192011**	**UC-57-3_1.5-2.0_03192011**	**UC-57-4_2.0-2.5_03192011**	**WM-58-1_0.0-0.5_03192011**	**WM-58-2_0.5-1.0_03192011**	**WM-58-3_1.0-1.5_03192011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Metals													
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	2.3 mg/kg	1.5 mg/kg	6.9 mg/kg	**15.6 mg/kg**	8.4 mg/kg	2.1 mg/kg	**17.4 mg/kg**	**14.6 mg/kg**	**16.8 mg/kg**
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	0.13 j mg/kg	0.3 j mg/kg	0.96 mg/kg	**2.6 mg/kg**	**2.6 mg/kg**	0.19 j mg/kg	**3.3 mg/kg**	**4.4 mg/kg**	**2.2 mg/kg**
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	13.9 j mg/kg	16.6 j mg/kg	22.8 j mg/kg	37.5 j mg/kg	36.9 j mg/kg	18.8 j mg/kg	**182 j mg/kg**	**124 j mg/kg**	**68.4 j mg/kg**
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	11.1 j mg/kg	10.1 j mg/kg	27.9 j mg/kg	**62.9 j mg/kg**	**41.8 j mg/kg**	11.1 j mg/kg	**727 j mg/kg**	**684 j mg/kg**	**627 j mg/kg**
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	2.6 j mg/kg	3.1 j mg/kg	**107 j mg/kg**	**313 j mg/kg**	**202 j mg/kg**	2.7 j mg/kg	**381 j mg/kg**	**425 j mg/kg**	**323 j mg/kg**
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	< 0.18 mg/kg	0.0055 j mg/kg	0.085 j mg/kg	**0.52 mg/kg**	**0.52 mg/kg**	0.0082 j mg/kg	**0.3 mg/kg**	**0.58 mg/kg**	**0.45 mg/kg**
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	14.1 mg/kg	10.9 mg/kg	19 mg/kg	**31.4 mg/kg**	**30.3 mg/kg**	15.4 mg/kg	**265 mg/kg**	**172 mg/kg**	**103 mg/kg**
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	26.7 j mg/kg	66.1 j mg/kg	**353 j mg/kg**	**1040 j mg/kg**	**615 j mg/kg**	39.8 j mg/kg	**1390 j mg/kg**	**2170 j mg/kg**	**1370 j mg/kg**

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**WM-58**	**WM-59**	**WM-59**	**WM-59**	**WM-59**	**WM-60**	**WM-60**	**WM-60**
				Sample Date	**3/19/2011**	**3/21/2011**	**3/21/2011**	**3/21/2011**	**3/21/2011**	**3/21/2011**	**3/21/2011**	**3/21/2011**
				Depth Interval	**2 - 2.5**	**0 - 0.5**	**0.5 - 1**	**1 - 1.5**	**1.5 - 2**	**0 - 0.5**	**0.5 - 1**	**1 - 1.4**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**WM-58-4_2.0-2.5_03192011**	**WM-59-1_0.0-0.5_03212011**	**WM-59-2_0.5-1.0_03212011**	**WM-59-3_1.0-1.5_03212011**	**WM-59-4_1.5-2.0_03212011**	**WM-60-1_0.0-0.5_03212011**	**WM-60-2_0.5-1.0_03212011**	**WM-60-3_1.0-1.4_03212011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II								
Effective Date			2/1/2007	2/1/2007								
Exceedance Key			**Bold**	Underline								
Metals												
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	1.7 mg/kg	2.2 mg/kg	7.5 mg/kg	1.4 j mg/kg	1.1 j mg/kg	2.3 mg/kg	3.1 mg/kg	2.6 mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	0.088 j mg/kg	0.3 j mg/kg	**1.9 mg/kg**	0.071 j mg/kg	0.16 j mg/kg	< 0.64 mg/kg	< 0.83 mg/kg	< 0.72 mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	6.8 j mg/kg	19.9 j mg/kg	**61.4 j mg/kg**	11.8 j mg/kg	17.9 j mg/kg	14.1 mg/kg	26.1 mg/kg	27.7 mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	6.2 j mg/kg	16.7 j mg/kg	**257 j mg/kg**	7.6 j mg/kg	11 j mg/kg	9 j mg/kg	23.3 j mg/kg	14.2 j mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	1.2 j mg/kg	7 j mg/kg	**148 j mg/kg**	1.6 j mg/kg	2 j mg/kg	4.1 mg/kg	15.8 mg/kg	3.6 mg/kg
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	0.0012 j mg/kg	0.031 j mg/kg	0.13 j mg/kg	0.0099 j mg/kg	0.0068 j mg/kg	0.013 j mg/kg	0.048 j mg/kg	0.012 j mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	5.4 mg/kg	17.2 mg/kg	**72.6 mg/kg**	8.5 mg/kg	12.5 mg/kg	12.1 mg/kg	20.9 mg/kg	21.8 mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	11 j mg/kg	63.4 j mg/kg	**803 j mg/kg**	20.3 j mg/kg	30.2 j mg/kg	36.2 mg/kg	118 mg/kg	44.1 mg/kg

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

			Sys Loc Code	WM-61		WM-61	WM-61	WM-61	WM-62	WM-62	WM-62	WM-62
			Sample Date	3/21/2011		3/21/2011	3/21/2011	3/21/2011	3/21/2011	3/21/2011	3/21/2011	3/21/2011
			Depth Interval	0 - 0.5	0 - 0.5	1 - 1.5	1.5 - 2	2.5 - 3	0 - 0.5	0.5 - 1	1 - 1.5	1.5 - 2
			Depth Unit	ft	ft	ft	ft	ft	ft	ft	ft	ft
			Sys Sample Code	WM-61-1_0.0-0.5_03212011	WM-61-1_0.0-0.5_03212011_FD	WM-61-2_1.0-1.5_03212011	WM-61-3_1.5-2.0_03212011	WM-61-4_2.5-3.0_03212011	WM-62-1_0.0-0.5_03212011	WM-62-2_0.5-1.0_03212011	WM-62-3_1.0-1.5_03212011	WM-62-4_1.5-2.0_03212011
			Sample Type Code	N	FD	N	N	N	N	N	N	N
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II								
Effective Date			2/1/2007	2/1/2007								
Exceedance Key			**Bold**	Underline								
Metals												
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	2.7 mg/kg	3 mg/kg	2.4 mg/kg	2.5 mg/kg	2.5 mg/kg	2.9 mg/kg	2.7 mg/kg	2.3 mg/kg	2 mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	< 0.66 mg/kg	< 0.66 mg/kg	< 0.66 mg/kg	< 0.69 mg/kg	< 0.67 mg/kg	< 0.76 mg/kg	< 0.68 mg/kg	< 0.64 mg/kg	< 0.66 mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	16.3 mg/kg	18.4 mg/kg	21.5 mg/kg	20.2 mg/kg	14.3 mg/kg	18 mg/kg	16.9 mg/kg	16.5 mg/kg	18.5 mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	19 j mg/kg	25.3 j mg/kg	12.5 j mg/kg	11.6 j mg/kg	14.8 j mg/kg	12.1 j mg/kg	11.9 j mg/kg	11.1 j mg/kg	10.4 j mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	18.4 mg/kg	23.3 mg/kg	2.6 mg/kg	2.6 mg/kg	2 mg/kg	3.5 mg/kg	2.6 mg/kg	2.5 mg/kg	2.6 mg/kg
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	0.062 j mg/kg	0.096 j mg/kg	0.013 j mg/kg	0.0099 j mg/kg	0.0022 j mg/kg	0.017 j mg/kg	0.0041 j mg/kg	0.0028 j mg/kg	0.0061 j mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	14.5 mg/kg	15.6 mg/kg	16.3 mg/kg	15.6 mg/kg	14.7 mg/kg	16 mg/kg	14.4 mg/kg	13.8 mg/kg	15.6 mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	**130 mg/kg**	**144 mg/kg**	41.3 mg/kg	42.5 mg/kg	29.4 mg/kg	40.1 mg/kg	37.7 mg/kg	33.3 mg/kg	36.9 mg/kg

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**WM-63**
				Sample Date	**3/21/2011**
				Depth Interval	**0 - 0.5**
				Depth Unit	**ft**
				Sys Sample Code	**WM-63-1_0.0-0.5_03212011**
				Sample Type Code	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II	
Effective Date			2/1/2007	2/1/2007	
Exceedance Key			**Bold**	Underline	
Metals					
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	**9.9 mg/kg**
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	**1.5 mg/kg**
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	**91 mg/kg**
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	**326 j mg/kg**
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	**170 mg/kg**
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	**0.23 mg/kg**
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	**132 mg/kg**
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	**720 mg/kg**

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**WM-63**	**WM-63**	**WM-63**	**WM-64**	**WM-64**	**WM-64**	**WM-64**	**WM-65**	**WM-65**
				Sample Date	**3/21/2011**	**3/21/2011**	**3/21/2011**	**3/10/2011**	**3/10/2011**	**3/10/2011**	**3/10/2011**	**3/21/2011**	**3/21/2011**
				Depth Interval	**0.5 - 1**	**1 - 1.5**	**1.8 - 2.2**	**0 - 0.5**	**1 - 1.5**	**2 - 2.5**	**3 - 3.5**	**0 - 0.5**	**1 - 1.5**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**WM-63-2_0.5-1.0_03212011**	**WM-63-3_1.0-1.5_03212011**	**WM-63-4_1.8-2.2_03212011**	**WM-64-1_0.0-0.5_03102011**	**WM-64-2_1.0-1.5_03102011**	**WM-64-3_2.0-2.5_03102011**	**WM-64-4_3.0-3.5_03102011**	**WM-65-1_0.0-0.5_03212011**	**WM-65-2_1.0-1.5_03212011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Metals													
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	**14.1 mg/kg**	**16.6 mg/kg**	2.4 mg/kg	3.0 mg/kg	**12.7 mg/kg**	**21.0 mg/kg**	3.2 mg/kg	2.3 mg/kg	**13.3 mg/kg**
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	**3.2 mg/kg**	**1.8 mg/kg**	< 0.67 mg/kg	0.27 j mg/kg	**4.0 mg/kg**	**2.4 mg/kg**	0.21 j mg/kg	< 0.74 mg/kg	**3.9 mg/kg**
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	**75.7 mg/kg**	**52.6 mg/kg**	14.8 mg/kg	21.7 j mg/kg	**109 mg/kg**	**45.2 j mg/kg**	22.7 mg/kg	20.5 mg/kg	**115 mg/kg**
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	**417 j mg/kg**	**416 j mg/kg**	9.8 j mg/kg	21.7 j mg/kg	**476 mg/kg**	**562 j mg/kg**	18.6 mg/kg	15.5 j mg/kg	**446 j mg/kg**
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	**316 mg/kg**	**264 mg/kg**	2.9 mg/kg	12.1 mg/kg	**404 mg/kg**	**256 mg/kg**	5.7 mg/kg	7 mg/kg	**403 mg/kg**
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	**0.51 mg/kg**	**0.37 mg/kg**	0.014 j mg/kg	< 0.17 mg/kg	**0.77 mg/kg**	**0.38 mg/kg**	< 0.19 mg/kg	0.036 j mg/kg	**0.66 mg/kg**
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	**101 mg/kg**	**59.5 mg/kg**	13.7 mg/kg	17.5 j mg/kg	**136 mg/kg**	**45.5 j mg/kg**	18.8 mg/kg	16.2 mg/kg	**132 mg/kg**
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	**1490 mg/kg**	**1180 mg/kg**	40.5 mg/kg	67.5 j mg/kg	**1690 mg/kg**	**683 j mg/kg**	49.7 mg/kg	60.9 mg/kg	**2500 mg/kg**

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

					Sys Loc Code	**WM-65**	**WM-65**	**WM-66**	**WM-66**		**WM-66**	**WM-66**	**WM-67**	**WM-67**
					Sample Date	**3/21/2011**	**3/21/2011**	**3/22/2011**	**3/22/2011**		**3/22/2011**	**3/22/2011**	**3/22/2011**	**3/22/2011**
					Depth Interval	**2 - 2.5**	**3 - 3.5**	**0 - 0.5**	**1 - 1.5**	**1 - 1.5**	**2 - 2.5**	**3 - 3.5**	**0 - 0.5**	**1 - 1.5**
					Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
					Sys Sample Code	**WM-65-3_2.0-2.5_03212011**	**WM-65-4_3.0-3.5_03212011**	**WM-66-1_0.0-0.5_03222011**	**WM-66-2_1.0-1.5_03222011**	**WM-66-2_1.0-1.5_03222011_FD**	**WM-66-3_2.0-2.5_03222011**	**WM-66-4_3.0-3.5_03222011**	**WM-67-1_0.0-0.5_03222011**	**WM-67-2_1.0-1.5_03222011**
					Sample Type Code	**N**	**N**	**N**	**N**	**FD**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II										
Effective Date			2/1/2007	2/1/2007										
Exceedance Key			**Bold**	Underline										
Metals														
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	**16.1 mg/kg**	3 mg/kg	2.4 mg/kg	4.0 mg/kg	4.1 mg/kg		9.4 mg/kg	2.0 mg/kg	2.7 mg/kg	2.6 mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	**3.1 mg/kg**	< 0.74 mg/kg	< 1.0 mg/kg	< 1.0 mg/kg	< 1.0 mg/kg		**1.7 mg/kg**	< 0.67 mg/kg	< 0.87 mg/kg	< 0.80 mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	27.2 mg/kg	23.6 mg/kg	29.0 mg/kg	39.6 mg/kg	39.9 mg/kg		**43.2 mg/kg**	26.9 mg/kg	21.6 mg/kg	24.3 mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	**286 j mg/kg**	12.7 j mg/kg	20.7 j mg/kg	**46.8 j mg/kg**	**45.9 j mg/kg**		**237 j mg/kg**	15.4 j mg/kg	14.2 j mg/kg	17.9 j mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	**206 mg/kg**	3.9 mg/kg	7.5 mg/kg	34.0 mg/kg	34.1 mg/kg		**203 mg/kg**	3.5 mg/kg	5.6 mg/kg	7.4 mg/kg
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	**0.2 mg/kg**	0.025 j mg/kg	0.046 j mg/kg	0.11 j mg/kg	0.11 j mg/kg		**0.39 mg/kg**	0.022 j mg/kg	0.033 j mg/kg	0.047 j mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	**27.1 mg/kg**	18.2 mg/kg	**23.4 mg/kg**	**32.5 mg/kg**	**32.5 mg/kg**		**44.9 mg/kg**	19.8 mg/kg	18.4 mg/kg	20.2 mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	**377 mg/kg**	49.3 mg/kg	78.2 mg/kg	**200 mg/kg**	**205 mg/kg**		**693 mg/kg**	44.7 mg/kg	58.4 mg/kg	65.2 mg/kg

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**WM-67**	**WM-67**	**WM-68**	**WM-68**	**WM-68**	**WM-69**	**WM-69**	**WM-69**	**WM-69**
				Sample Date	**3/22/2011**	**3/22/2011**	**3/23/2011**	**3/23/2011**	**3/23/2011**	**3/23/2011**	**3/23/2011**	**3/23/2011**	**3/23/2011**
				Depth Interval	**2.5 - 3**	**3.1 - 3.5**	**0 - 0.5**	**0.5 - 1**	**1 - 1.4**	**0 - 0.5**	**0.5 - 1**	**1 - 1.5**	**1.5 - 2**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**WM-67-3_2.5-3.0_03222011**	**WM-67-4_3.1-3.5_03222011**	**WM-68-1_0.0-0.5_03232011**	**WM-68-2_0.5-1.0_03232011**	**WM-68-3_1.0-1.4_03232011**	**WM-69-1_0.0-0.5_03232011**	**WM-69-2_0.5-1.0_03232011**	**WM-69-3_1.0-1.5_03232011**	**WM-69-4_1.5-2.0_03232011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Metals													
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	**13.8 mg/kg**	4.4 mg/kg	2.4 mg/kg	1.9 mg/kg	2.2 mg/kg	2.3 mg/kg	2.2 mg/kg	2.6 mg/kg	2.6 mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	**3.3 mg/kg**	< 0.93 mg/kg	< 0.84 mg/kg	< 0.73 mg/kg	< 0.71 mg/kg	< 0.74 mg/kg	< 0.67 mg/kg	< 0.78 mg/kg	< 0.81 mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	**77.6 mg/kg**	27.3 mg/kg	6.8 mg/kg	16.8 mg/kg	18.2 mg/kg	15.4 mg/kg	15.4 mg/kg	22.0 mg/kg	20.1 mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	**348 j mg/kg**	31.4 j mg/kg	5.5 j mg/kg	12.8 j mg/kg	15.0 j mg/kg	8.8 j mg/kg	11.8 j mg/kg	27.4 j mg/kg	18.3 j mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	**321 mg/kg**	24.8 mg/kg	1.7 mg/kg	4.6 mg/kg	5.6 mg/kg	5.6 mg/kg	8.1 mg/kg	22.9 mg/kg	5.7 mg/kg
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	**0.62 mg/kg**	0.065 j mg/kg	0.014 j mg/kg	0.022 j mg/kg	0.029 j mg/kg	0.023 j mg/kg	0.095 j mg/kg	0.081 j mg/kg	0.020 j mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	**76.1 mg/kg**	22.5 mg/kg	7.2 mg/kg	15.4 mg/kg	16.2 mg/kg	13.0 mg/kg	12.8 mg/kg	18.2 mg/kg	16.2 mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	**1340 mg/kg**	102 mg/kg	33.2 mg/kg	43.1 mg/kg	48.6 mg/kg	46.0 mg/kg	74.3 mg/kg	**125 mg/kg**	46.8 mg/kg

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**WM-70**	**WM-70**		**WM-70**	**WM-70**	**WM-71**	**WM-71**	**WM-71**	**WM-71**
				Sample Date	**3/23/2011**	**3/23/2011**		**3/23/2011**	**3/23/2011**	**3/23/2011**	**3/23/2011**	**3/23/2011**	**3/23/2011**
				Depth Interval	**0 - 0.5**	**2 - 2.5**	**2 - 2.5**	**2.5 - 3**	**3 - 3.5**	**0 - 0.5**	**1 - 1.5**	**2 - 2.5**	**3 - 3.5**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**WM-70-1_0.0-0.5_03232011**	**WM-70-2_2.0-2.5_03232011**	**WM-70-2_2.0-2.5_03232011_FD**	**WM-70-3_2.5-3.0_03232011**	**WM-70-4_3.0-3.5_03232011**	**WM-71-1_0.0-0.5_03232011**	**WM-71-2_1.0-1.5_03232011**	**WM-71-3_2.0-2.5_03232011**	**WM-71-4_3.0-3.5_03232011**
				Sample Type Code	**N**	**N**	**FD**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Metals													
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	2.4 mg/kg	**10.6 mg/kg**	**11.3 mg/kg**	**14.0 mg/kg**	2.0 mg/kg	2.2 mg/kg	0.85 j mg/kg	1.5 mg/kg	0.98 j mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	< 0.95 mg/kg	**3.6 mg/kg**	**3.9 mg/kg**	**1.6 mg/kg**	< 0.72 mg/kg	< 0.53 mg/kg	< 0.60 mg/kg	< 0.62 mg/kg	< 0.62 mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	25.8 mg/kg	**81.6 mg/kg**	**95.0 mg/kg**	**43.8 mg/kg**	31.4 mg/kg	8.6 mg/kg	8.9 mg/kg	10.7 mg/kg	8.7 mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	17.2 j mg/kg	**334 j mg/kg**	**368 j mg/kg**	**230 j mg/kg**	16.4 j mg/kg	8.3 j mg/kg	5.4 j mg/kg	8.9 j mg/kg	9.7 j mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	6.0 mg/kg	**322 mg/kg**	**359 mg/kg**	**202 mg/kg**	4.3 mg/kg	12.7 mg/kg	1.6 mg/kg	1.9 mg/kg	1.8 mg/kg
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	0.036 j mg/kg	**0.84 mg/kg**	**0.71 mg/kg**	**0.24 mg/kg**	0.025 j mg/kg	0.031 j mg/kg	< 0.12 mg/kg	< 0.12 mg/kg	< 0.12 mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	20.7 mg/kg	**88.5 mg/kg**	**98.8 mg/kg**	**43.5 mg/kg**	**24.2 mg/kg**	8.3 mg/kg	7.9 mg/kg	8.6 mg/kg	10.0 mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	68.9 mg/kg	**2360 mg/kg**	**1640 mg/kg**	**492 mg/kg**	60.6 mg/kg	92.2 mg/kg	15.5 mg/kg	17.4 mg/kg	16.3 mg/kg

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**WM-72**	**WM-72**	**WM-72**	**WM-72**	**WM-73**	**WM-73**	**WM-73**	**WM-73**	**WM-74**
				Sample Date	**3/23/2011**	**3/23/2011**	**3/23/2011**	**3/23/2011**	**3/24/2011**	**3/24/2011**	**3/24/2011**	**3/24/2011**	**3/24/2011**
				Depth Interval	**0 - 0.5**	**1 - 1.5**	**2 - 2.5**	**3 - 3.5**	**0 - 0.5**	**0.5 - 1**	**1 - 1.5**	**1.5 - 2**	**0 - 0.5**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**WM-72-1_0.0-0.5_03232011**	**WM-72-2_1.0-1.5_03232011**	**WM-72-3_2.0-2.5_03232011**	**WM-72-4_3.0-3.5_03232011**	**WM-73-1_0.0-0.5_03242011**	**WM-73-2_0.5-1.0_03242011**	**WM-73-3_1.0-1.5_03242011**	**WM-73-4_1.5-2.0_03242011**	**WM-74-1_0.0-0.5_03242011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Metals													
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	0.94 j mg/kg	3.5 mg/kg	0.92 j mg/kg	0.44 j mg/kg	7.7 mg/kg	6.2 mg/kg	4.6 mg/kg	1.7 mg/kg	2.0 mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	< 0.61 mg/kg	< 0.66 mg/kg	< 0.64 mg/kg	< 0.64 mg/kg	**2.7 mg/kg**	< 1.1 mg/kg	< 0.88 mg/kg	< 0.76 mg/kg	< 0.87 mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	7.4 mg/kg	12.5 mg/kg	6.8 mg/kg	6.2 mg/kg	**50.7 mg/kg**	42.9 mg/kg	19.6 mg/kg	15.9 mg/kg	22.0 mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	4.8 j mg/kg	15.5 j mg/kg	5.2 j mg/kg	4.7 j mg/kg	**110 j mg/kg**	**69.6 j mg/kg**	20.9 j mg/kg	14.6 j mg/kg	15.0 j mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	3.4 mg/kg	22.2 mg/kg	1.1 j mg/kg	1.2 j mg/kg	**162 mg/kg**	**73.2 mg/kg**	13.9 mg/kg	2.6 mg/kg	5.7 mg/kg
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	< 0.12 mg/kg	0.046 j mg/kg	< 0.13 mg/kg	< 0.13 mg/kg	**0.55 mg/kg**	0.13 j mg/kg	< 0.18 mg/kg	< 0.15 mg/kg	0.023 j mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	7.0 mg/kg	11.9 mg/kg	7.3 mg/kg	6.4 mg/kg	**44.7 mg/kg**	**38.2 mg/kg**	18.1 mg/kg	16.2 mg/kg	18.3 mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	20.2 mg/kg	77.9 mg/kg	14.2 mg/kg	12.1 mg/kg	**739 mg/kg**	**261 mg/kg**	76.5 mg/kg	30.6 mg/kg	58.8 mg/kg

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**WM-74**	**WM-74**	**WM-74**	**UC-75**	**UC-75**	**UC-75**	**UC-75**	**UC-76**	**UC-76**
				Sample Date	**3/24/2011**	**3/24/2011**	**3/24/2011**	**6/8/2011**	**6/8/2011**	**6/8/2011**	**6/8/2011**	**6/8/2011**	**6/8/2011**
				Depth Interval	**2.5 - 3**	**3 - 3.5**	**4 - 4.5**	**0 - 0.5**	**0.5 - 1**	**1 - 1.5**	**1.5 - 2**	**0 - 0.5**	**0.5 - 1**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**WM-74-2_2.5-3.0_03242011**	**WM-74-3_3.0-3.5_03242011**	**WM-74-4_4.0-4.5_03242011**	**UC-75-1_0.0-0.5_06082011**	**UC-75-2_0.5-1.0_06082011**	**UC-75-3_1.0-1.5_06082011**	**UC-75-4_1.5-2.0_06082011**	**UC-76-1_0.0-0.5_06082011**	**UC-76-2_0.5-1.0_06082011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Metals													
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	7.8 mg/kg	**13.5 mg/kg**	1.8 mg/kg	< 1.4 R mg/kg	1.1 * mg/kg	< 1.6 * mg/kg	< 1.6 * mg/kg	< 1.8 * mg/kg	< 1.8 * mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	**2.8 mg/kg**	**2.4 mg/kg**	< 0.66 mg/kg	**0.99 mg/kg**	0.60 j mg/kg	**1.3 mg/kg**	**1.3 mg/kg**	0.89 j mg/kg	0.91 mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	**58.5 mg/kg**	**53.7 mg/kg**	19.7 mg/kg	22.7 mg/kg	12.5 mg/kg	26.0 mg/kg	29.0 mg/kg	28.5 mg/kg	20.9 mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	**154 j mg/kg**	**256 j mg/kg**	12.4 j mg/kg	**37.4 mg/kg**	17.7 mg/kg	**44.8 mg/kg**	**45.9 mg/kg**	**42.4 mg/kg**	**35.9 mg/kg**
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	**170 mg/kg**	**251 mg/kg**	2.9 mg/kg	**106 mg/kg**	**87.0 mg/kg**	**138 mg/kg**	**124 mg/kg**	**84.9 mg/kg**	**109 mg/kg**
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	**0.53 mg/kg**	0.017 j mg/kg	0.018 j mg/kg	0.088 j mg/kg	**0.25 mg/kg**	0.17 mg/kg	0.14 j mg/kg	0.082 j mg/kg	0.090 j mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	**55.1 mg/kg**	**53.1 mg/kg**	15.7 mg/kg	16.5 mg/kg	7.5 j mg/kg	16.3 mg/kg	18.3 mg/kg	18.3 mg/kg	14.8 mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	**974 mg/kg**	**784 mg/kg**	40.7 mg/kg	**327 * mg/kg**	**219 * mg/kg**	**399 * mg/kg**	**357 * mg/kg**	**274 * mg/kg**	**357 * mg/kg**

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

			Sys Loc Code	UC-76	UC-77	UC-77	UC-77	UC-78	UC-78	UC-78	UC-79	UC-79
			Sample Date	6/8/2011	6/9/2011	6/9/2011	6/9/2011	6/9/2011	6/9/2011	6/9/2011	6/9/2011	6/9/2011
			Depth Interval	1 - 1.5	0 - 0.5	0.5 - 1	1 - 1.5	0 - 0.5	0.5 - 1	1 - 1.7	0 - 0.5	0.5 - 1
			Depth Unit	ft	ft	ft	ft	ft	ft	ft	ft	ft
			Sys Sample Code	UC-76-3_1.0-1.5_06082011	UC-77-1_0.0-0.5_06092011	UC-77-2_0.5-1.0_06092011	UC-77-3_1.0-1.5_06092011	UC-78-1_0.0-0.5_06092011	UC-78-2_0.5-1.0_06092011	UC-78-3_1.0-1.7_06092011	UC-79-1_0.0-0.5_06092011	UC-79-2_0.5-1.0_06092011
			Sample Type Code	N	N	N	N	N	N	N	N	N
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II								
Effective Date			2/1/2007	2/1/2007								
Exceedance Key			**Bold**	Underline								
Metals												
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	< 1.8 * mg/kg	< 1.6 * mg/kg	< 1.5 * mg/kg	< 1.5 * mg/kg	9.7 mg/kg	**9.9 mg/kg**	9.1 mg/kg	**11.3 mg/kg**	8.6 mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	0.63 j mg/kg	0.73 j mg/kg	**1.1 mg/kg**	0.68 j mg/kg	**1.1 mg/kg**	**0.99 mg/kg**	**1.2 mg/kg**	**1.5 mg/kg**	0.92 mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	17.0 mg/kg	27.0 mg/kg	23.8 mg/kg	30.4 mg/kg	25.2 mg/kg	25.1 mg/kg	30.4 mg/kg	33.4 mg/kg	23.0 mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	20.0 mg/kg	**38.9 mg/kg**	**32.0 mg/kg**	**35.0 mg/kg**	**35.5 mg/kg**	**38.8 mg/kg**	31.3 mg/kg	**58.0 mg/kg**	30.6 mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	**53.6 mg/kg**	**53.4 mg/kg**	**40.2 mg/kg**	**41.5 mg/kg**	**105 mg/kg**	**67.1 mg/kg**	**65.6 mg/kg**	133 mg/kg	**65.3 mg/kg**
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	0.043 j mg/kg	0.054 j mg/kg	0.059 j mg/kg	0.091 j mg/kg	**0.18 mg/kg**	0.14 j mg/kg	**0.22 mg/kg**	0.086 j mg/kg	**0.37 mg/kg**
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	8.0 mg/kg	14.6 mg/kg	12.5 mg/kg	14.9 mg/kg	15.7 mg/kg	16.5 mg/kg	13.7 mg/kg	**24.6 mg/kg**	14.5 mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	**167 * mg/kg**	**173 * mg/kg**	**155 * mg/kg**	**158 * mg/kg**	**224 mg/kg**	**200 mg/kg**	**224 mg/kg**	523 mg/kg	**190 mg/kg**

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**UC-80**		**UC-80**	**UC-81**	**UC-81**	**UC-81**	**UC-82**	**UC-82**	**UC-82**
				Sample Date	**6/10/2011**		**6/10/2011**	**6/10/2011**	**6/10/2011**	**6/10/2011**	**6/10/2011**	**6/10/2011**	**6/10/2011**
				Depth Interval	**0 - 0.5**	**0 - 0.5**	**0.5 - 1.3**	**0 - 0.5**	**0.5 - 1**	**1 - 1.5**	**0 - 0.5**	**1 - 1.5**	**2 - 2.5**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**UC-80-1_0.0-0.5_06102011**	**UC-80-1_0.0-0.5_06102011_FD**	**UC-80-2_0.5-1.3_06102011**	**UC-81-1_0.0-0.5_06102011**	**UC-81-2_0.5-1.0_06102011**	**UC-81-3_1.0-1.5_06102011**	**UC-82-1_0.0-0.5_06102011**	**UC-82-2_1.0-1.5_06102011**	**UC-82-3_2.0-2.5_06102011**
				Sample Type Code	**N**	**FD**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Metals													
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	**10.6 mg/kg**	**10.0 mg/kg**	**11.1 mg/kg**	9.4 mg/kg	6.3 mg/kg	7.0 mg/kg	**10.7 mg/kg**	7.4 mg/kg	**14.8 mg/kg**
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	**1.5 mg/kg**	**1.4 mg/kg**	**1.2 mg/kg**	**1.1 mg/kg**	0.90 mg/kg	< 0.99 mg/kg	**1.3 mg/kg**	< 1.0 mg/kg	**2.4 mg/kg**
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	31.1 mg/kg	28.1 mg/kg	27.4 mg/kg	24.5 mg/kg	17.9 mg/kg	16.2 mg/kg	28.7 mg/kg	11.1 mg/kg	22.6 mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	**62.0 mg/kg**	**56.3 mg/kg**	**45.5 mg/kg**	**42.8 mg/kg**	31.1 mg/kg	22.5 mg/kg	**48.0 mg/kg**	18.6 mg/kg	**57.6 mg/kg**
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	**133 mg/kg**	**141 mg/kg**	**85.1 mg/kg**	**65.4 mg/kg**	**69.6 mg/kg**	**59.4 mg/kg**	**92.1 mg/kg**	**91.3 mg/kg**	**316 mg/kg**
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	0.077 j mg/kg	0.081 j mg/kg	0.15 j mg/kg	0.063 j mg/kg	0.057 j mg/kg	0.053 j mg/kg	0.098 j mg/kg	**0.22 mg/kg**	**0.48 mg/kg**
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	**27.0 mg/kg**	**24.6 mg/kg**	19.0 mg/kg	22.7 mg/kg	12.2 mg/kg	10.7 mg/kg	**24.6 mg/kg**	< 8.3 mg/kg	19.9 mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	**469 mg/kg**	**490 mg/kg**	**337 mg/kg**	**233 mg/kg**	**186 mg/kg**	**164 mg/kg**	**341 mg/kg**	**227 mg/kg**	**913 mg/kg**

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**UC-82**	**UC-83**	**UC-83**	**UC-83**	**UC-83**	**WM-84**	**WM-84**	**WM-84**	**WM-84**
				Sample Date	**6/10/2011**	**6/13/2011**	**6/13/2011**	**6/13/2011**	**6/13/2011**	**6/13/2011**	**6/13/2011**	**6/13/2011**	**6/13/2011**
				Depth Interval	**2.9 - 3.4**	**0.5 - 1**	**1 - 1.5**	**2 - 2.5**	**0 - 0.5**	**0 - 0.5**	**0.5 - 1**	**1 - 1.5**	**0.5 - 1**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**UC-82-4_2.9-3.4_06102011**	**UC-83-2_0.5-1.0_06132011**	**UC-83-3_1.0-1.5_06132011**	**UC-83-4_2.0-2.5_06132011**	**UC-83-1_0.0-0.5_06132011**	**WM-84-1_0.0-0.5_06132011**	**WM-84-2_0.5-1.0_06132011**	**WM-84-3_1.0-1.5_06132011**	**WM-84-2_0.5-1.0_06132011_FD**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**FD**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Metals													
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	**15.6 mg/kg**	7.9 mg/kg	**12.1 mg/kg**	**13.5 mg/kg**	8.3 mg/kg	**14.9 mg/kg**	**50.2 mg/kg**	**29.6 mg/kg**	**17.4 mg/kg**
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	**2.0 mg/kg**	**1.1 mg/kg**	**1.3 mg/kg**	**1.7 mg/kg**	**1.1 mg/kg**	< 0.57 mg/kg	**1.2 mg/kg**	< 0.63 mg/kg	< 0.58 mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	19.3 mg/kg	28.8 mg/kg	25.0 mg/kg	21.6 mg/kg	28.4 mg/kg	**175 mg/kg**	**168 mg/kg**	**133 mg/kg**	**154 mg/kg**
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	**47.3 mg/kg**	**47.2 mg/kg**	**46.6 mg/kg**	**49.9 mg/kg**	**42.8 mg/kg**	**571 mg/kg**	**1790 mg/kg**	**876 mg/kg**	**747 mg/kg**
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	**222 mg/kg**	**87.0 mg/kg**	**125 mg/kg**	**259 mg/kg**	**80.3 mg/kg**	**265 mg/kg**	**347 mg/kg**	**250 mg/kg**	**177 mg/kg**
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	**0.26 mg/kg**	0.12 j mg/kg	0.17 mg/kg	0.17 j mg/kg	0.058 j mg/kg	0.038 j mg/kg	0.14 mg/kg	0.069 j mg/kg	**0.24 mg/kg**
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	17.2 mg/kg	21.8 mg/kg	18.7 mg/kg	17.0 mg/kg	19.5 mg/kg	**205 mg/kg**	**253 mg/kg**	**167 mg/kg**	**193 mg/kg**
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	**612 mg/kg**	**314 mg/kg**	**380 mg/kg**	**618 mg/kg**	**484 mg/kg**	**918 mg/kg**	**1810 mg/kg**	**999 mg/kg**	**804 mg/kg**

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**WM-85**	**WM-85**	**WM-85**	**WM-85**	**WM-86**	**WM-86**	**WM-86**	**WM-87**	**WM-87**
				Sample Date	**6/13/2011**	**6/13/2011**	**6/13/2011**	**6/13/2011**	**6/15/2011**	**6/15/2011**	**6/15/2011**	**6/15/2011**	**6/15/2011**
				Depth Interval	**0 - 0.5**	**1 - 1.5**	**2 - 2.5**	**2.9 - 3.4**	**0 - 0.5**	**0.5 - 1**	**1 - 1.5**	**0 - 0.5**	**0.5 - 1**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**WM-85-1_0.0-0.5_06132011**	**WM-85-2_1.0-1.5_06132011**	**WM-85-3_2.0-2.5_06132011**	**WM-85-4_2.9-3.4_06132011**	**WM-86-1_0.0-0.5_06152011**	**WM-86-2_0.5-1.0_06152011**	**WM-86-3_1.0-1.5_06152011**	**WM-87-1_0.0-0.5_06152011**	**WM-87-2_0.5-1.0_06152011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Metals													
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	3.2 mg/kg	1.7 mg/kg	2.5 mg/kg	2.3 mg/kg	2.0 mg/kg	< 2.0 mg/kg	< 1.9 mg/kg	< 2.2 mg/kg	< 1.2 mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	< 0.78 mg/kg	< 0.80 mg/kg	< 0.97 mg/kg	< 0.83 mg/kg	< 0.82 mg/kg	< 0.98 mg/kg	< 0.93 mg/kg	< 1.1 mg/kg	< 0.61 mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	8.4 mg/kg	16.3 mg/kg	35.8 mg/kg	37.0 mg/kg	17.0 mg/kg	13.0 mg/kg	7.1 mg/kg	13.6 mg/kg	3.1 mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	17.0 mg/kg	16.5 mg/kg	27.5 mg/kg	**37.1 mg/kg**	**45.0 mg/kg**	21.2 mg/kg	9.7 mg/kg	30.1 mg/kg	2.8 j mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	20.1 mg/kg	3.1 mg/kg	5.6 mg/kg	9.4 mg/kg	33.4 mg/kg	8.4 mg/kg	< 1.9 mg/kg	16.6 mg/kg	< 1.2 mg/kg
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	0.046 j mg/kg	0.017 j mg/kg	0.026 j mg/kg	0.025 j mg/kg	0.071 j mg/kg	0.020 j mg/kg	0.017 j mg/kg	0.011 j mg/kg	0.0090 j mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	8.7 mg/kg	11.0 mg/kg	**28.3 mg/kg**	**31.2 mg/kg**	21.2 mg/kg	12.6 mg/kg	< 7.4 mg/kg	12.4 mg/kg	< 4.9 mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	**150 mg/kg**	32.4 mg/kg	71.3 mg/kg	87.8 mg/kg	**123 mg/kg**	35.1 mg/kg	12.4 mg/kg	46.0 mg/kg	5.5 j mg/kg

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

			Sys Loc Code	WM-88	WM-88		WM-88	WM-88	WM-89	WM-89	WM-89	WM-89
			Sample Date	11/15/2011	11/15/2011		11/15/2011	11/15/2011	11/15/2011	11/15/2011	11/15/2011	11/15/2011
			Depth Interval	0 - 0.5	2 - 2.5	2 - 2.5	3.25 - 3.75	4 - 4.5	0 - 0.5	2 - 2.5	3.5 - 4	5 - 5.5
			Depth Unit	ft	ft	ft	ft	ft	ft	ft	ft	ft
			Sys Sample Code	WM-88-1_0.0-0.5_11152011	WM-88-2_2.0-2.5_11152011	WM-88-2_2.0-2.5_11152011_FD	WM-88-3_3.25-3.75_11152011	WM-88-4_4.0-4.5_11152011	WM-89-1_0.0-0.5_11152011	WM-89-2_2.0-2.5_11152011	WM-89-3_3.5-4.0_11152011	WM-89-4_5.0-5.5_11152011
			Sample Type Code	N	N	FD	N	N	N	N	N	N
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II								
Effective Date			2/1/2007	2/1/2007								
Exceedance Key			**Bold**	Underline								
Metals												
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	7.2 j mg/kg	**14.3 j mg/kg**	**12.9 j mg/kg**	**20.5 j mg/kg**	5.6 j mg/kg	7.6 j mg/kg	**13.5 j mg/kg**	**31.2 j mg/kg**	4.5 j mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	< 1.8 mg/kg	**2.8 j mg/kg**	**2.8 j mg/kg**	**1.9 j mg/kg**	< 1.0 mg/kg	< 1.5 mg/kg	**2.6 j mg/kg**	**2.4 j mg/kg**	< 0.97 mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	**45.4 j mg/kg**	**61.0 j mg/kg**	**60.6 j mg/kg**	**47.2 j mg/kg**	36.8 j mg/kg	**46.1 j mg/kg**	**66.9 j mg/kg**	31.5 j mg/kg	20.5 j mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	30.2 j mg/kg	**119 j mg/kg**	**105 j mg/kg**	**77.1 j mg/kg**	29.9 j mg/kg	**33.8 j mg/kg**	**137 j mg/kg**	**61.6 j mg/kg**	21.0 j mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	35.8 j mg/kg	**265 j mg/kg**	**233 j mg/kg**	**207 j mg/kg**	18.6 j mg/kg	33.0 j mg/kg	**243 j mg/kg**	**218 j mg/kg**	8.0 j mg/kg
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	< 0.36 mg/kg	**0.79 j mg/kg**	**1.0 j mg/kg**	**0.39 j mg/kg**	< 0.21 mg/kg	< 0.30 mg/kg	**0.77 j mg/kg**	**0.43 j mg/kg**	< 0.19 mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	**37.7 j mg/kg**	**56.3 j mg/kg**	**53.7 j mg/kg**	**40.2 j mg/kg**	**36.8 j mg/kg**	**38.9 j mg/kg**	**62.3 j mg/kg**	**30.8 j mg/kg**	21.9 j mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	**185 j mg/kg**	**1010 j mg/kg**	**956 j mg/kg**	**643 j mg/kg**	112 j mg/kg	**179 j mg/kg**	**999 j mg/kg**	**539 j mg/kg**	50.0 j mg/kg

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**UC-90**	**UC-90**	**UC-90**	**UC-90**	**UC-91**	**UC-91**	**UC-91**	**UC-91**	**UC-96**
				Sample Date	**11/16/2011**	**11/16/2011**	**11/16/2011**	**11/16/2011**	**11/16/2011**	**11/16/2011**	**11/16/2011**	**11/16/2011**	**11/1/2011**
				Depth Interval	**0 - 0.5**	**0.5 - 1**	**2 - 2.5**	**3 - 3.5**	**0 - 0.5**	**2.5 - 3**	**4 - 4.5**	**5 - 5.5**	**0 - 0.5**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**UC-90-1_0.0-0.5_11162011**	**UC-90-2_0.5-1.0_11162011**	**UC-90-3_2.0-2.5_11162011**	**UC-90-4_3.0-3.5_11162011**	**UC-91-1_0.0-0.5_11162011**	**UC-91-2_2.5-3.0_11162011**	**UC-91-3_4.0-4.5_11162011**	**UC-91-4_5.0-5.5_11162011**	**UC-96-1_0.0-0.5_11012011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Metals													
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	**14.1 j mg/kg**	**10.0 j mg/kg**	2.6 j mg/kg	3.2 j mg/kg	4.9 j mg/kg	**10.1 j mg/kg**	**10.9 j mg/kg**	3.2 j mg/kg	**14.4 j mg/kg**
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	**2.0 j mg/kg**	**1.5 j mg/kg**	< 0.73 mg/kg	< 0.88 mg/kg	< 1.3 mg/kg	**1.4 j mg/kg**	**2.2 j mg/kg**	< 0.90 mg/kg	< 0.88 j mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	**44.6 j mg/kg**	38.0 j mg/kg	19.6 j mg/kg	15.3 j mg/kg	40.2 j mg/kg	39.3 j mg/kg	40.8 j mg/kg	20.0 j mg/kg	17.9 j mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	**50.4 j mg/kg**	**38.4 j mg/kg**	11.3 j mg/kg	12.1 j mg/kg	30.0 j mg/kg	**50.0 j mg/kg**	**49.9 j mg/kg**	13.6 j mg/kg	13.8 j mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	**186 j mg/kg**	**140 j mg/kg**	5.2 j mg/kg	4.6 j mg/kg	21.6 j mg/kg	**141 j mg/kg**	**190 j mg/kg**	5.9 j mg/kg	**117 j mg/kg**
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	**0.84 j mg/kg**	**0.39 j mg/kg**	< 0.15 mg/kg	< 0.18 mg/kg	< 0.26 mg/kg	**0.43 j mg/kg**	**0.37 j mg/kg**	< 0.18 mg/kg	< 0.18 j mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	**36.3 j mg/kg**	**32.6 j mg/kg**	18.1 j mg/kg	16.3 j mg/kg	**32.0 j mg/kg**	**34.5 j mg/kg**	**35.4 j mg/kg**	18.6 j mg/kg	8.4 j mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	**702 j mg/kg**	**453 j mg/kg**	48.0 j mg/kg	32.6 j mg/kg	**137 j mg/kg**	**583 j mg/kg**	**627 j mg/kg**	42.9 j mg/kg	**288 j mg/kg**

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**UC-96**	**UC-96**	**UC-96**	**UC-97**	**UC-97**	**UC-97**	**UC-97**	**WM-101**	**WM-101**
				Sample Date	**11/2/2011**	**11/2/2011**	**11/2/2011**	**11/2/2011**	**11/2/2011**	**11/2/2011**	**11/2/2011**	**11/16/2011**	**11/16/2011**
				Depth Interval	**5 - 7.5**	**7.5 - 10**	**10 - 12.5**	**0 - 2.5**	**5 - 7.5**	**7.5 - 10**	**15 - 17.5**	**0 - 1**	**5 - 7.5**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**UC-96-2_5.0-7.5_11022011**	**UC-96-3_7.5-10.0_11022011**	**UC-96-4_10.0-12.5_11022011**	**UC-97-1_0.0-2.5_11022011**	**UC-97-2_5.0-7.5_11022011**	**UC-97-3_7.5-10.0_11022011**	**UC-97-4_15.0-17.5_11022011**	**WM-101-1_0.0-1.0_11162011**	**WM-101-2_5.0-7.5_11162011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Metals													
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	**15.7 j mg/kg**	**15.7 j mg/kg**	2.9 j mg/kg	**24.1 j mg/kg**	**23.4 j mg/kg**	**28.3 j mg/kg**	2.0 j mg/kg	**25.8 j mg/kg**	2.4 j mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	**1.7 j mg/kg**	**1.7 j mg/kg**	< 0.62 j mg/kg	**1.9 j mg/kg**	**2.0 j mg/kg**	**3.1 j mg/kg**	< 0.63 j mg/kg	**4.7 j mg/kg**	< 0.64 mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	28.8 j mg/kg	24.8 j mg/kg	11.7 j mg/kg	26.0 j mg/kg	34.4 j mg/kg	26.1 j mg/kg	13.7 j mg/kg	**134 j mg/kg**	15.5 j mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	**36.4 j mg/kg**	24.9 j mg/kg	6.1 j mg/kg	27.0 j mg/kg	30.0 j mg/kg	27.4 j mg/kg	6.6 j mg/kg	**513 j mg/kg**	13.1 j mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	**134 j mg/kg**	**213 j mg/kg**	9.3 j mg/kg	**196 j mg/kg**	**181 j mg/kg**	**442 j mg/kg**	3.7 j mg/kg	**468 j mg/kg**	4.9 j mg/kg
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	< 0.15 j mg/kg	**0.29 j mg/kg**	< 0.12 j mg/kg	**0.18 j mg/kg**	0.17 j mg/kg	**0.21 j mg/kg**	< 0.13 j mg/kg	**0.50 j mg/kg**	< 0.13 mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	**24.8 j mg/kg**	22.3 j mg/kg	13.4 j mg/kg	20.8 j mg/kg	18.7 j mg/kg	21.0 j mg/kg	13.0 j mg/kg	**230 j mg/kg**	16.0 j mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	**403 j mg/kg**	**610 j mg/kg**	60.2 j mg/kg	**571 j mg/kg**	**494 j mg/kg**	**1100 j mg/kg**	26.3 j mg/kg	**2100 j mg/kg**	32.6 j mg/kg

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**WM-101**	**WM-101**	**WM-102**
				Sample Date	**11/16/2011**	**11/16/2011**	**11/16/2011**
				Depth Interval	**15 - 17.5**	**20 - 22.5**	**0 - 2.5**
				Depth Unit	**ft**	**ft**	**ft**
				Sys Sample Code	**WM-101-3_15.0-17.5_11162011**	**WM-101-4_20.0-22.5_11162011**	**WM-102-1_0.0-2.5_11162011**
				Sample Type Code	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II			
Effective Date			2/1/2007	2/1/2007			
Exceedance Key			**Bold**	Underline			
Metals							
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	2.5 j mg/kg	3.1 j mg/kg	3.4 j mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	< 0.66 mg/kg	< 0.70 j mg/kg	< 0.71 j mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	15.4 j mg/kg	24.0 j mg/kg	22.7 j mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	11.7 j mg/kg	16.5 j mg/kg	17.8 j mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	4.2 j mg/kg	6.9 j mg/kg	11.5 j mg/kg
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	< 0.13 mg/kg	< 0.14 j mg/kg	< 0.14 j mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	15.4 j mg/kg	**24.0 j mg/kg**	20.5 j mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	31.1 j mg/kg	49.6 j mg/kg	68.2 j mg/kg

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**WM-102**		**WM-102**		**WM-102**
				Sample Date	**11/16/2011**		**11/16/2011**		**11/16/2011**
				Depth Interval	**2.5 - 5**	**2.5 - 5**	**15 - 17.5**	**15 - 17.5**	**27.5 - 30**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**WM-102-2_2.5-5.0_11162011**	**WM-102-2_2.5-5.0_11162011_FD**	**WM-102-3_15.0-17.5_11162011**	**WM-102-3_15.0-17.5_11162011_FD**	**WM-102-4_27.5-30.0_11162011**
				Sample Type Code	**N**	**FD**	**N**	**FD**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II					
Effective Date			2/1/2007	2/1/2007					
Exceedance Key			**Bold**	Underline					
Metals									
Arsenic	NA	Lab	**9.8 mg/kg**	33 mg/kg	3.3 j mg/kg	3.1 j mg/kg	2.1 j mg/kg	1.9 j mg/kg	2.3 j mg/kg
Cadmium	NA	Lab	**0.99 mg/kg**	5.0 mg/kg	< 0.64 j mg/kg	< 0.64 j mg/kg	< 0.63 j mg/kg	< 0.63 j mg/kg	< 0.61 j mg/kg
Chromium	NA	Lab	**43 mg/kg**	110 mg/kg	20.1 j mg/kg	20.3 j mg/kg	13.2 j mg/kg	10.7 j mg/kg	8.4 j mg/kg
Copper	NA	Lab	**32 mg/kg**	150 mg/kg	12.5 j mg/kg	12.2 j mg/kg	9.5 j mg/kg	7.8 j mg/kg	5.7 j mg/kg
Lead	NA	Lab	**36 mg/kg**	130 mg/kg	6.2 j mg/kg	5.9 j mg/kg	4.1 j mg/kg	3.2 j mg/kg	2.9 j mg/kg
Mercury	NA	Lab	**0.18 mg/kg**	1.1 mg/kg	< 0.13 j mg/kg	< 0.13 j mg/kg	< 0.13 j mg/kg	< 0.13 j mg/kg	< 0.12 j mg/kg
Nickel	NA	Lab	**23 mg/kg**	49 mg/kg	20.5 j mg/kg	20.0 j mg/kg	14.0 j mg/kg	11.5 j mg/kg	9.0 j mg/kg
Zinc	NA	Lab	**120 mg/kg**	460 mg/kg	35.2 J- mg/kg	34.3 j mg/kg	27.8 j mg/kg	22.8 j mg/kg	19.4 j mg/kg

Table 7
Metals Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

Data Qualifiers/Footnotes	
Qualifier	**Definition**
--	Not analyzed/not available.
a	Estimated value, calculated using some or all values that are estimates.
b	Potential false positive value based on blank data validation procedures.
c	Coeluting compound.
e	Estimated value, exceeded the instrument calibration range.
h	EPA recommended sample preservation, extraction or analysis holding time was exceeded.
I	Indeterminate value based on failure of blind duplicate data to meet quality assurance criteria.
j	Reported value is less than the stated laboratory quantitation limit and is considered an estimated value.
p	Relative percent difference is >40% (25% CLP pesticides) between primary and confirmation GC columns.
pp	Small peak in chromatogram below method detection limit.
r	The presence of the compound is suspect based on the ID criteria of the retention time and relative retention time obtained from the examination of the chromatograms.
s	Potential false positive value based on statistical analysis of blank sample data.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
N	Sample Type: Normal
FD	Sample Type: Field Duplicate
AT	Sample chromatogram is noted to be atypical of a petroleum product.
DLND	Not detected, detection limit not determined.
DF	Did not flash
EMPC	Estimated maximum possible concentration.
NA – (Not applicable)	NA indicates that a fractional portion of the sample is not part of the analytical testing or field collection procedures.
ND	Not detected.
TIC	Tentatively identified compound

Table 8
Additional Parameters Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

		Sys Loc Code	**WM-3**	**WM-3**	**WM-3**	**WM-3**	**WM-10**	**WM-10**	**WM-10**
		Sample Date	**2/20/2011**	**2/20/2011**	**2/20/2011**	**2/20/2011**	**2/25/2011**	**2/25/2011**	**2/25/2011**
		Depth Interval	**0 - 1 ft**	**2 - 4 ft**	**4.2 - 4.75 ft**	**4.75 - 5.25 ft**	**0 - 1 ft**	**1 - 2 ft**	**2 - 2.8 ft**
		Sys Sample Code	**WM-3-1_0.0-1.0_02202011**	**WM-3-2_2.0-4.0_02202011**	**WM-3-3_4.2-4.75_02202011**	**WM-3-4_4.75-5.25_02202011**	**WM-10-1_0.0-1.0_02252011**	**WM-10-2_1.0-2.0_02252011**	**WM-10-3_2.0-2.8_02252011**
		Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location							
General Parameters									
Nitrogen, ammonia (NH3) as N	NA	Lab	**14 mg/kg**	**14 mg/kg**	**12 mg/kg**	**9.9 mg/kg**	**4.4 mg/kg**	**20 mg/kg**	**34 mg/kg**
Nitrogen, total kjeldahl (TKN)	NA	Lab	**960 mg/kg**	**2000 mg/kg**	**1400 mg/kg**	**420 mg/kg**	**790 mg/kg**	**920 mg/kg**	**7000 mg/kg**
Phosphate, Ortho as P	NA	Lab	< 2.0 mg/kg	< 1.6 mg/kg	< 1.4 mg/kg	< 1.2 mg/kg	< 1.5 mg/kg	< 1.7 mg/kg	< 2.6 mg/kg
Cyanide	NA	Lab	< 0.75 mg/kg	< 0.75 mg/kg	< 0.70 mg/kg	< 0.62 mg/kg	**0.55 j mg/kg**	**1.4 j mg/kg**	**0.34 j mg/kg**
pH	NA	Field	**7.1 pH units**	**6.9 pH units**	**7.0 pH units**	**7.2 pH units**	--	--	--
TPHs									
Total Petroleum Hydrocarbons C10-C20	NA	Lab	< 66 mg/kg	< 54 mg/kg	< 46 mg/kg	< 41 mg/kg	< 2400 mg/kg	< 5500 mg/kg	< 87 mg/kg
Total Petroleum Hydrocarbons C20-C34	NA	Lab	< 66 mg/kg	< 54 mg/kg	< 46 mg/kg	< 41 mg/kg	**10000 mg/kg**	**44000 mg/kg**	**150 mg/kg**

Table 8
Additional Parameters Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

		Sys Loc Code	**UC-11**	**UC-11**	**UC-11**	**UC-11**	**WM-13**	**WM-13**	**WM-18**
		Sample Date	**2/26/2011**	**2/26/2011**	**2/26/2011**	**2/26/2011**	**3/4/2011**	**3/4/2011**	**3/1/2011**
		Depth Interval	**0 - 1 ft**	**1 - 2 ft**	**2 - 3 ft**	**3 - 3.5 ft**	**0 - 0.5 ft**	**1.5 - 2 ft**	**0 - 0.7 ft**
		Sys Sample Code	**UC-11-1_0.0-1.0_02262011**	**UC-11-2_1.0-2.0_02262011**	**UC-11-3_2.0-3.0_02262011**	**UC-11-4_3.0-3.5_02262011**	**WM-13-1_0.0-0.5_03042011**	**WM-13-2_1.5-2.0_03042011**	**WM-18-1_0.0-0.7_03012011**
		Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location							
General Parameters									
Nitrogen, ammonia (NH3) as N	NA	Lab	**13 mg/kg**	**34 mg/kg**	**44 mg/kg**	**70 mg/kg**	--	--	**7.3 mg/kg**
Nitrogen, total kjeldahl (TKN)	NA	Lab	**2100 mg/kg**	**780 mg/kg**	**1200 mg/kg**	**9300 mg/kg**	--	--	**2500 mg/kg**
Phosphate, Ortho as P	NA	Lab	< 2.4 mg/kg	< 2.1 mg/kg	< 2.1 mg/kg	< 5.3 mg/kg	--	--	< 1.9 mg/kg
Cyanide	NA	Lab	**1.5 j mg/kg**	**2.6 j mg/kg**	**4.3 j mg/kg**	**0.63 j mg/kg**	--	--	< 0.94 mg/kg
pH	NA	Field	**5.5 pH units**	**7.0 pH units**	**7.0 pH units**	--	**7.2 pH units**	**7.2 pH units**	--
TPHs									
Total Petroleum Hydrocarbons C10-C20	NA	Lab	< 1600 mg/kg	< 340 mg/kg	**1200 mg/kg**	< 870 mg/kg	--	--	< 320 mg/kg
Total Petroleum Hydrocarbons C20-C34	NA	Lab	**2300 mg/kg**	**1900 mg/kg**	**4900 mg/kg**	**1700 mg/kg**	--	--	**1400 mg/kg**

Table 8
Additional Parameters Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

		Sys Loc Code	**WM-18**	**WM-18**	**WM-21**	**WM-21**	**WM-21**	**WM-21**	**UC-23**
		Sample Date	**3/1/2011**	**3/1/2011**	**3/4/2011**	**3/4/2011**	**3/4/2011**	**3/4/2011**	**3/2/2011**
		Depth Interval	**0.7 - 1.7 ft**	**1.7 - 2.7 ft**	**0 - 0.5 ft**	**2 - 2.5 ft**	**4 - 4.5 ft**	**5 - 5.5 ft**	**0 - 0.5 ft**
		Sys Sample Code	**WM-18-2_0.7-1.7_03012011**	**WM-18-3_1.7-2.7_03012011**	**WM-21-1_0.0-0.5_03042011**	**WM-21-2_2.0-2.5_03042011**	**WM-21-3_4.0-4.5_03042011**	**WM-21-4_5.0-5.5_03042011**	**UC-23-1_0.0-0.5_03022011**
		Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location							
General Parameters									
Nitrogen, ammonia (NH3) as N	NA	Lab	**21 mg/kg**	**31 mg/kg**	**7.1 mg/kg**	**41 mg/kg**	**100 mg/kg**	**94 mg/kg**	**7.7 mg/kg**
Nitrogen, total kjeldahl (TKN)	NA	Lab	**2000 mg/kg**	**2500 mg/kg**	**2100 mg/kg**	**2000 mg/kg**	**3900 mg/kg**	**2600 mg/kg**	**3100 mg/kg**
Phosphate, Ortho as P	NA	Lab	< 1.8 mg/kg	< 1.8 mg/kg	< 2.3 mg/kg	< 1.9 mg/kg	< 2.3 mg/kg	< 1.9 mg/kg	< 2.9 mg/kg
Cyanide	NA	Lab	< 0.85 mg/kg	< 0.65 mg/kg	**0.19 * mg/kg**	**0.21 * mg/kg**	**0.37 * mg/kg**	**0.15 * mg/kg**	**0.64 * mg/kg**
pH	NA	Field	--	--	**7.0 pH units**	**7.0 pH units**	**7.0 pH units**	**7.0 pH units**	**7.0 pH units**
TPHs									
Total Petroleum Hydrocarbons C10-C20	NA	Lab	< 1400 mg/kg	< 60 mg/kg	< 77 mg/kg	< 63 mg/kg	< 3700 mg/kg	< 63 mg/kg	< 96 * mg/kg
Total Petroleum Hydrocarbons C20-C34	NA	Lab	**7800 mg/kg**	**320 mg/kg**	**170 mg/kg**	**580 mg/kg**	**23000 mg/kg**	**82 mg/kg**	**450 * mg/kg**

Table 8
Additional Parameters Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

		Sys Loc Code	UC-23	UC-23	UC-23	UC-29	UC-29	UC-29		
		Sample Date	3/2/2011	3/2/2011	3/2/2011	3/3/2011	3/3/2011	3/3/2011		
		Depth Interval	1.5 - 2 ft	2.5 - 3 ft	3.75 - 4.25 ft	2.5 - 3 ft	0 - 0.5 ft	1 - 1.5 ft	1 - 1.5 ft	
		Sys Sample Code	UC-23-2_1.5-2.0_03022011	UC-23-3_2.5-3.0_03022011	UC-23-4_3.75-4.25_03022011	UC-29-4_2.5-3.0_03032011_FD	UC-29-1_0.0-0.5_03032011	UC-29-2_1.0-1.5_03032011	UC-29-2_1.0-1.5_03032011_FD	
		Sample Type Code	N	N	N	FD	N	N	FD	
Chemical Name	Total or Dissolved	Analysis Location								
General Parameters										
Nitrogen, ammonia (NH3) as N	NA	Lab	**38 mg/kg**	**61 mg/kg**	**23 mg/kg**	**38 mg/kg**	**5.6 mg/kg**	**23 mg/kg**	**25 mg/kg**	
Nitrogen, total kjeldahl (TKN)	NA	Lab	**1600 mg/kg**	**1800 mg/kg**	**470 mg/kg**	**1200 mg/kg**	**2500 mg/kg**	**1400 mg/kg**	**1400 mg/kg**	
Phosphate, Ortho as P	NA	Lab	< 2.2 mg/kg	< 2.3 mg/kg	< 1.6 mg/kg	< 1.5 mg/kg	< 2.6 mg/kg	< 2.2 mg/kg	< 2.1 mg/kg	
Cyanide	NA	Lab	**2.4 * mg/kg**	**6.8 * mg/kg**	**0.23 * mg/kg**	--	**0.56 * mg/kg**	**3.0 * mg/kg**	**2.2 * mg/kg**	
pH	NA	Field	**7.0 pH units**	**7.0 pH units**	**7.0 pH units**	--	**7.0 pH units**	**7.0 pH units**	--	
TPHs										
Total Petroleum Hydrocarbons C10-C20	NA	Lab	< 740 mg/kg	**790 mg/kg**	< 52 mg/kg	< 49 mg/kg	< 430 mg/kg	**780 mg/kg**	**430 mg/kg**	
Total Petroleum Hydrocarbons C20-C34	NA	Lab	**4700 mg/kg**	**4300 mg/kg**	< 52 mg/kg	**72 mg/kg**	**920 mg/kg**	**4500 mg/kg**	**2400 mg/kg**	

Table 8
Additional Parameters Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

		Sys Loc Code	**UC-29**	**UC-29**	**WM-30**	**WM-30**	**WM-30**	**WM-30**	**WM-32**
		Sample Date	**3/3/2011**	**3/3/2011**	**3/8/2011**	**3/8/2011**	**3/8/2011**	**3/8/2011**	**3/13/2011**
		Depth Interval	**2 - 2.5 ft**	**2.5 - 3 ft**	**0 - 0.5 ft**	**1 - 1.5 ft**	**2 - 2.5 ft**	**3.5 - 4 ft**	**0 - 0.5 ft**
		Sys Sample Code	**UC-29-3_2.0-2.5_03032011**	**UC-29-4_2.5-3.0_03032011**	**WM-30-1_0.0-0.5_03082011**	**WM-30-2_1.0-1.5_03082011**	**WM-30-3_2.0-2.5_03082011**	**WM-30-4_3.5-4.0_03082011**	**WM-32-1_0.0-0.5_03132011**
		Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location							
General Parameters									
Nitrogen, ammonia (NH3) as N	NA	Lab	**63 mg/kg**	**36 mg/kg**	**7.0 mg/kg**	**13 mg/kg**	**18 mg/kg**	**25 mg/kg**	**7.1 mg/kg**
Nitrogen, total kjeldahl (TKN)	NA	Lab	**2500 mg/kg**	**970 mg/kg**	**2100 mg/kg**	**600 mg/kg**	**1100 mg/kg**	**480 mg/kg**	**1400 mg/kg**
Phosphate, Ortho as P	NA	Lab	< 2.3 mg/kg	< 1.5 mg/kg	< 1.6 mg/kg	< 1.3 mg/kg	< 1.4 mg/kg	< 1.3 mg/kg	< 1.6 mg/kg
Cyanide	NA	Lab	**1.7 * mg/kg**	**0.15 * mg/kg**	**1.1 j mg/kg**	**0.26 j mg/kg**	**0.21 j mg/kg**	**0.013 j mg/kg**	**0.13 j mg/kg**
pH	NA	Field	**7.0 pH units**	**7.0 pH units**	--	--	--	--	--
TPHs									
Total Petroleum Hydrocarbons C10-C20	NA	Lab	< 760 mg/kg	--	< 52 mg/kg	< 43 mg/kg	< 46 mg/kg	< 42 mg/kg	< 54 mg/kg
Total Petroleum Hydrocarbons C20-C34	NA	Lab	**3200 mg/kg**	--	**190 mg/kg**	< 43 mg/kg	< 46 mg/kg	< 42 mg/kg	< 54 mg/kg

Table 8
Additional Parameters Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

		Sys Loc Code	WM-32	WM-32	WM-32
		Sample Date	3/13/2011	3/13/2011	3/13/2011
		Depth Interval	0.5 - 1 ft	1 - 1.5 ft	3.5 - 4 ft
		Sys Sample Code	WM-32-2_0.5-1.0_03132011	WM-32-3_1.0-1.5_03132011	WM-32-4_3.5-4.0_03132011
		Sample Type Code	N	N	N
Chemical Name	Total or Dissolved	Analysis Location			
General Parameters					
Nitrogen, ammonia (NH3) as N	NA	Lab	**16 mg/kg**	**13 mg/kg**	< 2.3 mg/kg
Nitrogen, total kjeldahl (TKN)	NA	Lab	**780 mg/kg**	**470 mg/kg**	< 170 mg/kg
Phosphate, Ortho as P	NA	Lab	< 1.4 mg/kg	< 1.3 mg/kg	< 1.1 mg/kg
Cyanide	NA	Lab	**0.061 j mg/kg**	**0.071 j mg/kg**	**0.048 j mg/kg**
pH	NA	Field	--	--	--
TPHs					
Total Petroleum Hydrocarbons C10-C20	NA	Lab	< 47 mg/kg	< 42 mg/kg	< 37 mg/kg
Total Petroleum Hydrocarbons C20-C34	NA	Lab	< 47 mg/kg	**110 mg/kg**	< 37 mg/kg

Table 8
Additional Parameters Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

Data Qualifiers/Footnotes	
Qualifier	**Definition**
--	Not analyzed/not available.
a	Estimated value, calculated using some or all values that are estimates.
b	Potential false positive value based on blank data validation procedures.
c	Coeluting compound.
e	Estimated value, exceeded the instrument calibration range.
f	Sample was collected at a flowrate exceeding the recommended rate of 200 mL/minute.
h	EPA recommended sample preservation, extraction or analysis holding time was exceeded.
i	Indeterminate value based on failure of blind duplicate data to meet quality assurance criteria.
j	Reported value is less than the stated laboratory quantitation limit and is considered an estimated value.
p	Relative percent difference is >40% (25% CLP pesticides) between primary and confirmation GC columns.
pp	Small peak in chromatogram below method detection limit.
r	The presence of the compound is suspect based on the ID criteria of the retention time and relative retention time obtained from the examination of the chromatograms.
s	Potential false positive value based on statistical analysis of blank sample data.
v	Sample was collected under a vacuum of greater than XX inches of mercury.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
N	Sample Type: Normal
FD	Sample Type: Field Duplicate
AT	Sample chromatogram is noted to be atypical of a petroleum product.
DLND	Not detected, detection limit not determined.
EMPC	Estimated maximum possible concentration.
NA – (Not applicable)	NA indicates that a fractional portion of the sample is not part of the analytical testing or field collection procedures.
ND	Not detected.
TIC	Tentatively identified compound

Table 9
PCB Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**WM-3**	**WM-3**	**WM-3**	**WM-3**	**WM-10**
				Sample Date	**2/20/2011**	**2/20/2011**	**2/20/2011**	**2/20/2011**	**2/25/2011**
				Depth Interval	**0 - 1**	**2 - 4**	**4.2 - 4.75**	**4.75 - 5.25**	**0 - 1**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**WM-3-1_0.0-1.0_02202011**	**WM-3-2_2.0-4.0_02202011**	**WM-3-3_4.2-4.75_02202011**	**WM-3-4_4.75-5.25_02202011**	**WM-10-1_0.0-1.0_02252011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II					
Effective Date			2/1/2007	2/1/2007					
Exceedance Key			**Bold**	No Exceed					
PCBs									
Aroclor 1016	NA	Lab			< 0.07 mg/kg	< 0.049 mg/kg	< 0.047 mg/kg	< 0.042 mg/kg	< 0.043 mg/kg
Aroclor 1221	NA	Lab			< 0.07 mg/kg	< 0.049 mg/kg	< 0.047 mg/kg	< 0.042 mg/kg	< 0.043 mg/kg
Aroclor 1232	NA	Lab			< 0.07 mg/kg	< 0.049 mg/kg	< 0.047 mg/kg	< 0.042 mg/kg	< 0.043 mg/kg
Aroclor 1242	NA	Lab			< 0.07 mg/kg	< 0.049 mg/kg	< 0.047 mg/kg	< 0.042 mg/kg	< 0.043 mg/kg
Aroclor 1248	NA	Lab			< 0.07 mg/kg	< 0.049 mg/kg	< 0.047 mg/kg	< 0.042 mg/kg	< 0.043 mg/kg
Aroclor 1254	NA	Lab			< 0.07 mg/kg	< 0.049 mg/kg	< 0.047 mg/kg	< 0.042 mg/kg	< 0.043 mg/kg
Aroclor 1260	NA	Lab			< 0.07 mg/kg	< 0.049 mg/kg	< 0.047 mg/kg	< 0.042 mg/kg	< 0.043 mg/kg
Aroclor 1262	NA	Lab			< 0.07 mg/kg	< 0.049 mg/kg	< 0.047 mg/kg	< 0.042 mg/kg	< 0.043 mg/kg
Aroclor 1268	NA	Lab			< 0.07 mg/kg	< 0.049 mg/kg	< 0.047 mg/kg	< 0.042 mg/kg	< 0.043 mg/kg
Sum of PCBs, ND at 0	NA	Lab	0.06 mg/kg	0.68 mg/kg	0 mg/kg	0 mg/kg	0 mg/kg	0 mg/kg	0 mg/kg

Table 9
PCB Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**WM-10**	**WM-10**	**UC-11**	**UC-11**	**UC-11**
				Sample Date	**2/25/2011**	**2/25/2011**	**2/26/2011**	**2/26/2011**	**2/26/2011**
				Depth Interval	**1 - 2**	**2 - 2.8**	**0 - 1**	**1 - 2**	**2 - 3**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**WM-10-2_1.0-2.0_02252011**	**WM-10-3_2.0-2.8_02252011**	**UC-11-1_0.0-1.0_02262011**	**UC-11-2_1.0-2.0_02262011**	**UC-11-3_2.0-3.0_02262011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II					
Effective Date			2/1/2007	2/1/2007					
Exceedance Key			**Bold**	No Exceed					
PCBs									
Aroclor 1016	NA	Lab			< 0.054 mg/kg	< 0.094 mg/kg	< 0.075 mg/kg	< 0.069 mg/kg	< 0.066 mg/kg
Aroclor 1221	NA	Lab			< 0.054 mg/kg	< 0.094 mg/kg	< 0.075 mg/kg	< 0.069 mg/kg	< 0.066 mg/kg
Aroclor 1232	NA	Lab			< 0.054 mg/kg	< 0.094 mg/kg	< 0.075 mg/kg	< 0.069 mg/kg	< 0.066 mg/kg
Aroclor 1242	NA	Lab			< 0.054 mg/kg	< 0.094 mg/kg	< 0.075 mg/kg	< 0.069 mg/kg	< 0.066 mg/kg
Aroclor 1248	NA	Lab			< 0.054 mg/kg	< 0.094 mg/kg	0.016 j mg/kg	< 0.069 mg/kg	< 0.066 mg/kg
Aroclor 1254	NA	Lab			< 0.054 mg/kg	< 0.094 mg/kg	0.024 j mg/kg	0.025 j mg/kg	0.043 j mg/kg
Aroclor 1260	NA	Lab			< 0.054 mg/kg	< 0.094 mg/kg	< 0.075 mg/kg	< 0.069 mg/kg	< 0.066 mg/kg
Aroclor 1262	NA	Lab			< 0.054 mg/kg	< 0.094 mg/kg	< 0.075 mg/kg	< 0.069 mg/kg	< 0.066 mg/kg
Aroclor 1268	NA	Lab			< 0.054 mg/kg	< 0.094 mg/kg	< 0.075 mg/kg	< 0.069 mg/kg	< 0.066 mg/kg
Sum of PCBs, ND at 0	NA	Lab	0.06 mg/kg	0.68 mg/kg	0 mg/kg	0 mg/kg	0.04 a mg/kg	0.03 a mg/kg	0.04 a mg/kg

Table 9
PCB Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**WM-18**	**WM-18**	**WM-18**	**WM-21**	**WM-21**
				Sample Date	**3/1/2011**	**3/1/2011**	**3/1/2011**	**3/4/2011**	**3/4/2011**
				Depth Interval	**0 - 0.7**	**0.7 - 1.7**	**1.7 - 2.7**	**0 - 0.5**	**2 - 2.5**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**WM-18-1_0.0-0.7_03012011**	**WM-18-2_0.7-1.7_03012011**	**WM-18-3_1.7-2.7_03012011**	**WM-21-1_0.0-0.5_03042011**	**WM-21-2_2.0-2.5_03042011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II					
Effective Date			2/1/2007	2/1/2007					
Exceedance Key			**Bold**	No Exceed					
PCBs									
Aroclor 1016	NA	Lab			< 0.061 mg/kg	< 0.058 mg/kg	< 0.06 mg/kg	< 0.076 mg/kg	< 0.061 mg/kg
Aroclor 1221	NA	Lab			< 0.061 mg/kg	< 0.058 mg/kg	< 0.06 mg/kg	< 0.076 mg/kg	< 0.061 mg/kg
Aroclor 1232	NA	Lab			< 0.061 mg/kg	< 0.058 mg/kg	< 0.06 mg/kg	< 0.076 mg/kg	< 0.061 mg/kg
Aroclor 1242	NA	Lab			< 0.061 mg/kg	< 0.058 mg/kg	< 0.06 mg/kg	< 0.076 mg/kg	< 0.061 mg/kg
Aroclor 1248	NA	Lab			< 0.061 mg/kg	< 0.058 mg/kg	< 0.06 mg/kg	< 0.076 mg/kg	< 0.061 mg/kg
Aroclor 1254	NA	Lab			< 0.061 mg/kg	< 0.058 mg/kg	< 0.06 mg/kg	< 0.076 mg/kg	< 0.061 mg/kg
Aroclor 1260	NA	Lab			< 0.061 mg/kg	< 0.058 mg/kg	< 0.06 mg/kg	< 0.076 mg/kg	< 0.061 mg/kg
Aroclor 1262	NA	Lab			< 0.061 mg/kg	< 0.058 mg/kg	< 0.06 mg/kg	< 0.076 mg/kg	< 0.061 mg/kg
Aroclor 1268	NA	Lab			< 0.061 mg/kg	< 0.058 mg/kg	< 0.06 mg/kg	< 0.076 mg/kg	< 0.061 mg/kg
Sum of PCBs, ND at 0	NA	Lab	0.06 mg/kg	0.68 mg/kg	0 mg/kg	0 mg/kg	0 mg/kg	0 mg/kg	0 mg/kg

Table 9
PCB Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**WM-21**	**WM-21**	**UC-23**	**UC-23**	**UC-23**
				Sample Date	**3/4/2011**	**3/4/2011**	**3/2/2011**	**3/2/2011**	**3/2/2011**
				Depth Interval	**4 - 4.5**	**5 - 5.5**	**0 - 0.5**	**1.5 - 2**	**2.5 - 3**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**WM-21-3_4.0-4.5_03042011**	**WM-21-4_5.0-5.5_03042011**	**UC-23-1_0.0-0.5_03022011**	**UC-23-2_1.5-2.0_03022011**	**UC-23-3_2.5-3.0_03022011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II					
Effective Date			2/1/2007	2/1/2007					
Exceedance Key			**Bold**	No Exceed					
PCBs									
Aroclor 1016	NA	Lab			< 0.076 mg/kg	< 0.063 mg/kg	< 0.092 mg/kg	< 0.073 mg/kg	< 0.078 mg/kg
Aroclor 1221	NA	Lab			< 0.076 mg/kg	< 0.063 mg/kg	< 0.092 mg/kg	< 0.073 mg/kg	< 0.078 mg/kg
Aroclor 1232	NA	Lab			< 0.076 mg/kg	< 0.063 mg/kg	< 0.092 mg/kg	< 0.073 mg/kg	< 0.078 mg/kg
Aroclor 1242	NA	Lab			< 0.076 mg/kg	< 0.063 mg/kg	< 0.092 mg/kg	0.014 j mg/kg	< 0.078 mg/kg
Aroclor 1248	NA	Lab			< 0.076 mg/kg	< 0.063 mg/kg	< 0.092 mg/kg	< 0.073 mg/kg	< 0.078 mg/kg
Aroclor 1254	NA	Lab			< 0.076 mg/kg	< 0.063 mg/kg	< 0.092 mg/kg	< 0.073 mg/kg	< 0.078 mg/kg
Aroclor 1260	NA	Lab			< 0.076 mg/kg	< 0.063 mg/kg	< 0.092 mg/kg	< 0.073 mg/kg	< 0.078 mg/kg
Aroclor 1262	NA	Lab			< 0.076 mg/kg	< 0.063 mg/kg	< 0.092 mg/kg	< 0.073 mg/kg	< 0.078 mg/kg
Aroclor 1268	NA	Lab			< 0.076 mg/kg	< 0.063 mg/kg	< 0.092 mg/kg	< 0.073 mg/kg	< 0.078 mg/kg
Sum of PCBs, ND at 0	NA	Lab	0.06 mg/kg	0.68 mg/kg	0 mg/kg	0 mg/kg	0 mg/kg	0.01 mg/kg	0 mg/kg

Table 9
PCB Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**UC-23**	**UC-29**	**UC-29**		**UC-29**
				Sample Date	**3/2/2011**	**3/3/2011**	**3/3/2011**		**3/3/2011**
				Depth Interval	**3.75 - 4.25**	**0 - 0.5**	**1 - 1.5**	**1 - 1.5**	**2 - 2.5**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**UC-23-4_3.75-4.25_03022011**	**UC-29-1_0.0-0.5_03032011**	**UC-29-2_1.0-1.5_03032011**	**UC-29-2_1.0-1.5_03032011_FD**	**UC-29-3_2.0-2.5_03032011**
				Sample Type Code	**N**	**N**	**N**	**FD**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II					
Effective Date			2/1/2007	2/1/2007					
Exceedance Key			**Bold**	No Exceed					
PCBs									
Aroclor 1016	NA	Lab			< 0.044 mg/kg	< 0.087 mg/kg	< 0.071 mg/kg	< 0.048 mg/kg	< 0.075 mg/kg
Aroclor 1221	NA	Lab			< 0.044 mg/kg	< 0.087 mg/kg	< 0.071 mg/kg	< 0.048 mg/kg	< 0.075 mg/kg
Aroclor 1232	NA	Lab			< 0.044 mg/kg	< 0.087 mg/kg	< 0.071 mg/kg	< 0.048 mg/kg	< 0.075 mg/kg
Aroclor 1242	NA	Lab			< 0.044 mg/kg	< 0.087 mg/kg	< 0.071 mg/kg	< 0.048 mg/kg	< 0.075 mg/kg
Aroclor 1248	NA	Lab			< 0.044 mg/kg	< 0.087 mg/kg	< 0.071 mg/kg	< 0.048 mg/kg	< 0.075 mg/kg
Aroclor 1254	NA	Lab			< 0.044 mg/kg	< 0.087 mg/kg	< 0.071 mg/kg	< 0.048 mg/kg	< 0.075 mg/kg
Aroclor 1260	NA	Lab			< 0.044 mg/kg	< 0.087 mg/kg	< 0.071 mg/kg	< 0.048 mg/kg	< 0.075 mg/kg
Aroclor 1262	NA	Lab			< 0.044 mg/kg	< 0.087 mg/kg	< 0.071 mg/kg	< 0.048 mg/kg	< 0.075 mg/kg
Aroclor 1268	NA	Lab			< 0.044 mg/kg	< 0.087 mg/kg	< 0.071 mg/kg	< 0.048 mg/kg	< 0.075 mg/kg
Sum of PCBs, ND at 0	NA	Lab	0.06 mg/kg	0.68 mg/kg	0 mg/kg	0 mg/kg	0 mg/kg	0 mg/kg	0 mg/kg

Table 9
PCB Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**UC-29**	**WM-30**	**WM-30**	**WM-30**	**WM-30**
				Sample Date	**3/3/2011**	**3/8/2011**	**3/8/2011**	**3/8/2011**	**3/8/2011**
				Depth Interval	**2.5 - 3**	**0 - 0.5**	**1 - 1.5**	**2 - 2.5**	**3.5 - 4**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**UC-29-4_2.5-3.0_03032011**	**WM-30-1_0.0-0.5_03082011**	**WM-30-2_1.0-1.5_03082011**	**WM-30-3_2.0-2.5_03082011**	**WM-30-4_3.5-4.0_03082011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II					
Effective Date			2/1/2007	2/1/2007					
Exceedance Key			**Bold**	No Exceed					
PCBs									
Aroclor 1016	NA	Lab			< 0.046 mg/kg	< 0.055 mg/kg	< 0.042 mg/kg	< 0.047 mg/kg	< 0.042 mg/kg
Aroclor 1221	NA	Lab			< 0.046 mg/kg	< 0.055 mg/kg	< 0.042 mg/kg	< 0.047 mg/kg	< 0.042 mg/kg
Aroclor 1232	NA	Lab			< 0.046 mg/kg	< 0.055 mg/kg	< 0.042 mg/kg	< 0.047 mg/kg	< 0.042 mg/kg
Aroclor 1242	NA	Lab			< 0.046 mg/kg	< 0.055 mg/kg	< 0.042 mg/kg	< 0.047 mg/kg	< 0.042 mg/kg
Aroclor 1248	NA	Lab			< 0.046 mg/kg	< 0.055 mg/kg	< 0.042 mg/kg	< 0.047 mg/kg	< 0.042 mg/kg
Aroclor 1254	NA	Lab			< 0.046 mg/kg	< 0.055 mg/kg	< 0.042 mg/kg	< 0.047 mg/kg	< 0.042 mg/kg
Aroclor 1260	NA	Lab			< 0.046 mg/kg	< 0.055 mg/kg	< 0.042 mg/kg	< 0.047 mg/kg	< 0.042 mg/kg
Aroclor 1262	NA	Lab			< 0.046 mg/kg	< 0.055 mg/kg	< 0.042 mg/kg	< 0.047 mg/kg	< 0.042 mg/kg
Aroclor 1268	NA	Lab			< 0.046 mg/kg	< 0.055 mg/kg	< 0.042 mg/kg	< 0.047 mg/kg	< 0.042 mg/kg
Sum of PCBs, ND at 0	NA	Lab	0.06 mg/kg	0.68 mg/kg	0 mg/kg	0 mg/kg	0 mg/kg	0 mg/kg	0 mg/kg

Table 9
PCB Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**WM-32**	**WM-32**	**WM-32**	**WM-32**
				Sample Date	**3/13/2011**	**3/13/2011**	**3/13/2011**	**3/13/2011**
				Depth Interval	**0 - 0.5**	**0.5 - 1**	**1 - 1.5**	**3.5 - 4**
				Depth Unit	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**WM-32-1_0.0-0.5_03132011**	**WM-32-2_0.5-1.0_03132011**	**WM-32-3_1.0-1.5_03132011**	**WM-32-4_3.5-4.0_03132011**
				Sample Type Code	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II				
Effective Date			2/1/2007	2/1/2007				
Exceedance Key			**Bold**	No Exceed				
PCBs								
Aroclor 1016	NA	Lab			< 0.055 mg/kg	< 0.048 mg/kg	< 0.04 mg/kg	< 0.037 mg/kg
Aroclor 1221	NA	Lab			< 0.055 mg/kg	< 0.048 mg/kg	< 0.04 mg/kg	< 0.037 mg/kg
Aroclor 1232	NA	Lab			< 0.055 mg/kg	< 0.048 mg/kg	< 0.04 mg/kg	< 0.037 mg/kg
Aroclor 1242	NA	Lab			< 0.055 mg/kg	< 0.048 mg/kg	< 0.04 mg/kg	< 0.037 mg/kg
Aroclor 1248	NA	Lab			< 0.055 mg/kg	< 0.048 mg/kg	< 0.04 mg/kg	< 0.037 mg/kg
Aroclor 1254	NA	Lab			< 0.055 mg/kg	< 0.048 mg/kg	< 0.04 mg/kg	< 0.037 mg/kg
Aroclor 1260	NA	Lab			< 0.055 mg/kg	< 0.048 mg/kg	< 0.04 mg/kg	< 0.037 mg/kg
Aroclor 1262	NA	Lab			< 0.055 mg/kg	< 0.048 mg/kg	< 0.04 mg/kg	< 0.037 mg/kg
Aroclor 1268	NA	Lab			< 0.055 mg/kg	< 0.048 mg/kg	< 0.04 mg/kg	< 0.037 mg/kg
Sum of PCBs, ND at 0	NA	Lab	0.06 mg/kg	0.68 mg/kg	0 mg/kg	0 mg/kg	0 mg/kg	0 mg/kg

Table 9
PCB Analytical Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

Data Qualifiers/Footnotes	
Qualifier	**Definition**
--	Not analyzed/not available.
a	Estimated value, calculated using some or all values that are estimates.
b	Potential false positive value based on blank data validation procedures.
c	Coeluting compound.
e	Estimated value, exceeded the instrument calibration range.
h	EPA recommended sample preservation, extraction or analysis holding time was exceeded.
I	Indeterminate value based on failure of blind duplicate data to meet quality assurance criteria.
j	Reported value is less than the stated laboratory quantitation limit and is considered an estimated value.
p	Relative percent difference is >40% (25% CLP pesticides) between primary and confirmation GC columns.
pp	Small peak in chromatogram below method detection limit.
r	The presence of the compound is suspect based on the ID criteria of the retention time and relative retention time obtained from the examination of the chromatograms.
s	Potential false positive value based on statistical analysis of blank sample data.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
N	Sample Type: Normal
FD	Sample Type: Field Duplicate
AT	Sample chromatogram is noted to be atypical of a petroleum product.
DF	Did not flash
EMPC	Estimated maximum possible concentration.
NA – (Not applicable)	NA indicates that a fractional portion of the sample is not part of the analytical testing or field collection procedures.
ND	Not detected.

Table 10
Polychlorinated Dibenzo-p-dioxins and Dibenzofurans (PCDD/PCDFs)
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

					Sys Loc Code	**WM-3**	**WM-3**	**WM-3**	**WM-3**	**WM-4**	**WM-4**	**WM-6**		**WM-6**	**WM-8**	**WM-8**	**WM-8**
					Sample Date	**2/20/2011**	**2/20/2011**	**2/20/2011**	**2/20/2011**	**2/21/2011**	**2/21/2011**	**2/22/2011**		**2/22/2011**	**2/24/2011**	**2/24/2011**	**2/24/2011**
					Depth Interval	**0 - 1**	**2 - 4**	**4.2 - 4.75**	**4.75 - 5.25**	**0 - 0.5**	**0.5 - 1**	**0 - 1**	**0 - 1**	**1.4 - 1.8**	**0 - 0.5**	**0.75 - 1.25**	**1.25 - 1.75**
					Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
					Sys Sample Code	**WM-3-1_0.0-1.0_02202011**	**WM-3-2_2.0-4.0_02202011**	**WM-3-3_4.2-4.75_02202011**	**WM-3-4_4.75-5.25_02202011**	**WM-4-1_0.0-0.5_02212011**	**WM-4-2_0.5-1.0_02212011**	**WM-6-1_0.0-1.0_02222011**	**WM-6-1_0.0-1.0_02222011_FD**	**WM-6-2_1.4-1.8_02222011**	**WM-8-1_0.0-0.5_02242011**	**WM-8-2_0.75-1.25_02242011**	**WM-8-3_1.25-1.75_02242011**
					Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**FD**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II													
Effective Date			2/1/2007	2/1/2007													
Exceedance Key			**Bold**	Underline													
Chlorinated Dioxins / Furans																	
2,3,7,8-Dioxin, tetra	NA	Lab			< 0.168 ng/kg	< 0.201 ng/kg	< 0.0916 ng/kg	< 0.143 ng/kg	2.53 ng/kg	1.57 j ng/kg	0.278 j ng/kg	< 0.428 j ng/kg	3.39 ng/kg	0.274 j ng/kg	2.22 j ng/kg	< 0.0693 ng/kg
1,2,3,7,8-Dioxin penta	NA	Lab			< 0.207 ng/kg	< 0.207 ng/kg	< 0.120 ng/kg	< 0.154 ng/kg	9.97 ng/kg	5.82 j ng/kg	0.686 j ng/kg	0.675 j ng/kg	8.77 j ng/kg	0.467 j ng/kg	7.63 ng/kg	< 0.0665 ng/kg
1,2,3,4,7,8-Dioxin, hexa	NA	Lab			< 0.277 ng/kg	< 0.269 ng/kg	< 0.136 ng/kg	< 0.183 ng/kg	8.89 ng/kg	2.65 j ng/kg	0.788 j ng/kg	1.05 j ng/kg	7.93 j ng/kg	0.662 j ng/kg	5.25 ng/kg	< 0.0686 ng/kg
1,2,3,6,7,8-Dioxin, hexa	NA	Lab			< 0.279 ng/kg	< 0.279 ng/kg	< 0.141 ng/kg	< 0.191 ng/kg	48.9 ng/kg	22.9 ng/kg	3.19 j ng/kg	3.84 j ng/kg	30.0 ng/kg	2.61 j ng/kg	34.3 ng/kg	< 0.0729 ng/kg
1,2,3,7,8,9-Dioxin, hexa	NA	Lab			< 0.299 ng/kg	< 0.295 ng/kg	< 0.148 ng/kg	< 0.200 ng/kg	35.1 ng/kg	13.3 ng/kg	2.13 j ng/kg	2.06 j ng/kg	24.1 ng/kg	1.67 j ng/kg	22.4 ng/kg	< 0.0762 ng/kg
1,2,3,4,6,7,8-Dioxin, hepta	NA	Lab			< 0.221 ng/kg	< 0.404 ng/kg	< 0.304 j ng/kg	0.310 j ng/kg	452 ng/kg	144 ng/kg	37.7 ng/kg	48.8 ng/kg	286 ng/kg	39.8 ng/kg	398 ng/kg	0.304 j ng/kg
Dioxin octa	NA	Lab			< 0.717 j ng/kg	< 0.687 j ng/kg	< 0.314 j ng/kg	< 0.400 j ng/kg	1340 ng/kg	817 ng/kg	279 ng/kg	411 ng/kg	1190 ng/kg	293 ng/kg	1870 ng/kg	< 0.166 j ng/kg
2,3,7,8-Dibenzofuran, tetra	NA	Lab			0.396 j ng/kg	0.573 j ng/kg	0.448 j ng/kg	0.496 j ng/kg	2 ng/kg	1.59 j ng/kg	1.02 j ng/kg	1.14 ng/kg	2.98 j ng/kg	0.993 j ng/kg	2.76 j ng/kg	0.516 j ng/kg
1,2,3,7,8-Dibenzofuran, penta	NA	Lab			< 0.147 ng/kg	< 0.169 ng/kg	< 0.0857 ng/kg	< 0.100 ng/kg	1.21 j ng/kg	1.48 j ng/kg	0.216 j ng/kg	< 0.206 ng/kg	1.07 j ng/kg	0.186 j ng/kg	0.983 j ng/kg	< 0.0483 ng/kg
2,3,4,7,8-Dibenzofuran, penta	NA	Lab			< 0.142 ng/kg	< 0.160 ng/kg	< 0.0855 ng/kg	< 0.104 ng/kg	3.76 j ng/kg	6.82 j ng/kg	0.501 j ng/kg	0.619 j ng/kg	3.58 j ng/kg	0.379 j ng/kg	3.04 j ng/kg	0.0626 j ng/kg
1,2,3,4,7,8-Dibenzofuran, hexa	NA	Lab			< 0.0951 ng/kg	< 0.106 ng/kg	< 0.0520 j ng/kg	< 0.0923 ng/kg	8.79 ng/kg	13.2 ng/kg	1.01 j ng/kg	1.04 j ng/kg	7.81 j ng/kg	0.841 j ng/kg	9.10 ng/kg	0.0475 j ng/kg
1,2,3,6,7,8-Dibenzofuran, hexa	NA	Lab			< 0.117 ng/kg	< 0.120 ng/kg	0.0808 j ng/kg	< 0.0990 ng/kg	12.7 ng/kg	16.4 ng/kg	1.78 j ng/kg	2.11 j ng/kg	10.6 ng/kg	1.38 j ng/kg	16.6 ng/kg	< 0.0496 j ng/kg
1,2,3,7,8,9-Dibenzofuran, hexa	NA	Lab			< 0.166 ng/kg	< 0.190 ng/kg	< 0.0949 ng/kg	< 0.133 ng/kg	1.84 j ng/kg	2.63 j ng/kg	0.276 j ng/kg	0.273 j ng/kg	1.95 j ng/kg	< 0.193 j ng/kg	2.19 j ng/kg	< 0.0699 ng/kg
2,3,4,6,7,8-Dibenzofuran, hexa	NA	Lab			< 0.116 ng/kg	< 0.127 ng/kg	< 0.0774 ng/kg	< 0.0978 ng/kg	7.03 ng/kg	10.1 ng/kg	0.794 j ng/kg	0.948 j ng/kg	5.72 j ng/kg	0.735 j ng/kg	6.76 ng/kg	< 0.0578 ng/kg
1,2,3,4,6,7,8-Dibenzofuran, hepta	NA	Lab			< 0.173 ng/kg	< 0.168 ng/kg	0.139 j ng/kg	< 0.172 j ng/kg	644 ng/kg	729 ng/kg	52.8 ng/kg	60.7 ng/kg	457 ng/kg	46.2 ng/kg	755 ng/kg	0.179 j ng/kg
1,2,3,4,7,8,9-Dibenzofuran, hepta	NA	Lab			< 0.254 ng/kg	< 0.275 ng/kg	< 0.157 ng/kg	< 0.128 ng/kg	4.99 j ng/kg	5.81 j ng/kg	0.583 j ng/kg	0.791 j ng/kg	4.44 j ng/kg	0.617 j ng/kg	5.99 ng/kg	< 0.0945 ng/kg
Dibenzofuran octa	NA	Lab			< 0.510 ng/kg	< 0.456 ng/kg	< 0.237 j ng/kg	< 0.235 ng/kg	219 ng/kg	215 ng/kg	20.4 ng/kg	28.9 ng/kg	194 ng/kg	20.3 ng/kg	300 ng/kg	< 0.128 j ng/kg
Dioxin tetra, Total	NA	Lab			0.783 j ng/kg	0.627 j ng/kg	1.94 j ng/kg	2.84 j ng/kg	29.1 j ng/kg	18.1 j ng/kg	3.12 j ng/kg	3.03 j ng/kg	25.6 j ng/kg	3.75 j ng/kg	18.7 j ng/kg	1.20 j ng/kg
Dibenzofuran tetra, Total	NA	Lab			0.820 j ng/kg	1.14 j ng/kg	1.86 j ng/kg	1.07 j ng/kg	20.6 j ng/kg	35.8 j ng/kg	4.82 j ng/kg	4.61 j ng/kg	31.7 j ng/kg	4.53 j ng/kg	17.7 j ng/kg	1.48 j ng/kg
Dioxin penta, Total	NA	Lab			0.955 j ng/kg	0.757 j ng/kg	1.20 j ng/kg	2.05 j ng/kg	89.8 j ng/kg	48.9 j ng/kg	6.62 j ng/kg	6.68 j ng/kg	78.4 j ng/kg	5.99 j ng/kg	51.8 j ng/kg	0.945 j ng/kg
Dibenzofuran penta, Total	NA	Lab			< 0.142 ng/kg	< 0.160 ng/kg	< 0.0855 ng/kg	< 0.100 ng/kg	80.5 j ng/kg	112 j ng/kg	7.45 j ng/kg	7.69 j ng/kg	64.8 j ng/kg	5.85 j ng/kg	52.9 j ng/kg	0.0626 j ng/kg
Dioxin, hexa, Total	NA	Lab			0.527 j ng/kg	0.555 j ng/kg	0.887 j ng/kg	1.66 j ng/kg	419 j ng/kg	186 j ng/kg	30.0 j ng/kg	35.3 j ng/kg	292 j ng/kg	26.7 j ng/kg	346 j ng/kg	0.622 j ng/kg
Dibenzofuran, hexa, Total	NA	Lab			< 0.0951 ng/kg	< 0.106 ng/kg	0.189 j ng/kg	< 0.0923 ng/kg	417 j ng/kg	549 j ng/kg	43.7 j ng/kg	39.2 j ng/kg	353 j ng/kg	32.9 j ng/kg	475 j ng/kg	0.149 j ng/kg
Dioxin, hepta, Total	NA	Lab			1.60 j ng/kg	< 0.404 ng/kg	0.743 j ng/kg	0.712 j ng/kg	839 j ng/kg	284 j ng/kg	90.7 j ng/kg	105 j ng/kg	595 j ng/kg	84.2 j ng/kg	809 j ng/kg	0.652 j ng/kg
Dibenzofuran, hepta, Total	NA	Lab			< 0.173 ng/kg	< 0.168 ng/kg	0.269 j ng/kg	0.172 j ng/kg	1160 j ng/kg	1380 j ng/kg	102 j ng/kg	120 j ng/kg	--	89.3 j ng/kg	1380 j ng/kg	0.322 j ng/kg
TCDD Equivalent, reporting limit at 0, TEF1998 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	0.04 a ng/kg	0.06 a ng/kg	0.05 a ng/kg	0.05 a ng/kg	**38.1 a ng/kg**	**28 a ng/kg**	**3.26 a ng/kg**	--	**30.7 a ng/kg**	--	**33.2 a ng/kg**	0.09 a ng/kg
TCDD Equivalent, reporting limit at 1/2, TEF1998 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	--	--	--	--	**38.1 a ng/kg**	**28 a ng/kg**	**3.26 a ng/kg**	**3.6 a ng/kg**	**30.7 a ng/kg**	**2.74 a ng/kg**	**33.2 a ng/kg**	--
TCDD Equivalent, reporting limit at 0, TEF 1998 [Fish]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	0.02 a ng/kg	0.03 a ng/kg	0.03 a ng/kg	0.03 a ng/kg	**29.96 a ng/kg**	**24.47 a ng/kg**	**2.71 a ng/kg**	--	**26.31 a ng/kg**	--	**26.44 a ng/kg**	0.06 a ng/kg
TCDD Equivalent, reporting limit at 1/2, TEF 1998 [Fish]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	--	--	--	--	**29.96 a ng/kg**	**24.47 a ng/kg**	**2.71 a ng/kg**	**2.99 a ng/kg**	**26.31 a ng/kg**	**2.21 a ng/kg**	**26.44 a ng/kg**	--
TCDD Equivalent, reporting limit at 0, TEF 2005 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	0.04 a ng/kg	0.06 a ng/kg	0.05 a ng/kg	0.05 a ng/kg	**37.7 a ng/kg**	**26.9 a ng/kg**	**3.22 a ng/kg**	--	**30.3 a ng/kg**	--	**33 a ng/kg**	0.08 a ng/kg
TCDD Equivalent, reporting limit at 1/2, TEF 2005 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	--	--	--	--	**37.7 a ng/kg**	**26.9 a ng/kg**	**3.22 a ng/kg**	**3.56 a ng/kg**	**30.3 a ng/kg**	**2.72 a ng/kg**	**33 a ng/kg**	--

Table 10
Polychlorinated Dibenzo-p-dioxins and Dibenzofurans (PCDD/PCDFs)
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

					Sys Loc Code	**WM-10**	**WM-10**	**WM-10**	**UC-11**	**UC-11**	**UC-11**	**UC-11**	**UC-15**	**UC-15**	**UC-15**	
					Sample Date	**2/25/2011**	**2/25/2011**	**2/25/2011**	**2/26/2011**	**2/26/2011**	**2/26/2011**	**2/26/2011**	**2/27/2011**	**2/27/2011**	**2/27/2011**	
					Depth Interval	**0 - 1**	**1 - 2**	**2 - 2.8**	**0 - 1**	**1 - 2**	**2 - 3**	**3 - 3.5**	**0 - 1**	**1 - 2**	**2 - 3**	**2 - 3**
					Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
					Sys Sample Code	**WM-10-1_0.0-1.0_02252011**	**WM-10-2_1.0-2.0_02252011**	**WM-10-3_2.0-2.8_02252011**	**UC-11-1_0.0-1.0_02262011**	**UC-11-2_1.0-2.0_02262011**	**UC-11-3_2.0-3.0_02262011**	**UC-11-4_3.0-3.5_02262011**	**UC-15-1_0.0-1.0_02272011**	**UC-15-2_1.0-2.0_02272011**	**UC-15-3_2.0-3.0_02272011**	**UC-15-3_2.0-3.0_02272011_FD**
					Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**FD**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II												
Effective Date			2/1/2007	2/1/2007												
Exceedance Key			**Bold**	Underline												
Chlorinated Dioxins / Furans																
2,3,7,8-Dioxin, tetra	NA	Lab			2.85 j ng/kg	< 44.40 j ng/kg	< 0.159 j ng/kg	4.25 j ng/kg	0.454 j ng/kg	1.54 ng/kg	< 0.247 j ng/kg	< 0.143 j ng/kg	0.334 j ng/kg	2.21 ng/kg	4.43 ng/kg
1,2,3,7,8-Dioxin penta	NA	Lab			7.87 j ng/kg	< 64.70 j ng/kg	0.357 j ng/kg	4.66 j ng/kg	1.09 j ng/kg	4.85 j ng/kg	0.897 j ng/kg	< 0.170 j ng/kg	0.174 j ng/kg	5.98 ng/kg	14.2 ng/kg
1,2,3,4,7,8-Dioxin, hexa	NA	Lab			6.80 j ng/kg	91.3 j ng/kg	0.337 j ng/kg	3.80 j ng/kg	0.409 j ng/kg	2.69 j ng/kg	0.518 j ng/kg	0.176 j ng/kg	< 0.377 ng/kg	5.88 ng/kg	8.59 ng/kg
1,2,3,6,7,8-Dioxin, hexa	NA	Lab			33.4 j ng/kg	< 71.30 j ng/kg	0.865 j ng/kg	< 2.27 j ng/kg	3.13 j ng/kg	17.3 ng/kg	3.68 j ng/kg	0.977 j ng/kg	2.14 j ng/kg	30.9 ng/kg	66.9 ng/kg
1,2,3,7,8,9-Dioxin, hexa	NA	Lab			24.9 j ng/kg	433 j ng/kg	0.592 j ng/kg	10.8 j ng/kg	1.59 j ng/kg	11.8 ng/kg	2.11 j ng/kg	0.666 j ng/kg	0.692 j ng/kg	19.4 ng/kg	41.8 ng/kg
1,2,3,4,6,7,8-Dioxin, hepta	NA	Lab			405 j ng/kg	6030 j ng/kg	6.59 j ng/kg	529 ng/kg	62.7 ng/kg	215 ng/kg	34.8 ng/kg	16.6 ng/kg	83.4 ng/kg	339 ng/kg	732 ng/kg
Dioxin octa	NA	Lab			1850 ng/kg	18800 j ng/kg	18.1 j ng/kg	5860 ng/kg	948 ng/kg	1720 ng/kg	305 ng/kg	145 ng/kg	1180 ng/kg	2780 ng/kg	5220 ng/kg
2,3,7,8-Dibenzofuran, tetra	NA	Lab			< 1.22 j ng/kg	< 13.40 ng/kg	< 0.202 j ng/kg	< 1.87 j ng/kg	1.56 ng/kg	1.33 ng/kg	< 0.281 j ng/kg	< 0.160 j ng/kg	1.33 ng/kg	3.23 ng/kg	5.66 ng/kg
1,2,3,7,8-Dibenzofuran, penta	NA	Lab			1.22 j ng/kg	< 32.30 ng/kg	0.225 j ng/kg	< 1.47 j ng/kg	< 0.173 ng/kg	0.368 j ng/kg	0.243 j ng/kg	< 0.196 ng/kg	0.086 j ng/kg	1.34 j ng/kg	3.03 j ng/kg
2,3,4,7,8-Dibenzofuran, penta	NA	Lab			2.09 j ng/kg	< 32.60 ng/kg	< 0.235 j ng/kg	< 2.09 j ng/kg	0.386 j ng/kg	1.26 j ng/kg	1.00 j ng/kg	0.267 j ng/kg	< 0.207 j ng/kg	4.39 j ng/kg	9.10 ng/kg
1,2,3,4,7,8-Dibenzofuran, hexa	NA	Lab			3.95 j ng/kg	< 38.40 j ng/kg	0.302 j ng/kg	< 3.70 j ng/kg	0.644 j ng/kg	2.82 j ng/kg	1.67 j ng/kg	0.368 j ng/kg	0.455 j ng/kg	13.6 ng/kg	28.8 ng/kg
1,2,3,6,7,8-Dibenzofuran, hexa	NA	Lab			2.32 j ng/kg	< 33.80 j ng/kg	0.253 j ng/kg	< 5.69 j ng/kg	< 0.325 j ng/kg	1.40 j ng/kg	1.23 j ng/kg	0.832 j ng/kg	0.674 j ng/kg	22.1 ng/kg	51.8 ng/kg
1,2,3,7,8,9-Dibenzofuran, hexa	NA	Lab			1.06 j ng/kg	< 42.40 R ng/kg	0.384 j ng/kg	< 5.07 j ng/kg	< 0.377 ng/kg	0.767 j ng/kg	0.335 j ng/kg	< 0.162 ng/kg	< 0.238 ng/kg	3.23 j ng/kg	6.95 j ng/kg
2,3,4,6,7,8-Dibenzofuran, hexa	NA	Lab			3.72 j ng/kg	< 37.80 j ng/kg	0.287 j ng/kg	< 3.12 j ng/kg	0.586 j ng/kg	2.18 j ng/kg	0.973 j ng/kg	0.357 j ng/kg	0.379 j ng/kg	8.89 ng/kg	20.1 ng/kg
1,2,3,4,6,7,8-Dibenzofuran, hepta	NA	Lab			102 j ng/kg	2460 j ng/kg	2.74 j ng/kg	184 ng/kg	33.6 ng/kg	230 ng/kg	81.9 ng/kg	26.7 ng/kg	20.7 ng/kg	1400 ng/kg	2560 ng/kg
1,2,3,4,7,8,9-Dibenzofuran, hepta	NA	Lab			3.76 j ng/kg	< 36.60 j ng/kg	0.399 j ng/kg	< 1.90 j ng/kg	0.731 j ng/kg	2.30 j ng/kg	1.01 j ng/kg	0.293 j ng/kg	0.870 j ng/kg	9.28 ng/kg	18.9 j ng/kg
Dibenzofuran octa	NA	Lab			99.9 j ng/kg	1470 ng/kg	1.67 j ng/kg	192 ng/kg	32.2 ng/kg	125 ng/kg	32.4 ng/kg	11.2 ng/kg	71.4 ng/kg	576 ng/kg	1050 ng/kg
Dioxin tetra, Total	NA	Lab			11.8 j ng/kg	226 j ng/kg	2.63 j ng/kg	21.0 j ng/kg	3.01 j ng/kg	15.8 j ng/kg	5.94 j ng/kg	2.22 j ng/kg	1.55 j ng/kg	17.6 j ng/kg	34.3 j ng/kg
Dibenzofuran tetra, Total	NA	Lab			1.22 j ng/kg	13.4 j ng/kg	2.07 j ng/kg	60.0 j ng/kg	5.93 j ng/kg	11.0 j ng/kg	7.34 j ng/kg	2.51 j ng/kg	4.35 j ng/kg	18.6 j ng/kg	39.7 j ng/kg
Dioxin penta, Total	NA	Lab			62.1 j ng/kg	1060 j ng/kg	3.39 j ng/kg	41.3 j ng/kg	5.47 j ng/kg	42.4 j ng/kg	10.4 j ng/kg	3.56 j ng/kg	2.86 j ng/kg	57.7 j ng/kg	112 j ng/kg
Dibenzofuran penta, Total	NA	Lab			23.7 j ng/kg	32.3 j ng/kg	1.01 j ng/kg	< 1.47 ng/kg	5.00 j ng/kg	21.6 j ng/kg	9.97 j ng/kg	2.45 j ng/kg	2.52 j ng/kg	63.3 j ng/kg	135 j ng/kg
Dioxin, hexa, Total	NA	Lab			320 j ng/kg	5350 j ng/kg	7.30 j ng/kg	192 j ng/kg	23.8 j ng/kg	183 j ng/kg	36.5 j ng/kg	9.59 j ng/kg	19.4 j ng/kg	288 j ng/kg	619 j ng/kg
Dibenzofuran, hexa, Total	NA	Lab			121 j ng/kg	1440 j ng/kg	3.26 j ng/kg	153 j ng/kg	23.5 j ng/kg	154 j ng/kg	59.1 j ng/kg	15.0 j ng/kg	13.6 j ng/kg	704 j ng/kg	1590 j ng/kg
Dioxin, hepta, Total	NA	Lab			798 j ng/kg	11600 j ng/kg	13.9 j ng/kg	1150 j ng/kg	144 j ng/kg	489 j ng/kg	82.5 j ng/kg	35.4 j ng/kg	175 j ng/kg	746 j ng/kg	1630 j ng/kg
Dibenzofuran, hepta, Total	NA	Lab			283 j ng/kg	5090 j ng/kg	5.97 j ng/kg	444 j ng/kg	72.3 j ng/kg	460 j ng/kg	159 j ng/kg	49.8 j ng/kg	63.5 j ng/kg	2450 j ng/kg	4680 j ng/kg
TCDD Equivalent, reporting limit at 0, TEF1998 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	--	--	--	--	--	**15.7 a ng/kg**	--	--	--	**39 a ng/kg**	**80.1 a ng/kg**
TCDD Equivalent, reporting limit at 1/2, TEF1998 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	**24.8 a ng/kg**	**213 a ng/kg**	**0.92 a ng/kg**	**19.8 a ng/kg**	**3.64 a ng/kg**	**15.7 a ng/kg**	**3.81 a ng/kg**	**1.1 a ng/kg**	**2.34 a ng/kg**	**39 a ng/kg**	**80.1 a ng/kg**
TCDD Equivalent, reporting limit at 0, TEF 1998 [Fish]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	--	--	--	--	--	**12.18 a ng/kg**	--	--	--	**33.61 a ng/kg**	**66.91 a ng/kg**
TCDD Equivalent, reporting limit at 1/2, TEF 1998 [Fish]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	**18.6 a ng/kg**	**154.64 a ng/kg**	**0.86 a ng/kg**	**15.4 a ng/kg**	**2.73 a ng/kg**	**12.18 a ng/kg**	**3.18 a ng/kg**	**0.87 a ng/kg**	**1.34 a ng/kg**	**33.61 a ng/kg**	**66.91 a ng/kg**
TCDD Equivalent, reporting limit at 0, TEF 2005 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	--	--	--	--	--	**15.8 a ng/kg**	--	--	--	**38.8 a ng/kg**	**79.5 a ng/kg**
TCDD Equivalent, reporting limit at 1/2, TEF 2005 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	**24.8 a ng/kg**	**213 a ng/kg**	**0.89 a ng/kg**	**20.8 a ng/kg**	**3.75 a ng/kg**	**15.8 a ng/kg**	**3.67 a ng/kg**	**1.08 a ng/kg**	**2.56 a ng/kg**	**38.8 a ng/kg**	**79.5 a ng/kg**

Table 10
Polychlorinated Dibenzo-p-dioxins and Dibenzofurans (PCDD/PCDFs)
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**UC-15**	**UC-17**	**UC-17**	**UC-17**	**UC-17**	**WM-18**	**WM-18**	**WM-18**	**WM-21**
				Sample Date	**2/27/2011**	**3/1/2011**	**3/1/2011**	**3/1/2011**	**3/1/2011**	**3/1/2011**	**3/1/2011**	**3/1/2011**	**3/4/2011**
				Depth Interval	**3 - 4**	**0 - 0.5**	**1 - 1.5**	**2 - 2.5**	**2.5 - 3**	**0 - 0.7**	**0.7 - 1.7**	**1.7 - 2.7**	**0 - 0.5**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**UC-15-4_3.0-4.0_02272011**	**UC-17-1_0.0-0.5_03012011**	**UC-17-2_1.0-1.5_03012011**	**UC-17-3_2.0-2.5_03012011**	**UC-17-4_2.5-3.0_03012011**	**WM-18-1_0.0-0.7_03012011**	**WM-18-2_0.7-1.7_03012011**	**WM-18-3_1.7-2.7_03012011**	**WM-21-1_0.0-0.5_03042011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Chlorinated Dioxins / Furans													
2,3,7,8-Dioxin, tetra	NA	Lab			< 0.112 ng/kg	< 0.226 j ng/kg	1.24 ng/kg	1.74 ng/kg	2.89 j ng/kg	0.602 ng/kg	< 23.30 ng/kg	< 0.0497 ng/kg	< 0.111 j ng/kg
1,2,3,7,8-Dioxin penta	NA	Lab			< 0.169 ng/kg	0.372 j ng/kg	1.07 ng/kg	2.80 j ng/kg	9.59 j ng/kg	0.888 ng/kg	43.3 j ng/kg	< 0.0448 ng/kg	< 0.0815 j ng/kg
1,2,3,4,7,8-Dioxin, hexa	NA	Lab			< 0.233 ng/kg	0.412 j ng/kg	0.702 j ng/kg	1.65 j ng/kg	10.9 j ng/kg	1.06 ng/kg	< 31.70 j ng/kg	< 0.0878 ng/kg	0.133 j ng/kg
1,2,3,6,7,8-Dioxin, hexa	NA	Lab			< 0.249 ng/kg	< 0.158 j ng/kg	7.51 ng/kg	11.0 ng/kg	60.6 ng/kg	5.59 ng/kg	218 j ng/kg	< 0.0999 ng/kg	< 0.0972 j ng/kg
1,2,3,7,8,9-Dioxin, hexa	NA	Lab			< 0.260 ng/kg	1.03 j ng/kg	2.55 j ng/kg	7.07 ng/kg	37.3 ng/kg	3.43 ng/kg	< 33.70 ng/kg	< 0.0981 ng/kg	0.282 j ng/kg
1,2,3,4,6,7,8-Dioxin, hepta	NA	Lab			1.14 j ng/kg	24.4 ng/kg	179 ng/kg	160 ng/kg	595 ng/kg	88.7 ng/kg	1920 j ng/kg	< 0.0769 j ng/kg	7.16 ng/kg
Dioxin octa	NA	Lab			< 0.366 j ng/kg	206 ng/kg	2190 ng/kg	1570 ng/kg	5560 ng/kg	595 ng/kg	7030 j ng/kg	< 0.115 j ng/kg	63.4 ng/kg
2,3,7,8-Dibenzofuran, tetra	NA	Lab			< 0.193 j ng/kg	< 0.103 j ng/kg	3.63 j ng/kg	2.37 j ng/kg	< 1.11 j ng/kg	2.06 j ng/kg	< 31.20 ng/kg	< 0.0642 j ng/kg	< 0.0592 j ng/kg
1,2,3,7,8-Dibenzofuran, penta	NA	Lab			< 0.0971 ng/kg	< 0.0594 j ng/kg	< 0.122 j ng/kg	< 0.0943 j ng/kg	< 2.10 j ng/kg	< 0.0956 j ng/kg	< 8.13 ng/kg	< 0.0513 ng/kg	< 0.0624 ng/kg
2,3,4,7,8-Dibenzofuran, penta	NA	Lab			< 0.0981 ng/kg	< 0.0682 j ng/kg	< 0.191 j ng/kg	< 0.101 j ng/kg	< 2.04 j ng/kg	< 0.0989 j ng/kg	< 17.10 ng/kg	< 0.0587 ng/kg	< 0.0644 j ng/kg
1,2,3,4,7,8-Dibenzofuran, hexa	NA	Lab			< 0.107 ng/kg	< 0.126 j ng/kg	< 0.119 j ng/kg	< 0.166 j ng/kg	39.9 ng/kg	< 0.0795 j ng/kg	< 35.00 ng/kg	< 0.0589 ng/kg	< 0.0558 j ng/kg
1,2,3,6,7,8-Dibenzofuran, hexa	NA	Lab			< 0.116 ng/kg	< 0.133 j ng/kg	< 0.120 j ng/kg	< 0.171 j ng/kg	45.9 ng/kg	< 0.0808 j ng/kg	< 37.30 ng/kg	< 0.0598 ng/kg	< 0.0574 j ng/kg
1,2,3,7,8,9-Dibenzofuran, hexa	NA	Lab			< 0.110 ng/kg	< 0.107 j ng/kg	< 0.358 j ng/kg	0.71 ng/kg	8.71 j ng/kg	< 0.0861 j ng/kg	< 46.90 j ng/kg	< 0.0519 ng/kg	< 0.0711 ng/kg
2,3,4,6,7,8-Dibenzofuran, hexa	NA	Lab			< 0.120 ng/kg	< 0.145 j ng/kg	< 0.0998 j ng/kg	< 0.189 j ng/kg	25.9 ng/kg	< 0.0814 j ng/kg	< 40.30 j ng/kg	< 0.0652 ng/kg	< 0.0592 j ng/kg
1,2,3,4,6,7,8-Dibenzofuran, hepta	NA	Lab			2.49 j ng/kg	60.2 ng/kg	51.9 ng/kg	260 ng/kg	3610 ng/kg	34.4 ng/kg	2090 j ng/kg	< 0.0424 j ng/kg	9.87 ng/kg
1,2,3,4,7,8,9-Dibenzofuran, hepta	NA	Lab			< 0.150 ng/kg	< 0.163 j ng/kg	< 0.113 j ng/kg	< 0.239 j ng/kg	< 9.59 j ng/kg	< 0.115 j ng/kg	< 37.00 j ng/kg	< 0.0684 ng/kg	< 0.0926 j ng/kg
Dibenzofuran octa	NA	Lab			< 0.960 ng/kg	25.1 ng/kg	68.9 ng/kg	118 ng/kg	1240 ng/kg	29.1 ng/kg	862 j ng/kg	< 0.178 j ng/kg	< 0.121 j ng/kg
Dioxin tetra, Total	NA	Lab			0.913 j ng/kg	3.48 j ng/kg	7.21 j ng/kg	11.9 j ng/kg	31.6 j ng/kg	5.58 j ng/kg	< 23.30 ng/kg	0.690 j ng/kg	1.44 j ng/kg
Dibenzofuran tetra, Total	NA	Lab			1.29 j ng/kg	4.45 j ng/kg	15.5 j ng/kg	10.8 j ng/kg	34.2 j ng/kg	8.89 j ng/kg	31.2 j ng/kg	1.44 j ng/kg	1.46 j ng/kg
Dioxin penta, Total	NA	Lab			0.918 j ng/kg	5.32 j ng/kg	11.8 j ng/kg	26.4 j ng/kg	136 j ng/kg	10.0 j ng/kg	324 j ng/kg	0.771 j ng/kg	1.81 j ng/kg
Dibenzofuran penta, Total	NA	Lab			0.133 j ng/kg	4.94 j ng/kg	9.29 j ng/kg	16.3 j ng/kg	191 j ng/kg	6.68 j ng/kg	109 j ng/kg	0.024 j ng/kg	0.0624 j ng/kg
Dioxin, hexa, Total	NA	Lab			1.44 j ng/kg	19.6 j ng/kg	83.3 j ng/kg	127 j ng/kg	719 j ng/kg	49.4 j ng/kg	1760 j ng/kg	0.0878 j ng/kg	0.0972 j ng/kg
Dibenzofuran, hexa, Total	NA	Lab			1.42 j ng/kg	30.7 j ng/kg	53.2 j ng/kg	155 j ng/kg	1960 j ng/kg	30.0 j ng/kg	1260 j ng/kg	0.0519 j ng/kg	6.73 j ng/kg
Dioxin, hepta, Total	NA	Lab			2.47 j ng/kg	68.3 j ng/kg	414 j ng/kg	413 j ng/kg	1550 j ng/kg	186 j ng/kg	3600 j ng/kg	0.0769 j ng/kg	17.6 j ng/kg
Dibenzofuran, hepta, Total	NA	Lab			4.55 j ng/kg	103 j ng/kg	152 j ng/kg	526 j ng/kg	6620 j ng/kg	83.5 j ng/kg	3970 j ng/kg	0.0424 j ng/kg	19.1 j ng/kg
TCDD Equivalent, reporting limit at 0, TEF1998 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	0.04 a ng/kg	--	--	--	--	--	--	ND	0.22 a ng/kg
TCDD Equivalent, reporting limit at 1/2, TEF1998 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	--	**1.56 a ng/kg**	**6.37 a ng/kg**	**11.2 a ng/kg**	**78.8 a ng/kg**	**4.04 a ng/kg**	**135 a ng/kg**	--	--
TCDD Equivalent, reporting limit at 0, TEF 1998 [Fish]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	0.03 a ng/kg	--	--	--	--	--	--	ND	0.18 a ng/kg
TCDD Equivalent, reporting limit at 1/2, TEF 1998 [Fish]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	--	**1.4 a ng/kg**	**3.95 a ng/kg**	**8.72 a ng/kg**	**68.96 a ng/kg**	**2.75 a ng/kg**	**102.25 a ng/kg**	--	--
TCDD Equivalent, reporting limit at 0, TEF 2005 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	0.04 a ng/kg	--	--	--	--	--	--	ND	0.23 a ng/kg
TCDD Equivalent, reporting limit at 1/2, TEF 2005 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	--	**1.6 a ng/kg**	**6.8 a ng/kg**	**11.6 a ng/kg**	**79.9 a ng/kg**	**4.16 a ng/kg**	**135 a ng/kg**	--	--

Table 10
Polychlorinated Dibenzo-p-dioxins and Dibenzofurans (PCDD/PCDFs)
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				Sys Loc Code	**WM-21**	**WM-21**	**WM-21**	**WM-22**	**WM-22**	**WM-22**	**WM-22**	**UC-23**	**UC-23**
				Sample Date	**3/4/2011**	**3/4/2011**	**3/4/2011**	**3/6/2011**	**3/6/2011**	**3/6/2011**	**3/6/2011**	**3/2/2011**	**3/2/2011**
				Depth Interval	**2 - 2.5**	**4 - 4.5**	**5 - 5.5**	**0 - 0.5**	**1.5 - 2**	**4 - 4.5**	**5.5 - 6**	**0 - 0.5**	**1.5 - 2**
				Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
				Sys Sample Code	**WM-21-2_2.0-2.5_03042011**	**WM-21-3_4.0-4.5_03042011**	**WM-21-4_5.0-5.5_03042011**	**WM-22-1_0.0-0.5_03062011**	**WM-22-2_1.5-2.0_03062011**	**WM-22-3_4.0-4.5_03062011**	**WM-22-4_5.5-6.0_03062011**	**UC-23-1_0.0-0.5_03022011**	**UC-23-2_1.5-2.0_03022011**
				Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II									
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Chlorinated Dioxins / Furans													
2,3,7,8-Dioxin, tetra	NA	Lab			0.404 j ng/kg	< 20.20 ng/kg	< 0.145 ng/kg	< 0.209 ng/kg	< 0.944 j ng/kg	< 0.182 ng/kg	0.561 j ng/kg	< 0.234 j ng/kg	6.41 j ng/kg
1,2,3,7,8-Dioxin penta	NA	Lab			0.283 j ng/kg	< 42.20 ng/kg	< 0.156 ng/kg	< 0.260 ng/kg	0.424 j ng/kg	< 0.196 ng/kg	1.10 j ng/kg	0.415 j ng/kg	< 10.50 ng/kg
1,2,3,4,7,8-Dioxin, hexa	NA	Lab			0.355 j ng/kg	< 25.80 ng/kg	< 0.228 ng/kg	< 0.505 ng/kg	< 0.749 j ng/kg	< 0.206 ng/kg	0.862 j ng/kg	0.250 j ng/kg	< 6.41 ng/kg
1,2,3,6,7,8-Dioxin, hexa	NA	Lab			< 0.132 j ng/kg	< 23.90 ng/kg	< 0.218 ng/kg	< 0.471 ng/kg	5.64 ng/kg	0.444 j ng/kg	5.67 ng/kg	< 0.126 j ng/kg	33.8 j ng/kg
1,2,3,7,8,9-Dioxin, hexa	NA	Lab			1.24 j ng/kg	< 25.80 ng/kg	< 0.232 ng/kg	< 0.505 ng/kg	2.09 j ng/kg	0.332 j ng/kg	3.59 j ng/kg	0.825 j ng/kg	14.1 j ng/kg
1,2,3,4,6,7,8-Dioxin, hepta	NA	Lab			61.9 ng/kg	< 34.60 ng/kg	< 0.203 j ng/kg	7.52 ng/kg	171 ng/kg	3.65 j ng/kg	88.4 ng/kg	21.0 ng/kg	715 ng/kg
Dioxin octa	NA	Lab			528 ng/kg	76.0 j ng/kg	0.779 j ng/kg	82.8 ng/kg	2470 ng/kg	23.7 ng/kg	824 ng/kg	181 ng/kg	7210 ng/kg
2,3,7,8-Dibenzofuran, tetra	NA	Lab			1.58 j ng/kg	< 30.20 ng/kg	< 0.183 j ng/kg	< 0.361 j ng/kg	1.80 j ng/kg	< 0.467 j ng/kg	< 0.396 j ng/kg	< 0.176 j ng/kg	< 16.40 j ng/kg
1,2,3,7,8-Dibenzofuran, penta	NA	Lab			< 0.0557 j ng/kg	< 26.80 ng/kg	< 0.0959 ng/kg	< 0.196 ng/kg	< 0.287 j ng/kg	< 0.206 ng/kg	< 0.179 ng/kg	< 0.170 j ng/kg	< 3.74 ng/kg
2,3,4,7,8-Dibenzofuran, penta	NA	Lab			< 0.0581 j ng/kg	< 32.00 ng/kg	< 0.0935 ng/kg	< 0.196 ng/kg	0.442 j ng/kg	< 0.187 ng/kg	0.523 j ng/kg	< 0.167 j ng/kg	< 6.12 j ng/kg
1,2,3,4,7,8-Dibenzofuran, hexa	NA	Lab			< 0.0848 j ng/kg	< 19.10 ng/kg	< 0.115 ng/kg	< 0.275 ng/kg	< 0.811 j ng/kg	0.239 j ng/kg	1.69 j ng/kg	< 0.116 j ng/kg	5.54 j ng/kg
1,2,3,6,7,8-Dibenzofuran, hexa	NA	Lab			< 0.0891 j ng/kg	< 18.50 ng/kg	< 0.107 ng/kg	< 0.264 ng/kg	1.23 j ng/kg	1.06 j ng/kg	2.51 j ng/kg	< 0.118 j ng/kg	6.87 j ng/kg
1,2,3,7,8,9-Dibenzofuran, hexa	NA	Lab			< 0.0936 j ng/kg	< 23.30 R ng/kg	< 0.173 ng/kg	< 0.448 ng/kg	< 0.467 ng/kg	< 0.222 ng/kg	< 0.333 ng/kg	< 0.148 j ng/kg	< 7.11 ng/kg
2,3,4,6,7,8-Dibenzofuran, hexa	NA	Lab			< 0.0905 j ng/kg	< 17.40 ng/kg	< 0.114 ng/kg	< 0.300 ng/kg	0.884 j ng/kg	0.375 j ng/kg	1.57 j ng/kg	< 0.122 j ng/kg	6.87 j ng/kg
1,2,3,4,6,7,8-Dibenzofuran, hepta	NA	Lab			22.9 ng/kg	< 28.00 j ng/kg	< 0.155 j ng/kg	6.09 ng/kg	37.5 ng/kg	18.7 ng/kg	128 ng/kg	25.2 ng/kg	163 ng/kg
1,2,3,4,7,8,9-Dibenzofuran, hepta	NA	Lab			< 0.126 j ng/kg	< 25.90 ng/kg	< 0.211 ng/kg	< 0.746 ng/kg	< 0.917 j ng/kg	< 0.283 ng/kg	< 1.33 j ng/kg	< 0.128 j ng/kg	8.19 j ng/kg
Dibenzofuran octa	NA	Lab			24.4 ng/kg	< 58.00 ng/kg	< 0.350 ng/kg	4.89 j ng/kg	56.6 ng/kg	6.16 j ng/kg	60.8 ng/kg	< 0.159 j ng/kg	269 ng/kg
Dioxin tetra, Total	NA	Lab			3.83 j ng/kg	< 20.20 ng/kg	1.32 j ng/kg	1.64 j ng/kg	5.33 j ng/kg	< 0.182 j ng/kg	4.04 j ng/kg	2.72 j ng/kg	11.5 j ng/kg
Dibenzofuran tetra, Total	NA	Lab			6.14 j ng/kg	< 30.20 ng/kg	1.13 j ng/kg	1.07 j ng/kg	6.49 j ng/kg	< 0.467 j ng/kg	4.59 j ng/kg	3.84 j ng/kg	35.0 j ng/kg
Dioxin penta, Total	NA	Lab			4.87 j ng/kg	< 42.20 ng/kg	1.06 j ng/kg	1.87 j ng/kg	5.89 j ng/kg	0.909 j ng/kg	10.1 j ng/kg	4.04 j ng/kg	26.4 j ng/kg
Dibenzofuran penta, Total	NA	Lab			0.0557 j ng/kg	< 26.80 ng/kg	< 0.0935 ng/kg	0.868 j ng/kg	6.51 j ng/kg	1.85 j ng/kg	9.89 j ng/kg	0.120 j ng/kg	46.8 j ng/kg
Dioxin, hexa, Total	NA	Lab			23.6 j ng/kg	< 23.90 ng/kg	0.673 j ng/kg	3.70 j ng/kg	44.1 j ng/kg	4.28 j ng/kg	49.4 j ng/kg	14.2 j ng/kg	351 j ng/kg
Dibenzofuran, hexa, Total	NA	Lab			19.4 j ng/kg	< 17.40 ng/kg	< 0.107 ng/kg	4.67 j ng/kg	35.5 j ng/kg	13.1 j ng/kg	70.4 j ng/kg	17.8 j ng/kg	216 j ng/kg
Dioxin, hepta, Total	NA	Lab			128 j ng/kg	< 34.60 ng/kg	0.371 j ng/kg	19.3 j ng/kg	374 j ng/kg	8.21 j ng/kg	211 j ng/kg	51.3 j ng/kg	1520 j ng/kg
Dibenzofuran, hepta, Total	NA	Lab			59.5 j ng/kg	28.0 j ng/kg	0.155 j ng/kg	14.7 j ng/kg	126 j ng/kg	33.5 j ng/kg	245 j ng/kg	47.7 j ng/kg	524 j ng/kg
TCDD Equivalent, reporting limit at 0, TEF1998 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	--	0.01 a ng/kg	0.000079 a ng/kg	0.14 a ng/kg	--	--	--	**1.0 a ng/kg**	--
TCDD Equivalent, reporting limit at 1/2, TEF1998 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	**1.95 a ng/kg**	--	--	--	**4.73 a ng/kg**	0.76 a ng/kg	**5.81 a ng/kg**	--	**31.1 a ng/kg**
TCDD Equivalent, reporting limit at 0, TEF 1998 [Fish]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	--	0.01 a ng/kg	0.0000779 a ng/kg	0.08 a ng/kg	--	--	--	0.84 a ng/kg	--
TCDD Equivalent, reporting limit at 1/2, TEF 1998 [Fish]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	**1.34 a ng/kg**	--	--	--	**2.56 a ng/kg**	0.69 a ng/kg	**4.52 a ng/kg**	--	**21.23 a ng/kg**
TCDD Equivalent, reporting limit at 0, TEF 2005 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	--	0.02 a ng/kg	0.0002337 a ng/kg	0.16 a ng/kg	--	--	--	**1.03 a ng/kg**	--
TCDD Equivalent, reporting limit at 1/2, TEF 2005 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	**2.05 a ng/kg**	--	--	--	**5.15 a ng/kg**	0.74 a ng/kg	**5.88 a ng/kg**	**--**	**32 a ng/kg**

Table 10
Polychlorinated Dibenzo-p-dioxins and Dibenzofurans (PCDD/PCDFs)
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II	Sys Loc Code: UC-23 / Sample Date: 3/2/2011 / Depth Interval: 2.5 - 3 ft / Depth Unit: ft / Sys Sample Code: UC-23-3_2.5-3.0_03022011 / Sample Type Code: N	UC-23 3/2/2011 3.75 - 4.25 ft UC-23-4_3.75-4.25_03022011 N	UC-29 3/3/2011 0 - 0.5 ft UC-29-1_0.0-0.5_03032011 N	UC-29 3/3/2011 1 - 1.5 ft UC-29-2_1.0-1.5_03032011 N	UC-29 3/3/2011 1 - 1.5 ft UC-29-2_1.0-1.5_03032011_FD FD	UC-29 3/3/2011 2 - 2.5 ft UC-29-3_2.0-2.5_03032011 N	UC-29 3/3/2011 2.5 - 3 ft UC-29-4_2.5-3.0_03032011 N	WM-30 3/8/2011 0 - 0.5 ft WM-30-1_0.0-0.5_03082011 N	WM-30 3/8/2011 1 - 1.5 ft WM-30-2_1.0-1.5_03082011 N	WM-30 3/8/2011 2 - 2.5 ft WM-30-3_2.0-2.5_03082011 N
Effective Date			2/1/2007	2/1/2007										
Exceedance Key			**Bold**	Underline										
Chlorinated Dioxins / Furans														
2,3,7,8-Dioxin, tetra	NA	Lab			2.82 j ng/kg	< 0.101 j ng/kg	< 0.431 j ng/kg	< 7.71 j ng/kg	2.01 ng/kg	0.670 j ng/kg	< 0.129 j ng/kg	< 0.211 j ng/kg	< 0.155 ng/kg	< 0.170 ng/kg
1,2,3,7,8-Dioxin penta	NA	Lab			10.7 j ng/kg	< 0.0829 ng/kg	0.392 j ng/kg	8.34 j ng/kg	7.87 ng/kg	2.57 j ng/kg	< 0.0779 ng/kg	< 0.423 j ng/kg	< 0.182 ng/kg	< 0.198 ng/kg
1,2,3,4,7,8-Dioxin, hexa	NA	Lab			7.34 j ng/kg	< 0.101 ng/kg	0.249 j ng/kg	< 8.21 ng/kg	4.56 j ng/kg	1.87 j ng/kg	< 0.0951 ng/kg	0.477 j ng/kg	< 0.182 ng/kg	< 0.214 ng/kg
1,2,3,6,7,8-Dioxin, hexa	NA	Lab			46.9 ng/kg	< 0.105 j ng/kg	< 0.0972 j ng/kg	42.3 j ng/kg	28.6 ng/kg	16.8 ng/kg	< 0.0922 j ng/kg	2.25 j ng/kg	< 0.169 ng/kg	< 0.212 ng/kg
1,2,3,7,8,9-Dioxin, hexa	NA	Lab			29.3 ng/kg	< 0.108 ng/kg	0.775 j ng/kg	23.7 j ng/kg	18.5 ng/kg	8.22 ng/kg	< 0.0983 ng/kg	2.10 j ng/kg	< 0.183 ng/kg	< 0.223 ng/kg
1,2,3,4,6,7,8-Dioxin, hepta	NA	Lab			486 ng/kg	< 0.0863 j ng/kg	41.0 ng/kg	775 ng/kg	278 ng/kg	138 ng/kg	< 0.110 j ng/kg	23.1 ng/kg	0.498 j ng/kg	< 0.264 ng/kg
Dioxin octa	NA	Lab			2810 ng/kg	< 0.128 j ng/kg	402 ng/kg	7510 ng/kg	1630 ng/kg	1230 ng/kg	< 0.152 j ng/kg	69.2 ng/kg	2.36 j ng/kg	0.522 j ng/kg
2,3,7,8-Dibenzofuran, tetra	NA	Lab			< 1.85 j ng/kg	< 0.0638 j ng/kg	1.49 j ng/kg	21.6 j ng/kg	2.19 j ng/kg	< 0.146 j ng/kg	< 0.0777 j ng/kg	< 0.196 j ng/kg	< 0.164 j ng/kg	< 0.206 j ng/kg
1,2,3,7,8-Dibenzofuran, penta	NA	Lab			< 1.56 j ng/kg	< 0.0591 ng/kg	< 0.145 j ng/kg	< 3.78 ng/kg	< 0.102 j ng/kg	< 0.0736 j ng/kg	< 0.0605 ng/kg	< 0.134 ng/kg	< 0.0904 ng/kg	< 0.114 ng/kg
2,3,4,7,8-Dibenzofuran, penta	NA	Lab			< 0.685 j ng/kg	< 0.0553 ng/kg	< 0.260 j ng/kg	5.28 j ng/kg	< 0.128 j ng/kg	< 0.0816 j ng/kg	< 0.0636 j ng/kg	< 0.127 ng/kg	< 0.0852 ng/kg	< 0.102 ng/kg
1,2,3,4,7,8-Dibenzofuran, hexa	NA	Lab			< 1.86 j ng/kg	< 0.0505 j ng/kg	< 0.113 j ng/kg	10.5 j ng/kg	7.07 ng/kg	9.05 ng/kg	< 0.0662 ng/kg	< 0.231 j ng/kg	< 0.0952 ng/kg	< 0.0961 ng/kg
1,2,3,6,7,8-Dibenzofuran, hexa	NA	Lab			< 1.76 j ng/kg	< 0.0510 j ng/kg	< 0.115 j ng/kg	< 6.12 j ng/kg	< 0.166 j ng/kg	11.0 ng/kg	< 0.0644 ng/kg	0.165 j ng/kg	< 0.0942 ng/kg	< 0.0953 ng/kg
1,2,3,7,8,9-Dibenzofuran, hexa	NA	Lab			< 1.80 j ng/kg	< 0.0632 j ng/kg	< 0.179 j ng/kg	< 8.34 ng/kg	< 0.206 j ng/kg	< 0.239 j ng/kg	< 0.0666 ng/kg	< 0.231 ng/kg	< 0.152 ng/kg	< 0.137 ng/kg
2,3,4,6,7,8-Dibenzofuran, hexa	NA	Lab			< 2.01 j ng/kg	< 0.0537 j ng/kg	< 0.102 j ng/kg	10.0 j ng/kg	4.94 ng/kg	6.68 ng/kg	< 0.0683 ng/kg	< 0.136 j ng/kg	< 0.102 ng/kg	< 0.0942 ng/kg
1,2,3,4,6,7,8-Dibenzofuran, hepta	NA	Lab			1680 ng/kg	< 0.0516 j ng/kg	18.0 ng/kg	294 ng/kg	665 ng/kg	824 ng/kg	< 0.0574 j ng/kg	5.66 ng/kg	< 0.229 j ng/kg	< 0.125 ng/kg
1,2,3,4,7,8,9-Dibenzofuran, hepta	NA	Lab			< 5.51 j ng/kg	< 0.0837 j ng/kg	< 0.123 j ng/kg	< 15.70 j ng/kg	< 0.236 j ng/kg	5.53 ng/kg	< 0.0916 ng/kg	< 0.694 ng/kg	< 0.227 ng/kg	< 0.206 ng/kg
Dibenzofuran octa	NA	Lab			625 ng/kg	< 0.139 j ng/kg	28.7 ng/kg	387 ng/kg	274 ng/kg	283 ng/kg	< 0.144 j ng/kg	2.33 j ng/kg	< 0.382 ng/kg	< 0.399 ng/kg
Dioxin tetra, Total	NA	Lab			34.1 j ng/kg	0.927 j ng/kg	2.79 j ng/kg	29.7 j ng/kg	19.3 j ng/kg	8.21 j ng/kg	3.21 j ng/kg	2.41 j ng/kg	1.22 j ng/kg	2.89 j ng/kg
Dibenzofuran tetra, Total	NA	Lab			22.5 j ng/kg	1.18 j ng/kg	7.49 j ng/kg	78.2 j ng/kg	15.5 j ng/kg	13.4 j ng/kg	1.34 j ng/kg	1.22 j ng/kg	0.164 j ng/kg	1.07 j ng/kg
Dioxin penta, Total	NA	Lab			130 j ng/kg	0.826 j ng/kg	4.35 j ng/kg	81.2 j ng/kg	65.7 j ng/kg	37.9 j ng/kg	1.91 j ng/kg	4.80 j ng/kg	0.752 j ng/kg	1.66 j ng/kg
Dibenzofuran penta, Total	NA	Lab			98.1 j ng/kg	0.0553 j ng/kg	0.145 j ng/kg	66.7 j ng/kg	36.9 j ng/kg	48.9 j ng/kg	0.0605 j ng/kg	1.12 j ng/kg	< 0.0852 ng/kg	< 0.102 ng/kg
Dioxin, hexa, Total	NA	Lab			595 j ng/kg	0.101 j ng/kg	20.0 j ng/kg	473 j ng/kg	299 j ng/kg	192 j ng/kg	0.0922 j ng/kg	20.5 j ng/kg	0.852 j ng/kg	1.09 j ng/kg
Dibenzofuran, hexa, Total	NA	Lab			940 j ng/kg	0.0505 j ng/kg	17.0 j ng/kg	362 j ng/kg	377 j ng/kg	480 j ng/kg	0.0644 j ng/kg	4.88 j ng/kg	< 0.0942 ng/kg	< 0.0942 ng/kg
Dioxin, hepta, Total	NA	Lab			1060 j ng/kg	0.0863 j ng/kg	85.1 j ng/kg	1730 j ng/kg	609 j ng/kg	378 j ng/kg	0.110 j ng/kg	42.8 j ng/kg	1.03 j ng/kg	< 0.264 ng/kg
Dibenzofuran, hepta, Total	NA	Lab			3150 j ng/kg	7.95 j ng/kg	46.4 j ng/kg	871 j ng/kg	1220 j ng/kg	1500 j ng/kg	0.0574 j ng/kg	10.9 j ng/kg	0.229 j ng/kg	< 0.125 ng/kg
TCDD Equivalent, reporting limit at 0, TEF1998 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	--	ND	--	--	--	--	ND	--	0.01 a ng/kg	0.0000522 a ng/kg
TCDD Equivalent, reporting limit at 1/2, TEF1998 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	**44.6 a ng/kg**	--	**1.59 a ng/kg**	**38.4 a ng/kg**	**26.1 a ng/kg**	**18.5 a ng/kg**	--	**1.19 a ng/kg**	--	--
TCDD Equivalent, reporting limit at 0, TEF 1998 [Fish]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	--	ND	--	--	--	--	ND	--	0.00058 a ng/kg	0.0000522 a ng/kg
TCDD Equivalent, reporting limit at 1/2, TEF 1998 [Fish]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	**36.24 a ng/kg**	--	**1.17 a ng/kg**	**26.08 a ng/kg**	**21.11 a ng/kg**	**15.72 a ng/kg**	--	0.78 a ng/kg	--	--
TCDD Equivalent, reporting limit at 0, TEF 2005 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	--	ND	--	--	--	--	ND	--	0.01 a ng/kg	0.0001566 a ng/kg
TCDD Equivalent, reporting limit at 1/2, TEF 2005 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	**45.2 a ng/kg**	--	**1.65 a ng/kg**	**38.9 a ng/kg**	**26.5 a ng/kg**	**18.8 a ng/kg**	--	**1.19 a ng/kg**	--	--

Table 10
Polychlorinated Dibenzo-p-dioxins and Dibenzofurans (PCDD/PCDFs)
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II								
Sys Loc Code					**WM-30**	**WM-32**	**WM-32**	**WM-32**	**WM-32**	**UC-36**	**UC-36**	**UC-36**	**UC-36**
Sample Date					**3/8/2011**	**3/13/2011**	**3/13/2011**	**3/13/2011**	**3/13/2011**	**3/9/2011**	**3/9/2011**	**3/9/2011**	**3/9/2011**
Depth Interval					**3.5 - 4**	**0 - 0.5**	**0.5 - 1**	**1 - 1.5**	**3.5 - 4**	**0 - 0.5**	**1 - 1.5**	**2 - 2.5**	**2.5 - 3**
Depth Unit					**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
Sys Sample Code					**WM-30-4_3.5-4.0_03082011**	**WM-32-1_0.0-0.5_03132011**	**WM-32-2_0.5-1.0_03132011**	**WM-32-3_1.0-1.5_03132011**	**WM-32-4_3.5-4.0_03132011**	**UC-36-1_0.0-0.5_03092011**	**UC-36-2_1.0-1.5_03092011**	**UC-36-3_2.0-2.5_03092011**	**UC-36-4_2.5-3.0_03092011**
Sample Type Code					**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Effective Date			2/1/2007	2/1/2007									
Exceedance Key			**Bold**	Underline									
Chlorinated Dioxins / Furans													
2,3,7,8-Dioxin, tetra	NA	Lab			< 0.168 ng/kg	< 0.126 ng/kg	< 0.317 ng/kg	< 0.144 ng/kg	< 0.130 ng/kg	< 0.717 j ng/kg	1.58 ng/kg	< 0.162 ng/kg	< 0.193 ng/kg
1,2,3,7,8-Dioxin penta	NA	Lab			< 0.119 ng/kg	< 0.157 ng/kg	0.369 j ng/kg	< 0.156 ng/kg	< 0.136 ng/kg	< 0.679 j ng/kg	4.79 j ng/kg	< 0.175 ng/kg	< 0.232 ng/kg
1,2,3,4,7,8-Dioxin, hexa	NA	Lab			< 0.206 ng/kg	< 0.263 ng/kg	< 0.350 ng/kg	< 0.227 ng/kg	< 0.175 ng/kg	0.636 j ng/kg	4.42 j ng/kg	< 0.170 ng/kg	< 0.225 ng/kg
1,2,3,6,7,8-Dioxin, hexa	NA	Lab			< 0.193 ng/kg	< 0.250 ng/kg	< 1.01 j ng/kg	< 0.209 ng/kg	< 0.170 ng/kg	3.82 j ng/kg	41.2 ng/kg	< 0.175 ng/kg	< 0.231 ng/kg
1,2,3,7,8,9-Dioxin, hexa	NA	Lab			< 0.208 ng/kg	< 0.267 ng/kg	< 0.426 j ng/kg	< 0.227 ng/kg	< 0.180 ng/kg	2.09 j ng/kg	23.1 ng/kg	< 0.181 ng/kg	< 0.239 ng/kg
1,2,3,4,6,7,8-Dioxin, hepta	NA	Lab			< 0.212 ng/kg	3.83 j ng/kg	23.0 ng/kg	2.39 j ng/kg	< 0.305 ng/kg	89.5 ng/kg	277 ng/kg	0.997 j ng/kg	0.377 j ng/kg
Dioxin octa	NA	Lab			< 0.251 j ng/kg	36.0 ng/kg	227 ng/kg	15.3 ng/kg	< 0.299 j ng/kg	1070 ng/kg	1750 ng/kg	6.77 j ng/kg	2.07 j ng/kg
2,3,7,8-Dibenzofuran, tetra	NA	Lab			< 0.192 j ng/kg	< 0.174 j ng/kg	< 0.866 j ng/kg	< 0.186 j ng/kg	< 0.365 j ng/kg	1.89 j ng/kg	< 0.995 j ng/kg	< 0.199 j ng/kg	< 0.254 j ng/kg
1,2,3,7,8-Dibenzofuran, penta	NA	Lab			< 0.0814 ng/kg	< 0.114 ng/kg	< 0.157 ng/kg	< 0.133 ng/kg	< 0.113 ng/kg	< 0.321 ng/kg	1.94 j ng/kg	< 0.136 ng/kg	< 0.146 ng/kg
2,3,4,7,8-Dibenzofuran, penta	NA	Lab			< 0.0751 ng/kg	< 0.102 ng/kg	< 0.150 ng/kg	< 0.129 ng/kg	< 0.109 ng/kg	0.458 j ng/kg	6.86 ng/kg	< 0.130 ng/kg	< 0.0631 ng/kg
1,2,3,4,7,8-Dibenzofuran, hexa	NA	Lab			< 0.0955 ng/kg	< 0.165 ng/kg	< 0.150 j ng/kg	0.413 j ng/kg	< 0.109 ng/kg	1.23 j ng/kg	22.4 ng/kg	< 0.121 ng/kg	< 0.150 ng/kg
1,2,3,6,7,8-Dibenzofuran, hexa	NA	Lab			< 0.0935 ng/kg	< 0.153 j ng/kg	0.453 j ng/kg	< 0.254 ng/kg	< 0.0992 ng/kg	1.69 j ng/kg	39.7 ng/kg	< 0.0709 j ng/kg	< 0.159 ng/kg
1,2,3,7,8,9-Dibenzofuran, hexa	NA	Lab			< 0.157 ng/kg	< 0.254 ng/kg	< 0.405 ng/kg	< 0.394 ng/kg	< 0.188 ng/kg	< 0.361 ng/kg	< 4.66 j ng/kg	< 0.159 ng/kg	< 0.230 ng/kg
2,3,4,6,7,8-Dibenzofuran, hexa	NA	Lab			< 0.0980 ng/kg	< 0.175 ng/kg	< 0.244 j ng/kg	< 0.266 ng/kg	< 0.111 ng/kg	< 0.968 j ng/kg	15.3 ng/kg	< 0.122 ng/kg	< 0.154 ng/kg
1,2,3,4,6,7,8-Dibenzofuran, hepta	NA	Lab			< 0.113 ng/kg	5.79 ng/kg	11.5 ng/kg	7.76 ng/kg	< 0.219 j ng/kg	238 ng/kg	1930 ng/kg	1.64 j ng/kg	0.448 j ng/kg
1,2,3,4,7,8,9-Dibenzofuran, hepta	NA	Lab			< 0.185 ng/kg	< 0.463 ng/kg	< 0.500 ng/kg	< 0.574 ng/kg	< 0.387 ng/kg	< 1.28 j ng/kg	12.1 ng/kg	< 0.278 ng/kg	< 0.298 ng/kg
Dibenzofuran octa	NA	Lab			< 0.358 ng/kg	2.68 j ng/kg	7.76 j ng/kg	2.63 j ng/kg	< 0.494 ng/kg	121 ng/kg	588 ng/kg	0.648 j ng/kg	0.344 j ng/kg
Dioxin tetra, Total	NA	Lab			0.391 j ng/kg	0.974 j ng/kg	6.83 j ng/kg	0.304 j ng/kg	< 0.130 ng/kg	3.67 j ng/kg	22.5 j ng/kg	0.774 j ng/kg	0.598 j ng/kg
Dibenzofuran tetra, Total	NA	Lab			1.06 j ng/kg	1.47 j ng/kg	2.63 j ng/kg	1.02 j ng/kg	0.194 j ng/kg	7.25 j ng/kg	23.2 j ng/kg	1.40 j ng/kg	1.39 j ng/kg
Dioxin penta, Total	NA	Lab			0.283 j ng/kg	1.12 j ng/kg	5.64 j ng/kg	0.556 j ng/kg	< 0.136 ng/kg	7.57 j ng/kg	64.6 j ng/kg	0.855 j ng/kg	0.580 j ng/kg
Dibenzofuran penta, Total	NA	Lab			< 0.0751 ng/kg	0.568 j ng/kg	2.03 j ng/kg	0.841 j ng/kg	< 0.109 ng/kg	6.87 j ng/kg	114 j ng/kg	0.146 j ng/kg	< 0.0631 ng/kg
Dioxin, hexa, Total	NA	Lab			< 0.193 ng/kg	2.81 j ng/kg	13.5 j ng/kg	1.59 j ng/kg	< 0.170 ng/kg	49.0 j ng/kg	350 j ng/kg	1.16 j ng/kg	0.881 j ng/kg
Dibenzofuran, hexa, Total	NA	Lab			< 0.0935 ng/kg	3.66 j ng/kg	9.25 j ng/kg	5.01 j ng/kg	< 0.0992 ng/kg	54.9 j ng/kg	1160 j ng/kg	1.12 j ng/kg	0.168 j ng/kg
Dioxin, hepta, Total	NA	Lab			< 0.212 ng/kg	11.1 j ng/kg	51.7 j ng/kg	5.98 j ng/kg	< 0.305 ng/kg	228 j ng/kg	606 j ng/kg	2.38 j ng/kg	0.850 j ng/kg
Dibenzofuran, hepta, Total	NA	Lab			< 0.113 ng/kg	11.1 j ng/kg	25.1 j ng/kg	13.6 j ng/kg	0.219 j ng/kg	372 j ng/kg	3490 j ng/kg	2.81 j ng/kg	0.812 j ng/kg
TCDD Equivalent, reporting limit at 0, TEF1998 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	ND	0.1 a ng/kg	--	0.14 a ng/kg	ND	--	--	--	--
TCDD Equivalent, reporting limit at 1/2, TEF1998 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	--	--	**1.16 a ng/kg**	--	--	**5.54 a ng/kg**	**47.2 a ng/kg**	0.29 a ng/kg	0.32 a ng/kg
TCDD Equivalent, reporting limit at 0, TEF 1998 [Fish]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	ND	0.07 a ng/kg	--	0.12 a ng/kg	ND	--	--	--	--
TCDD Equivalent, reporting limit at 1/2, TEF 1998 [Fish]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	--	--	**0.93 a ng/kg**	--	--	**4.36 a ng/kg**	**40.68 a ng/kg**	0.3 a ng/kg	0.34 a ng/kg
TCDD Equivalent, reporting limit at 0, TEF 2005 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	ND	0.11 a ng/kg	---	0.15 a ng/kg	ND	--	--	--	--
TCDD Equivalent, reporting limit at 1/2, TEF 2005 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	--	--	**1.19 a ng/kg**	--	--	**5.68 a ng/kg**	**46.3 a ng/kg**	0.28 a ng/kg	0.32 a ng/kg

Table 10
Polychlorinated Dibenzo-p-dioxins and Dibenzofurans (PCDD/PCDFs)
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

					Sys Loc Code	WM-64	WM-64	WM-64	WM-64	UC-75	UC-75	UC-75	UC-75	UC-77	UC-77
					Sample Date	3/10/2011	3/10/2011	3/10/2011	3/10/2011	6/8/2011	6/8/2011	6/8/2011	6/8/2011	6/9/2011	6/9/2011
					Depth Interval	0 - 0.5	1 - 1.5	2 - 2.5	3 - 3.5	0 - 0.5	0.5 - 1	1 - 1.5	1.5 - 2	0 - 0.5	0.5 - 1
					Depth Unit	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
					Sys Sample Code	WM-64-1_0.0-0.5_03102011	WM-64-2_1.0-1.5_03102011	WM-64-3_2.0-2.5_03102011	WM-64-4_3.0-3.5_03102011	UC-75-1_0.0-0.5_06082011	UC-75-2_0.5-1.0_06082011	UC-75-3_1.0-1.5_06082011	UC-75-4_1.5-2.0_06082011	UC-77-1_0.0-0.5_06092011	UC-77-2_0.5-1.0_06092011
					Sample Type Code	N	N	N	N	N	N	N	N	N	N
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II											
Effective Date			2/1/2007	2/1/2007											
Exceedance Key			**Bold**	Underline											
Chlorinated Dioxins / Furans															
2,3,7,8-Dioxin, tetra	NA	Lab			< 0.273 ng/kg	5.40 ng/kg	< 18.60 ng/kg	< 0.203 ng/kg	< 3.47 ng/kg	< 8.45 ng/kg	< 2.82 ng/kg	< 3.28 ng/kg	< 3.16 ng/kg	< 1.39 j ng/kg
1,2,3,7,8-Dioxin penta	NA	Lab			< 0.293 ng/kg	15.9 ng/kg	< 14.50 ng/kg	< 0.154 ng/kg	< 2.65 ng/kg	< 4.34 ng/kg	1.74 j ng/kg	2.38 j ng/kg	< 1.44 ng/kg	< 1.05 ng/kg
1,2,3,4,7,8-Dioxin, hexa	NA	Lab			< 0.400 ng/kg	7.78 ng/kg	< 22.60 ng/kg	< 0.240 ng/kg	< 2.24 ng/kg	< 4.03 j ng/kg	< 1.77 ng/kg	< 4.85 j ng/kg	< 2.15 ng/kg	< 1.65 ng/kg
1,2,3,6,7,8-Dioxin, hexa	NA	Lab			0.679 j ng/kg	64.5 ng/kg	< 23.30 ng/kg	< 0.222 ng/kg	3.18 j ng/kg	< 4.46 j ng/kg	3.69 j ng/kg	< 1.77 ng/kg	< 2.37 ng/kg	< 1.84 ng/kg
1,2,3,7,8,9-Dioxin, hexa	NA	Lab			< 0.406 ng/kg	38.1 ng/kg	< 24.10 ng/kg	< 0.240 ng/kg	< 2.62 ng/kg	< 13.5 j ng/kg	< 4.4 j ng/kg	< 3.19 j ng/kg	< 2.43 ng/kg	< 1.88 ng/kg
1,2,3,4,6,7,8-Dioxin, hepta	NA	Lab			7.39 ng/kg	579 ng/kg	69.1 j ng/kg	1.11 j ng/kg	60.7 j ng/kg	30.8 j ng/kg	55.5 j ng/kg	62.1 j ng/kg	10.4 j ng/kg	12.6 j ng/kg
Dioxin octa	NA	Lab			43.3 ng/kg	2060 ng/kg	390 j ng/kg	2.50 j ng/kg	590 j ng/kg	342 j ng/kg	536 ng/kg	829 ng/kg	< 2.82 j ng/kg	184 ng/kg
2,3,7,8-Dibenzofuran, tetra	NA	Lab			< 0.303 j ng/kg	5.36 ng/kg	< 27.40 ng/kg	< 0.258 j ng/kg	1.93 j ng/kg	< 3.83 ng/kg	< 2.81 j ng/kg	3.56 j ng/kg	7.03 j ng/kg	5.68 j ng/kg
1,2,3,7,8-Dibenzofuran, penta	NA	Lab			< 0.205 ng/kg	< 1.38 ng/kg	< 10.50 ng/kg	< 0.106 ng/kg	< 1.88 ng/kg	< 3.7 ng/kg	< 1.7 ng/kg	< 1.12 ng/kg	< 1.28 ng/kg	< 0.886 ng/kg
2,3,4,7,8-Dibenzofuran, penta	NA	Lab			< 0.207 ng/kg	2.03 j ng/kg	< 4.33 ng/kg	< 0.100 ng/kg	< 4.35 ng/kg	< 8.29 ng/kg	< 1.65 j ng/kg	< 1.31 j ng/kg	< 1.16 ng/kg	< 0.75 ng/kg
1,2,3,4,7,8-Dibenzofuran, hexa	NA	Lab			< 0.273 ng/kg	5.13 ng/kg	< 21.70 ng/kg	< 0.139 ng/kg	1.36 j ng/kg	< 1.69 j ng/kg	< 2.38 ng/kg	< 1.63 ng/kg	< 1.54 ng/kg	< 1.12 ng/kg
1,2,3,6,7,8-Dibenzofuran, hexa	NA	Lab			< 0.261 ng/kg	2.52 j ng/kg	< 21.90 ng/kg	< 0.134 ng/kg	< 1.51 j ng/kg	< 2.29 j ng/kg	< 2.34 ng/kg	< 1.8 ng/kg	< 1.68 ng/kg	< 1.13 ng/kg
1,2,3,7,8,9-Dibenzofuran, hexa	NA	Lab			< 0.382 ng/kg	< 1.24 ng/kg	< 20.80 ng/kg	< 0.232 ng/kg	< 7.42 R ng/kg	< 11 R ng/kg	< 3.42 ng/kg	< 2.67 ng/kg	< 1.36 ng/kg	< 0.903 ng/kg
2,3,4,6,7,8-Dibenzofuran, hexa	NA	Lab			< 0.283 ng/kg	3.27 j ng/kg	< 25.10 ng/kg	< 0.143 ng/kg	< 2.57 ng/kg	< 3.18 j ng/kg	< 2.35 ng/kg	< 1.92 ng/kg	< 1.67 ng/kg	< 1.18 ng/kg
1,2,3,4,6,7,8-Dibenzofuran, hepta	NA	Lab			5.17 ng/kg	179 ng/kg	200 j ng/kg	< 0.447 j ng/kg	5.91 j ng/kg	< 2.25 j ng/kg	6.05 j ng/kg	8.35 j ng/kg	< 1.9 j ng/kg	3.1 j ng/kg
1,2,3,4,7,8,9-Dibenzofuran, hepta	NA	Lab			< 0.390 ng/kg	3.11 j ng/kg	< 26.50 ng/kg	< 0.272 ng/kg	< 2.44 j ng/kg	< 2.2 j ng/kg	< 1.23 ng/kg	< 1.22 ng/kg	< 2.27 ng/kg	< 1.51 ng/kg
Dibenzofuran octa	NA	Lab			2.60 j ng/kg	119 ng/kg	71.0 j ng/kg	0.516 j ng/kg	< 3.27 j ng/kg	< 9.91 j ng/kg	< 3.54 j ng/kg	< 3.62 j ng/kg	< 3.57 j ng/kg	< 5.21 j ng/kg
Dioxin tetra, Total	NA	Lab			0.588 j ng/kg	38.2 j ng/kg	< 18.60 j ng/kg	1.04 j ng/kg	< 3.47 ng/kg	< 8.45 ng/kg	< 2.82 ng/kg	< 3.28 ng/kg	< 3.16 ng/kg	1.39 j ng/kg
Dibenzofuran tetra, Total	NA	Lab			< 0.303 j ng/kg	14.7 j ng/kg	< 27.40 j ng/kg	< 0.258 j ng/kg	1.93 j ng/kg	< 3.83 ng/kg	7.54 j ng/kg	9.37 j ng/kg	12.8 j ng/kg	9.5 j ng/kg
Dioxin penta, Total	NA	Lab			1.65 j ng/kg	88.8 j ng/kg	< 14.50 j ng/kg	0.691 j ng/kg	0.796 j ng/kg	< 4.34 ng/kg	3.69 j ng/kg	9.74 j ng/kg	< 1.44 ng/kg	< 1.05 ng/kg
Dibenzofuran penta, Total	NA	Lab			0.514 j ng/kg	10.9 j ng/kg	< 4.33 j ng/kg	< 0.100 ng/kg	3.53 j ng/kg	< 3.7 ng/kg	4.21 j ng/kg	5.35 j ng/kg	< 1.16 ng/kg	< 0.75 ng/kg
Dioxin, hexa, Total	NA	Lab			5.75 j ng/kg	544 j ng/kg	82.2 j ng/kg	1.24 j ng/kg	48.1 j ng/kg	< 12.4 ng/kg	30.4 j ng/kg	35.9 j ng/kg	< 2.15 ng/kg	4.66 j ng/kg
Dibenzofuran, hexa, Total	NA	Lab			3.77 j ng/kg	157 j ng/kg	111 j ng/kg	0.276 j ng/kg	5.97 j ng/kg	< 6.99 ng/kg	10.3 j ng/kg	14.8 j ng/kg	1.21 j ng/kg	3.3 j ng/kg
Dioxin, hepta, Total	NA	Lab			15.6 j ng/kg	1060 j ng/kg	150 j ng/kg	1.88 j ng/kg	131 j ng/kg	59.2 j ng/kg	106 j ng/kg	135 j ng/kg	20.8 j ng/kg	30.2 j ng/kg
Dibenzofuran, hepta, Total	NA	Lab			10.7 j ng/kg	406 j ng/kg	346 j ng/kg	0.835 j ng/kg	15.6 j ng/kg	3.91 j ng/kg	15.9 j ng/kg	21.4 j ng/kg	4.6 j ng/kg	6.51 j ng/kg
TCDD Equivalent, reporting limit at 0, TEF1998 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	0.2 a ng/kg	--	**2.74 a ng/kg**	0.01 a ng/kg	**1.37 a ng/kg**	0.34 a ng/kg	**2.78 a ng/kg**	**3.52 a ng/kg**	0.81 a ng/kg	0.74 a ng/kg
TCDD Equivalent, reporting limit at 1/2, TEF1998 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	--	**42.9 a ng/kg**	--	--	--	--	--	--	--	--
TCDD Equivalent, reporting limit at 0, TEF 1998 [Fish]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	0.07 a ng/kg	--	**2.12 a ng/kg**	0.0014 a ng/kg	0.44 a ng/kg	0.07 a ng/kg	**1.95 a ng/kg**	**2.79 a ng/kg**	0.36 a ng/kg	0.35 a ng/kg
TCDD Equivalent, reporting limit at 1/2, TEF 1998 [Fish]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	--	**31.31 a ng/kg**	--	--	--	--	--	--	--	--
TCDD Equivalent, reporting limit at 0, TEF 2005 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	0.21 a ng/kg	--	**2.83 a ng/kg**	0.01 a ng/kg	**1.49 a ng/kg**	0.41 a ng/kg	**2.89 a ng/kg**	**3.69 a ng/kg**	0.81 a ng/kg	0.78 a ng/kg
TCDD Equivalent, reporting limit at 1/2, TEF 2005 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	--	**42.9 a ng/kg**	--	--	--	--	--	--	--	--

Table 10
Polychlorinated Dibenzo-p-dioxins and Dibenzofurans (PCDD/PCDFs)
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

					Sys Loc Code	**UC-77**	**UC-81**	**UC-81**	**UC-81**	**WM-84**	**WM-84**	**WM-84**	**WM-84**	**WM-88**	**UC-90**
					Sample Date	**6/9/2011**	**6/10/2011**	**6/10/2011**	**6/10/2011**	**6/13/2011**	**6/13/2011**	**6/13/2011**	**6/13/2011**	**11/15/2011**	**11/16/2011**
					Depth Interval	**1 - 1.5**	**0 - 0.5**	**0.5 - 1**	**1 - 1.5**	**0 - 0.5**	**0.5 - 1**	**1 - 1.5**	**0.5 - 1**	**0 - 0.5**	**0 - 0.5**
					Depth Unit	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**	**ft**
					Sys Sample Code	**UC-77-3_1.0-1.5_06092011**	**UC-81-1_0.0-0.5_06102011**	**UC-81-2_0.5-1.0_06102011**	**UC-81-3_1.0-1.5_06102011**	**WM-84-1_0.0-0.5_06132011**	**WM-84-2_0.5-1.0_06132011**	**WM-84-3_1.0-1.5_06132011**	**WM-84-2_0.5-1.0_06132011_FD**	**WM-88-1_0.0-0.5_11152011**	**UC-90-1_0.0-0.5_11162011**
					Sample Type Code	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**FD**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location	MPCA Sediment Quality Target Values Level I	MPCA Sediment Quality Target Values Level II											
Effective Date			2/1/2007	2/1/2007											
Exceedance Key			**Bold**	Underline											
Chlorinated Dioxins / Furans															
2,3,7,8-Dioxin, tetra	NA	Lab			< 2.24 ng/kg	< 2.56 ng/kg	< 14 ng/kg	< 8.84 ng/kg	0.56 ng/kg	< 2.09 ng/kg	< 2.56 ng/kg	< 1.97 ng/kg	< 0.176 ng/kg	1.31 ng/kg
1,2,3,7,8-Dioxin penta	NA	Lab			< 1.48 ng/kg	< 1.84 ng/kg	< 10.4 j ng/kg	< 15.9 ng/kg	2.63 ng/kg	1.7 j ng/kg	2.8 j ng/kg	2.16 j ng/kg	< 0.324 ng/kg	2.09 j ng/kg
1,2,3,4,7,8-Dioxin, hexa	NA	Lab			< 2.11 ng/kg	< 1.21 ng/kg	< 8.12 R ng/kg	< 7.99 R ng/kg	1.35 ng/kg	1.04 j ng/kg	< 1.39 ng/kg	< 2.16 j ng/kg	< 0.301 ng/kg	1.76 j ng/kg
1,2,3,6,7,8-Dioxin, hexa	NA	Lab			< 2.1 ng/kg	< 1.28 ng/kg	< 6.83 R ng/kg	< 7.91 R ng/kg	13.6 ng/kg	5.21 j ng/kg	< 2.45 j ng/kg	7.96 j ng/kg	1.37 j ng/kg	11.3 ng/kg
1,2,3,7,8,9-Dioxin, hexa	NA	Lab			< 2.26 ng/kg	< 1.34 ng/kg	< 7.61 R ng/kg	< 8.53 R ng/kg	6.75 ng/kg	4.02 j ng/kg	< 1.41 ng/kg	7.16 j ng/kg	0.976 j ng/kg	7.1 ng/kg
1,2,3,4,6,7,8-Dioxin, hepta	NA	Lab			28.3 j ng/kg	36.2 j ng/kg	50.1 j ng/kg	36.9 j ng/kg	168 ng/kg	41.1 j ng/kg	15.1 j ng/kg	91.6 ng/kg	16.2 ng/kg	161 ng/kg
Dioxin octa	NA	Lab			309 ng/kg	374 ng/kg	841 j ng/kg	827 j ng/kg	680 ng/kg	149 ng/kg	44.7 j ng/kg	255 ng/kg	105 ng/kg	1490 ng/kg
2,3,7,8-Dibenzofuran, tetra	NA	Lab			5.73 j ng/kg	5.32 j ng/kg	< 17.3 ng/kg	< 11.8 ng/kg	< 0.412 j ng/kg	4.64 j ng/kg	4.87 j ng/kg	4.68 j ng/kg	0.547 j ng/kg	2.26 ng/kg
1,2,3,7,8-Dibenzofuran, penta	NA	Lab			< 0.904 ng/kg	< 1.23 ng/kg	< 3.67 ng/kg	< 6.06 ng/kg	0.273 ng/kg	< 0.6 ng/kg	< 1.29 ng/kg	< 0.912 ng/kg	< 0.281 ng/kg	0.433 j ng/kg
2,3,4,7,8-Dibenzofuran, penta	NA	Lab			< 1.08 ng/kg	< 1.74 ng/kg	< 9.26 ng/kg	< 14.2 ng/kg	< 0.224 j ng/kg	< 1.17 j ng/kg	< 1.76 ng/kg	< 0.792 ng/kg	< 0.291 ng/kg	< 0.0945 ng/kg
1,2,3,4,7,8-Dibenzofuran, hexa	NA	Lab			< 1.47 ng/kg	< 1.04 ng/kg	< 3.04 j ng/kg	< 3.68 j ng/kg	0.596 ng/kg	0.873 j ng/kg	< 0.95 ng/kg	< 0.881 ng/kg	0.458 j ng/kg	3.35 j ng/kg
1,2,3,6,7,8-Dibenzofuran, hexa	NA	Lab			< 1.48 ng/kg	< 0.999 ng/kg	< 3.34 j ng/kg	< 4.13 j ng/kg	0.471 ng/kg	< 0.675 ng/kg	< 1.03 ng/kg	< 0.865 j ng/kg	0.63 j ng/kg	4.69 j ng/kg
1,2,3,7,8,9-Dibenzofuran, hexa	NA	Lab			< 2.44 ng/kg	< 1.62 ng/kg	< 9.29 R ng/kg	< 13.3 R ng/kg	< 0.309 ng/kg	< 0.941 ng/kg	< 1.49 ng/kg	< 0.807 ng/kg	< 0.206 ng/kg	< 0.229 ng/kg
2,3,4,6,7,8-Dibenzofuran, hexa	NA	Lab			< 1.46 ng/kg	< 0.832 ng/kg	< 5.2 R ng/kg	< 6.68 R ng/kg	0.503 ng/kg	< 0.711 ng/kg	< 0.964 ng/kg	< 0.899 ng/kg	0.334 j ng/kg	2.47 j ng/kg
1,2,3,4,6,7,8-Dibenzofuran, hepta	NA	Lab			< 4.51 j ng/kg	7.52 j ng/kg	< 2.62 j ng/kg	1.62 j ng/kg	13.5 ng/kg	50.3 j ng/kg	11 j ng/kg	16.3 j ng/kg	16.9 ng/kg	228 ng/kg
1,2,3,4,7,8,9-Dibenzofuran, hepta	NA	Lab			< 1.33 ng/kg	< 1.18 ng/kg	< 3.28 j ng/kg	< 2.78 j ng/kg	0.447 ng/kg	< 1.19 ng/kg	< 1.09 ng/kg	< 1.23 ng/kg	0.299 j ng/kg	2.39 j ng/kg
Dibenzofuran octa	NA	Lab			< 2.56 j ng/kg	< 5.53 j ng/kg	< 11.8 j ng/kg	< 12.4 j ng/kg	12.9 ng/kg	< 1.68 j ng/kg	< 2.27 j ng/kg	< 2.16 j ng/kg	9.84 j ng/kg	147 ng/kg
Dioxin tetra, Total	NA	Lab			< 2.24 ng/kg	< 2.56 ng/kg	< 14 ng/kg	2.59 j ng/kg	4.21 j ng/kg	< 2.09 ng/kg	< 2.56 ng/kg	< 1.97 ng/kg	1.07 j ng/kg	9.49 j ng/kg
Dibenzofuran tetra, Total	NA	Lab			10.1 j ng/kg	10.1 j ng/kg	< 17.3 ng/kg	< 11.8 ng/kg	4.6 j ng/kg	8.49 j ng/kg	8.84 j ng/kg	10 j ng/kg	0.849 j ng/kg	9.5 ng/kg
Dioxin penta, Total	NA	Lab			1.6 j ng/kg	< 1.84 ng/kg	4.63 j ng/kg	< 15.9 ng/kg	52.4 j ng/kg	10.9 j ng/kg	7.36 j ng/kg	10.9 j ng/kg	2.17 j ng/kg	21.7 j ng/kg
Dibenzofuran penta, Total	NA	Lab			< 0.904 ng/kg	< 1.23 ng/kg	< 3.67 ng/kg	< 6.06 ng/kg	4.61 j ng/kg	3.24 j ng/kg	< 1.29 ng/kg	< 0.792 ng/kg	2.66 j ng/kg	17.8 j ng/kg
Dioxin, hexa, Total	NA	Lab			10.3 j ng/kg	8.86 j ng/kg	8.12 j ng/kg	7.33 j ng/kg	198 j ng/kg	49.5 j ng/kg	18.3 j ng/kg	77.3 j ng/kg	11.9 j ng/kg	124 j ng/kg
Dibenzofuran, hexa, Total	NA	Lab			6.08 j ng/kg	7.33 j ng/kg	< 5.2 ng/kg	< 6.68 ng/kg	17.9 j ng/kg	27 j ng/kg	7.24 j ng/kg	14.9 j ng/kg	12.8 j ng/kg	135 j ng/kg
Dioxin, hepta, Total	NA	Lab			61 j ng/kg	72.8 j ng/kg	134 j ng/kg	94.5 j ng/kg	332 j ng/kg	81.9 j ng/kg	28.4 j ng/kg	173 j ng/kg	40 ng/kg	413 ng/kg
Dibenzofuran, hepta, Total	NA	Lab			10.1 j ng/kg	15.9 j ng/kg	5.8 j ng/kg	7.37 j ng/kg	36 j ng/kg	90.7 j ng/kg	19.6 j ng/kg	36.4 j ng/kg	34.1 ng/kg	445 j ng/kg
TCDD Equivalent, reporting limit at 0, TEF1998 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	**0.89 a ng/kg**	**1.01 a ng/kg**	0.59 a ng/kg	0.47 a ng/kg	--	--	**3.55 a ng/kg**	--	--	--
TCDD Equivalent, reporting limit at 1/2, TEF1998 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	--	--	--	--	**7.51 a ng/kg**	**5.68 a ng/kg**	--	**6.74 a ng/kg**	**1.13 a ng/kg**	**10.83 a ng/kg**
TCDD Equivalent, reporting limit at 0, TEF 1998 [Fish]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	0.35 a ng/kg	0.41 a ng/kg	0.13 a ng/kg	0.14 a ng/kg	--	--	**3.17 a ng/kg**	--	--	--
TCDD Equivalent, reporting limit at 1/2, TEF 1998 [Fish]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	--	--	--	--	**4.7 a ng/kg**	**4.67 a ng/kg**	--	**4.75 a ng/kg**	0.81 a ng/kg	**8.31 a ng/kg**
TCDD Equivalent, reporting limit at 0, TEF 2005 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	**0.95 a ng/kg**	**1.08 a ng/kg**	0.75 a ng/kg	0.63 a ng/kg	--	--	**3.56 a ng/kg**	--	--	--
TCDD Equivalent, reporting limit at 1/2, TEF 2005 [Human Health]	NA	Lab	**0.85 ng/kg**	21.5 ng/kg	--	--	--	--	**7.62 a ng/kg**	**5.59 a ng/kg**	--	**6.7 a ng/kg**	**1.12 a ng/kg**	**11.14 a ng/kg**

Data Qualifiers/Footnotes	
Qualifier	**Definition**
--	Not analyzed/not available.
a	Estimated value, calculated using some or all values that are estimates.
b	Potential false positive value based on blank data validation procedures.
c	Coeluting compound.
e	Estimated value, exceeded the instrument calibration range.
h	EPA recommended sample preservation, extraction or analysis holding time was exceeded.
I	Indeterminate value based on failure of blind duplicate data to meet quality assurance criteria.
j	Reported value is less than the stated laboratory quantitation limit and is considered an estimated value.
p	Relative percent difference is >40% (25% CLP pesticides) between primary and confirmation GC columns.
pp	Small peak in chromatogram below method detection limit.
r	The presence of the compound is suspect based on the ID criteria of the retention time and relative retention time obtained from the examination of the chromatograms.
s	Potential false positive value based on statistical analysis of blank sample data.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
N	Sample Type: Normal
FD	Sample Type: Field Duplicate
AT	Sample chromatogram is noted to be atypical of a petroleum product.
DLND	Not detected, detection limit not determined.
DF	Did not flash
EMPC	Estimated maximum possible concentration.
NA – (Not applicable)	NA indicates that a fractional portion of the sample is not part of the analytical testing or field collection procedures.
ND	Not detected.
TIC	Tentatively identified compound

Table 11
Total Organic Carbon and Black Carbon Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

							Chemical Name Total or Dissolved	Carbon, black NA	Carbon, total organic NA
Sys Loc Code	Sys Sample Code	Sample Date	Depth Interval	Depth Unit	Analysis Location	Sample Type Code			
WM-1	WM-1-1_0.0-0.7_02172011	02/17/2011	0 - 0.7	ft	Lab	N		**39200 mg/kg**	**34500 mg/kg**
WM-1	WM-1-2_0.7-1.9_02172011	02/17/2011	0.7 - 1.9	ft	Lab	N		**16300 mg/kg**	**16700 mg/kg**
WM-1	WM-1-3_1.9-2.1_02172011	02/17/2011	1.9 - 2.1	ft	Lab	N		**97300 mg/kg**	**101000 mg/kg**
WM-1	WM-1-4_2.5-3.0_02172011	02/17/2011	2.5 - 3	ft	Lab	N		**28700 mg/kg**	**28900 mg/kg**
WM-2	WM-2-1_0.0-0.5_02192011	02/19/2011	0 - 0.5	ft	Lab	N		**15400 mg/kg**	**14700 mg/kg**
WM-2	WM-2-2_1.2-1.4_02192011	02/19/2011	1.2 - 1.4	ft	Lab	N		**53200 mg/kg**	**47600 mg/kg**
WM-2	WM-2-3_1.4-1.9_02192011	02/19/2011	1.4 - 1.9	ft	Lab	N		**9700 mg/kg**	**9540 mg/kg**
WM-3	WM-3-1_0.0-1.0_02202011	02/20/2011	0 - 1	ft	Lab	N		**48500 mg/kg**	**48000 mg/kg**
WM-3	WM-3-2_2.0-4.0_02202011	02/20/2011	2 - 4	ft	Lab	N		**24200 mg/kg**	**23800 mg/kg**
WM-3	WM-3-3_4.2-4.75_02202011	02/20/2011	4.2 - 4.75	ft	Lab	N		**18600 mg/kg**	**18200 mg/kg**
WM-3	WM-3-4_4.75-5.25_02202011	02/20/2011	4.75 - 5.25	ft	Lab	N		**4440 mg/kg**	**4060 mg/kg**
WM-4	WM-4-1_0.0-0.5_02212011	02/21/2011	0 - 0.5	ft	Lab	N		**172000 mg/kg**	**168000 mg/kg**
WM-4	WM-4-2_0.5-1.0_02212011	02/21/2011	0.5 - 1	ft	Lab	N		**270000 mg/kg**	**265000 mg/kg**
WM-5	WM-5-1_0.0-0.5_02222011	02/22/2011	0 - 0.5	ft	Lab	N		**6750 h mg/kg**	**26100 h mg/kg**
WM-5	WM-5-2_1.0-1.5_02222011	02/22/2011	1 - 1.5	ft	Lab	N		**9940 h mg/kg**	**42100 h mg/kg**
WM-6	WM-6-1_0.0-1.0_02222011	02/22/2011	0 - 1	ft	Lab	N		**12700 h mg/kg**	**89000 h mg/kg**
WM-6	WM-6-1_0.0-1.0_02222011_FD	02/22/2011	0 - 1	ft	Lab	FD		**14400 h mg/kg**	**79700 h mg/kg**
WM-6	WM-6-2_1.4-1.8_02222011	02/22/2011	1.4 - 1.8	ft	Lab	N		**27000 h mg/kg**	**277000 h mg/kg**
WM-7	WM-7-1_0.0-0.5_02222011	02/22/2011	0 - 0.5	ft	Lab	N		**2970 h mg/kg**	**34100 h mg/kg**
WM-7	WM-7-2_1.1-1.6_02222011	02/22/2011	1.1 - 1.6	ft	Lab	N		**5690 h mg/kg**	**231000 h mg/kg**
WM-8	WM-8-1_0.0-0.5_02242011	02/24/2011	0 - 0.5	ft	Lab	N		**5780 h mg/kg**	**49100 h mg/kg**
WM-8	WM-8-2_0.75-1.25_02242011	02/24/2011	0.75 - 1.25	ft	Lab	N		**15500 h mg/kg**	**65200 h mg/kg**
WM-8	WM-8-3_1.25-1.75_02242011	02/24/2011	1.25 - 1.75	ft	Lab	N		**4140 h mg/kg**	**76800 h mg/kg**
WM-9	WM-9-1_0.0-0.5_03072011	03/07/2011	0 - 0.5	ft	Lab	N		**30700 mg/kg**	**176000 mg/kg**
WM-9	WM-9-2_0.5-1.0_03072011	03/07/2011	0.5 - 1	ft	Lab	N		**30700 mg/kg**	**176000 mg/kg**
WM-9	WM-9-3_1.5-2.0_03072011	03/07/2011	1.5 - 2	ft	Lab	N		**31600 mg/kg**	**147000 mg/kg**
WM-9	WM-9-4_2.0-2.5_03072011	03/07/2011	2 - 2.5	ft	Lab	N		**30600 mg/kg**	**217000 mg/kg**
WM-10	WM-10-1_0.0-1.0_02252011	02/25/2011	0 - 1	ft	Lab	N		**6280 h mg/kg**	**38600 h mg/kg**
WM-10	WM-10-2_1.0-2.0_02252011	02/25/2011	1 - 2	ft	Lab	N		**12700 h mg/kg**	**79800 h mg/kg**
WM-10	WM-10-3_2.0-2.8_02252011	02/25/2011	2 - 2.8	ft	Lab	N		**5020 h mg/kg**	**169000 h mg/kg**
UC-11	UC-11-1_0.0-1.0_02262011	02/26/2011	0 - 1	ft	Lab	N		**27200 h mg/kg**	**57800 h mg/kg**
UC-11	UC-11-2_1.0-2.0_02262011	02/26/2011	1 - 2	ft	Lab	N		**27000 h mg/kg**	**47400 h mg/kg**
UC-11	UC-11-3_2.0-3.0_02262011	02/26/2011	2 - 3	ft	Lab	N		**27700 h mg/kg**	**68000 h mg/kg**
UC-11	UC-11-4_3.0-3.5_02262011	02/26/2011	3 - 3.5	ft	Lab	N		**16300 h mg/kg**	**285000 h mg/kg**
UC-12	UC-12-1_0.0-0.5_02272011	02/27/2011	0 - 0.5	ft	Lab	N		**16000 h mg/kg**	**65900 h mg/kg**
UC-12	UC-12-2_1.5-2.0_02272011	02/27/2011	1.5 - 2	ft	Lab	N		**22100 h mg/kg**	**48400 h mg/kg**
UC-12	UC-12-3_2.5-3.1_02272011	02/27/2011	2.5 - 3.1	ft	Lab	N		**16000 h mg/kg**	**57700 h mg/kg**
UC-12	UC-12-4_3.1-3.6_02272011	02/27/2011	3.1 - 3.6	ft	Lab	N		**2870 h mg/kg**	**54700 h mg/kg**
WM-13	WM-13-1_0.0-0.5_03042011	03/04/2011	0 - 0.5	ft	Lab	N		**1200 h mg/kg**	**16300 h mg/kg**

Table 11
Total Organic Carbon and Black Carbon Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

							Chemical Name Total or Dissolved	Carbon, black NA	Carbon, total organic NA
Sys Loc Code	Sys Sample Code	Sample Date	Depth Interval	Depth Unit	Analysis Location	Sample Type Code			
WM-13	WM-13-2_1.5-2.0_03042011	03/04/2011	1.5 - 2	ft	Lab	N		**3440 h mg/kg**	**8620 h mg/kg**
WM-13	WM-13-3_3.25-3.75_03042011	03/04/2011	3.25 - 3.75	ft	Lab	N		**1300 h mg/kg**	**20500 h mg/kg**
WM-13	WM-13-4_3.75-4.25_03042011	03/04/2011	3.75 - 4.25	ft	Lab	N		< 1000 h mg/kg	**3500 h mg/kg**
WM-14	WM-14-1_0.0-0.5_02272011	02/27/2011	0 - 0.5	ft	Lab	N		**4020 h mg/kg**	**24100 h mg/kg**
WM-14	WM-14-2_0.5-1.0_02272011	02/27/2011	0.5 - 1	ft	Lab	N		**5160 h mg/kg**	**26700 h mg/kg**
WM-14	WM-14-3_1.0-1.5_02272011	02/27/2011	1 - 1.5	ft	Lab	N		**12900 h mg/kg**	**86200 h mg/kg**
WM-14	WM-14-4_1.5-2.0_02272011	02/27/2011	1.5 - 2	ft	Lab	N		**2890 h mg/kg**	**94700 h mg/kg**
UC-15	UC-15-1_0.0-1.0_02272011	02/27/2011	0 - 1	ft	Lab	N		**6620 h mg/kg**	**20100 h mg/kg**
UC-15	UC-15-2_1.0-2.0_02272011	02/27/2011	1 - 2	ft	Lab	N		**6020 h mg/kg**	**28400 h mg/kg**
UC-15	UC-15-3_2.0-3.0_02272011	02/27/2011	2 - 3	ft	Lab	N		**9260 h mg/kg**	**42900 h mg/kg**
UC-15	UC-15-3_2.0-3.0_02272011_FD	02/27/2011	2 - 3	ft	Lab	FD		**10600 h mg/kg**	**45600 h mg/kg**
UC-15	UC-15-4_3.0-4.0_02272011	02/27/2011	3 - 4	ft	Lab	N		**2280 h mg/kg**	**35800 h mg/kg**
UC-16	UC-16-1_0.0-0.5_02282011	02/28/2011	0 - 0.5	ft	Lab	N		**6520 h mg/kg**	**44600 h mg/kg**
UC-16	UC-16-2_2.0-2.5_02282011	02/28/2011	2 - 2.5	ft	Lab	N		**19700 h mg/kg**	**48600 h mg/kg**
UC-16	UC-16-3_3.0-3.5_02282011	02/28/2011	3 - 3.5	ft	Lab	N		**15500 h mg/kg**	**57500 h mg/kg**
UC-16	UC-16-4_4.0-4.5_02282011	02/28/2011	4 - 4.5	ft	Lab	N		**2920 h mg/kg**	**37300 h mg/kg**
UC-17	UC-17-1_0.0-0.5_03012011	03/01/2011	0 - 0.5	ft	Lab	N		**7420 h mg/kg**	**44700 mg/kg**
UC-17	UC-17-2_1.0-1.5_03012011	03/01/2011	1 - 1.5	ft	Lab	N		**13200 h mg/kg**	**43100 mg/kg**
UC-17	UC-17-3_2.0-2.5_03012011	03/01/2011	2 - 2.5	ft	Lab	N		**14300 h mg/kg**	**44000 mg/kg**
UC-17	UC-17-4_2.5-3.0_03012011	03/01/2011	2.5 - 3	ft	Lab	N		**13200 h mg/kg**	**53600 mg/kg**
WM-18	WM-18-1_0.0-0.7_03012011	03/01/2011	0 - 0.7	ft	Lab	N		**7100 h mg/kg**	**37800 h mg/kg**
WM-18	WM-18-2_0.7-1.7_03012011	03/01/2011	0.7 - 1.7	ft	Lab	N		**16800 h mg/kg**	**81200 mg/kg**
WM-18	WM-18-3_1.7-2.7_03012011	03/01/2011	1.7 - 2.7	ft	Lab	N		**2360 h mg/kg**	**42000 h mg/kg**
WM-19	WM-19-1_0.0-0.5_03022011	03/02/2011	0 - 0.5	ft	Lab	N		**3260 h mg/kg**	**36900 mg/kg**
WM-19	WM-19-2_0.75-1.25_03022011	03/02/2011	0.75 - 1.25	ft	Lab	N		**13000 h mg/kg**	**82700 mg/kg**
WM-19	WM-19-3_1.25-1.75_03022011	03/02/2011	1.25 - 1.75	ft	Lab	N		**5220 h mg/kg**	**26200 mg/kg**
UC-20	UC-20-1_0.0-0.5_03022011	03/02/2011	0 - 0.5	ft	Lab	N		**8530 h mg/kg**	**51000 mg/kg**
UC-20	UC-20-2_1.5-2.0_03022011	03/02/2011	1.5 - 2	ft	Lab	N		**21200 h mg/kg**	**47300 mg/kg**
UC-20	UC-20-3_2.5-3.0_03022011	03/02/2011	2.5 - 3	ft	Lab	N		**17000 h mg/kg**	**60900 mg/kg**
UC-20	UC-20-4_3.5-4.0_03022011	03/02/2011	3.5 - 4	ft	Lab	N		**2040 h mg/kg**	**22000 mg/kg**
WM-21	WM-21-1_0.0-0.5_03042011	03/04/2011	0 - 0.5	ft	Lab	N		**5950 h mg/kg**	**26500 h mg/kg**
WM-21	WM-21-2_2.0-2.5_03042011	03/04/2011	2 - 2.5	ft	Lab	N		**8000 h mg/kg**	**35500 h mg/kg**
WM-21	WM-21-3_4.0-4.5_03042011	03/04/2011	4 - 4.5	ft	Lab	N		**24000 h mg/kg**	**157000 h mg/kg**
WM-21	WM-21-4_5.0-5.5_03042011	03/04/2011	5 - 5.5	ft	Lab	N		**2720 h mg/kg**	**44500 h mg/kg**
WM-22	WM-22-1_0.0-0.5_03062011	03/06/2011	0 - 0.5	ft	Lab	N		**6340 h mg/kg**	**17400 h mg/kg**
WM-22	WM-22-2_1.5-2.0_03062011	03/06/2011	1.5 - 2	ft	Lab	N		**6200 h mg/kg**	**31900 h mg/kg**
WM-22	WM-22-3_4.0-4.5_03062011	03/06/2011	4 - 4.5	ft	Lab	N		< 1000 h mg/kg	**1620 h mg/kg**
WM-22	WM-22-4_5.5-6.0_03062011	03/06/2011	5.5 - 6	ft	Lab	N		**4140 h mg/kg**	**29000 h mg/kg**
UC-23	UC-23-1_0.0-0.5_03022011	03/02/2011	0 - 0.5	ft	Lab	N		**14200 h mg/kg**	**48800 mg/kg**

Table 11
Total Organic Carbon and Black Carbon Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

							Chemical Name Total or Dissolved	Carbon, black NA	Carbon, total organic NA
Sys Loc Code	Sys Sample Code	Sample Date	Depth Interval	Depth Unit	Analysis Location	Sample Type Code			
UC-23	UC-23-2_1.5-2.0_03022011	03/02/2011	1.5 - 2	ft	Lab	N		**24100 h mg/kg**	**53800 mg/kg**
UC-23	UC-23-3_2.5-3.0_03022011	03/02/2011	2.5 - 3	ft	Lab	N		**26100 h mg/kg**	**61900 mg/kg**
UC-23	UC-23-4_3.75-4.25_03022011	03/02/2011	3.75 - 4.25	ft	Lab	N		**2000 h mg/kg**	**6800 mg/kg**
WM-24	WM-24-1_0.0-0.5_03072011	03/07/2011	0 - 0.5	ft	Lab	N		**6740 h mg/kg**	**38400 h mg/kg**
WM-24	WM-24-2_1.0-1.5_03072011	03/07/2011	1 - 1.5	ft	Lab	N		**16500 h mg/kg**	**86100 h mg/kg**
WM-24	WM-24-2_1.0-1.5_03072011_FD	03/07/2011	1 - 1.5	ft	Lab	FD		**15700 h mg/kg**	**86100 h mg/kg**
WM-24	WM-24-3_2.0-2.5_03072011	03/07/2011	2 - 2.5	ft	Lab	N		**3260 h mg/kg**	**70400 h mg/kg**
WM-24	WM-24-4_3.0-3.5_03072011	03/07/2011	3 - 3.5	ft	Lab	N		**35100 h mg/kg**	**86400 h mg/kg**
WM-25	WM-25-1_0.0-0.5_03072011	03/07/2011	0 - 0.5	ft	Lab	N		**5390 mg/kg**	**30800 mg/kg**
WM-25	WM-25-2_2.5-3.0_03072011	03/07/2011	2.5 - 3	ft	Lab	N		**4660 mg/kg**	**25800 mg/kg**
WM-25	WM-25-3_5.5-6.0_03072011	03/07/2011	5.5 - 6	ft	Lab	N		**22800 mg/kg**	**127000 mg/kg**
WM-25	WM-25-4_6.0-6.5_03072011	03/07/2011	6 - 6.5	ft	Lab	N		**2250 mg/kg**	**37100 mg/kg**
WM-26	WM-26-1_0.0-0.5_03112011	03/11/2011	0 - 0.5	ft	Lab	N		**5400 mg/kg**	**36200 mg/kg**
WM-26	WM-26-2_0.5-1.0_03112011	03/11/2011	0.5 - 1	ft	Lab	N		**7920 mg/kg**	**43600 mg/kg**
WM-26	WM-26-3_1.3-1.8_03112011	03/11/2011	1.3 - 1.8	ft	Lab	N		**11600 mg/kg**	**88800 mg/kg**
WM-26	WM-26-4_1.8-2.1_03112011	03/11/2011	1.8 - 2.1	ft	Lab	N		**2230 mg/kg**	**40000 mg/kg**
WM-27	WM-27-1_0.0-0.5_03132011	03/13/2011	0 - 0.5	ft	Lab	N		**4990 mg/kg**	**32500 mg/kg**
WM-27	WM-27-2_0.5-1.0_03132011	03/13/2011	0.5 - 1	ft	Lab	N		**6680 mg/kg**	**35700 mg/kg**
WM-27	WM-27-3_1.4-1.9_03132011	03/13/2011	1.4 - 1.9	ft	Lab	N		**9360 mg/kg**	**62800 mg/kg**
WM-28	WM-28-1_0.0-0.5_03132011	03/13/2011	0 - 0.5	ft	Lab	N		**3850 mg/kg**	**40000 mg/kg**
WM-28	WM-28-2_2.0-2.5_03132011	03/13/2011	2 - 2.5	ft	Lab	N		**11500 mg/kg**	**76400 mg/kg**
WM-28	WM-28-2_2.0-2.5_03132011_FD	03/13/2011	2 - 2.5	ft	Lab	FD		**11700 mg/kg**	**75400 mg/kg**
WM-28	WM-28-3_2.5-3.0_03132011	03/13/2011	2.5 - 3	ft	Lab	N		**13500 mg/kg**	**57200 mg/kg**
WM-28	WM-28-4_3.0-3.5_03132011	03/13/2011	3 - 3.5	ft	Lab	N		**3480 mg/kg**	**34400 mg/kg**
UC-29	UC-29-1_0.0-0.5_03032011	03/03/2011	0 - 0.5	ft	Lab	N		**17200 h mg/kg**	**54200 h mg/kg**
UC-29	UC-29-2_1.0-1.5_03032011	03/03/2011	1 - 1.5	ft	Lab	N		**31100 h mg/kg**	**57600 h mg/kg**
UC-29	UC-29-2_1.0-1.5_03032011_FD	03/03/2011	1 - 1.5	ft	Lab	FD		**33000 h mg/kg**	**56900 h mg/kg**
UC-29	UC-29-3_2.0-2.5_03032011	03/03/2011	2 - 2.5	ft	Lab	N		**16500 h mg/kg**	**61800 h mg/kg**
UC-29	UC-29-4_2.5-3.0_03032011	03/03/2011	2.5 - 3	ft	Lab	N		**3060 h mg/kg**	**20800 h mg/kg**
WM-30	WM-30-1_0.0-0.5_03082011	03/08/2011	0 - 0.5	ft	Lab	N		**4420 mg/kg**	**36500 mg/kg**
WM-30	WM-30-2_1.0-1.5_03082011	03/08/2011	1 - 1.5	ft	Lab	N		< 1000 mg/kg	**4360 mg/kg**
WM-30	WM-30-3_2.0-2.5_03082011	03/08/2011	2 - 2.5	ft	Lab	N		**1060 mg/kg**	**16200 mg/kg**
WM-30	WM-30-4_3.5-4.0_03082011	03/08/2011	3.5 - 4	ft	Lab	N		**7110 mg/kg**	**12000 mg/kg**
UC-31	UC-31-1_0.0-0.5_03092011	03/09/2011	0 - 0.5	ft	Lab	N		**19700 mg/kg**	**50800 mg/kg**
UC-31	UC-31-2_0.5-1.0_03092011	03/09/2011	0.5 - 1	ft	Lab	N		**22300 mg/kg**	**60000 mg/kg**
UC-31	UC-31-3_1.0-1.5_03092011	03/09/2011	1 - 1.5	ft	Lab	N		**5680 mg/kg**	**34600 mg/kg**
UC-31	UC-31-3_1.0-1.5_03092011_FD	03/09/2011	1 - 1.5	ft	Lab	FD		**9560 * mg/kg**	**44100 mg/kg**
UC-31	UC-31-4_2.0-2.5_03092011	03/09/2011	2 - 2.5	ft	Lab	N		< 1000 mg/kg	**2950 mg/kg**
WM-32	WM-32-1_0.0-0.5_03132011	03/13/2011	0 - 0.5	ft	Lab	N		**10100 mg/kg**	**21800 mg/kg**

Table 11
Total Organic Carbon and Black Carbon Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

							Chemical Name Total or Dissolved	Carbon, black NA	Carbon, total organic NA
Sys Loc Code	Sys Sample Code	Sample Date	Depth Interval	Depth Unit	Analysis Location	Sample Type Code			
WM-32	WM-32-2_0.5-1.0_03132011	03/13/2011	0.5 - 1	ft	Lab	N		**6760 mg/kg**	**24400 mg/kg**
WM-32	WM-32-3_1.0-1.5_03132011	03/13/2011	1 - 1.5	ft	Lab	N		**1240 mg/kg**	**20300 mg/kg**
WM-32	WM-32-4_3.5-4.0_03132011	03/13/2011	3.5 - 4	ft	Lab	N		< 1000 mg/kg	< 1000 mg/kg
WM-33	WM-33-1_0.0-0.5_03082011	03/08/2011	0 - 0.5	ft	Lab	N		**11200 mg/kg**	**44000 mg/kg**
WM-33	WM-33-2_0.5-1.0_03082011	03/08/2011	0.5 - 1	ft	Lab	N		**16600 mg/kg**	**221000 mg/kg**
WM-33	WM-33-3_1.5-2.0_03082011	03/08/2011	1.5 - 2	ft	Lab	N		**3780 mg/kg**	**67300 mg/kg**
WM-33	WM-33-4_2.5-3.0_03082011	03/08/2011	2.5 - 3	ft	Lab	N		**4940 mg/kg**	**66200 mg/kg**
WM-34	WM-34-1_0.0-0.5_03142011	03/14/2011	0 - 0.5	ft	Lab	N		**15300 mg/kg**	**88900 mg/kg**
WM-34	WM-34-2_0.5-1.0_03142011	03/14/2011	0.5 - 1	ft	Lab	N		**3460 mg/kg**	**97100 mg/kg**
WM-34	WM-34-3_1.0-1.5_03142011	03/14/2011	1 - 1.5	ft	Lab	N		**13100 mg/kg**	**188000 mg/kg**
UC-35	UC-35-1_0.0-0.5_03092011	03/09/2011	0 - 0.5	ft	Lab	N		**18000 mg/kg**	**57500 mg/kg**
UC-35	UC-35-2_0.5-1.0_03092011	03/09/2011	0.5 - 1	ft	Lab	N		**7280 mg/kg**	**108000 mg/kg**
UC-35	UC-35-3_2.0-2.5_03092011	03/09/2011	2 - 2.5	ft	Lab	N		< 1000 mg/kg	**2780 mg/kg**
UC-35	UC-35-4_4.0-4.5_03092011	03/09/2011	4 - 4.5	ft	Lab	N		< 1000 mg/kg	**1060 mg/kg**
UC-36	UC-36-2_1.0-1.5_03092011	03/09/2011	1 - 1.5	ft	Lab	N		**11700 mg/kg**	**55400 mg/kg**
UC-36	UC-36-3_2.0-2.5_03092011	03/09/2011	2 - 2.5	ft	Lab	N		**2310 mg/kg**	**53100 mg/kg**
UC-36	UC-36-4_2.5-3.0_03092011	03/09/2011	2.5 - 3	ft	Lab	N		**4640 mg/kg**	**152000 mg/kg**
UC-36	UC-36-1_0.0-0.5_03092011	03/09/2011	0 - 0.5	ft	Lab	N		**8620 mg/kg**	**33500 mg/kg**
UC-37	UC-37-1_0.0-0.5_03102011	03/10/2011	0 - 0.5	ft	Lab	N		**6720 mg/kg**	**32400 mg/kg**
UC-37	UC-37-2_0.5-1.0_03102011	03/10/2011	0.5 - 1	ft	Lab	N		**1400 mg/kg**	**14500 mg/kg**
UC-37	UC-37-3_3.0-3.5_03102011	03/10/2011	3 - 3.5	ft	Lab	N		**4160 mg/kg**	**15700 mg/kg**
UC-37	UC-37-4_5.5-6.0_03102011	03/10/2011	5.5 - 6	ft	Lab	N		**1640 mg/kg**	**14600 mg/kg**
UC-38	UC-38-1_0.0-0.5_03112011	03/11/2011	0 - 0.5	ft	Lab	N		**13500 mg/kg**	**63500 mg/kg**
UC-38	UC-38-2_1.5-2.0_03112011	03/11/2011	1.5 - 2	ft	Lab	N		**26100 mg/kg**	**66000 mg/kg**
UC-38	UC-38-3_2.0-2.5_03112011	03/11/2011	2 - 2.5	ft	Lab	N		**24200 mg/kg**	**67100 mg/kg**
UC-38	UC-38-4_2.9-3.4_03112011	03/11/2011	2.9 - 3.4	ft	Lab	N		**2720 mg/kg**	**33400 mg/kg**
UC-39	UC-39-1_0.0-0.5_03032011	03/03/2011	0 - 0.5	ft	Lab	N		**7720 mg/kg**	**62100 h mg/kg**
UC-39	UC-39-2_2.0-2.5_03032011	03/03/2011	2 - 2.5	ft	Lab	N		**24200 mg/kg**	**56400 h mg/kg**
UC-39	UC-39-3_3.0-3.5_03032011	03/03/2011	3 - 3.5	ft	Lab	N		**20500 mg/kg**	**63100 h mg/kg**
UC-39	UC-39-4_4.0-4.5_03032011	03/03/2011	4 - 4.5	ft	Lab	N		**3700 mg/kg**	**44400 h mg/kg**
UC-40	UC-40-1_0.0-0.5_03102011	03/10/2011	0 - 0.5	ft	Lab	N		**6240 mg/kg**	**47300 h mg/kg**
UC-40	UC-40-2_1.5-2.0_03102011	03/10/2011	1.5 - 2	ft	Lab	N		**11100 mg/kg**	**45700 mg/kg**
UC-40	UC-40-3_3.0-3.5_03102011	03/10/2011	3 - 3.5	ft	Lab	N		**15700 mg/kg**	**55800 h mg/kg**
UC-40	UC-40-3_3.0-3.5_03102011_FD	03/10/2011	3 - 3.5	ft	Lab	FD		**12500 mg/kg**	**53500 mg/kg**
UC-40	UC-40-4_4.5-5.0_03102011	03/10/2011	4.5 - 5	ft	Lab	N		**2160 mg/kg**	**38700 mg/kg**
WM-41	WM-41-1_0.0-0.5_03152011	03/15/2011	0 - 0.5	ft	Lab	N		**1100 mg/kg**	**25900 mg/kg**
WM-41	WM-41-2_1.0-1.5_03152011	03/15/2011	1 - 1.5	ft	Lab	N		**2520 mg/kg**	**64900 mg/kg**
WM-41	WM-41-3_2.0-2.5_03152011	03/15/2011	2 - 2.5	ft	Lab	N		**1300 mg/kg**	**13000 mg/kg**
WM-41	WM-41-4_3.0-3.4_03152011	03/15/2011	3 - 3.4	ft	Lab	N		**1500 mg/kg**	**32300 mg/kg**

Table 11
Total Organic Carbon and Black Carbon Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

							Chemical Name **Total or Dissolved**	**Carbon, black** **NA**	**Carbon, total organic** **NA**
Sys Loc Code	Sys Sample Code	Sample Date	Depth Interval	Depth Unit	Analysis Location	Sample Type Code			
WM-42	WM-42-1_0.0-0.5_03152011	03/15/2011	0 - 0.5	ft	Lab	N		**4630 mg/kg**	**84100 mg/kg**
WM-42	WM-42-2_1.0-1.5_03152011	03/15/2011	1 - 1.5	ft	Lab	N		**3020 mg/kg**	**112000 mg/kg**
WM-42	WM-42-3_2.0-2.5_03152011	03/15/2011	2 - 2.5	ft	Lab	N		**2820 mg/kg**	**67600 mg/kg**
WM-42	WM-42-4_2.5-3.0_03152011	03/15/2011	2.5 - 3	ft	Lab	N		**1060 mg/kg**	**18100 mg/kg**
WM-43	WM-43-1_0.0-0.5_03152011	03/15/2011	0 - 0.5	ft	Lab	N		**5600 mg/kg**	**25600 mg/kg**
WM-43	WM-43-2_1.7-2.2_03152011	03/15/2011	1.7 - 2.2	ft	Lab	N		**9520 mg/kg**	**80200 mg/kg**
WM-43	WM-43-3_2.2-2.7_03152011	03/15/2011	2.2 - 2.7	ft	Lab	N		**17800 mg/kg**	**117000 mg/kg**
WM-43	WM-43-4_5.0-5.5_03152011	03/15/2011	5 - 5.5	ft	Lab	N		< 1000 mg/kg	**1600 mg/kg**
WM-44	WM-44-1_0.0-0.5_03162011	03/16/2011	0 - 0.5	ft	Lab	N		**6980 mg/kg**	**20600 mg/kg**
WM-44	WM-44-2_0.5-1.0_03162011	03/16/2011	0.5 - 1	ft	Lab	N		**2950 mg/kg**	**16100 mg/kg**
WM-44	WM-44-3_1.0-1.5_03162011	03/16/2011	1 - 1.5	ft	Lab	N		**2090 mg/kg**	**15800 mg/kg**
WM-44	WM-44-4_2.0-2.5_03162011	03/16/2011	2 - 2.5	ft	Lab	N		**1260 mg/kg**	**7300 mg/kg**
WM-45	WM-45-1_0.0-0.5_03162011	03/16/2011	0 - 0.5	ft	Lab	N		**1060 mg/kg**	**8050 mg/kg**
WM-45	WM-45-2_1.5-2.0_03162011	03/16/2011	1.5 - 2	ft	Lab	N		< 1000 mg/kg	**1770 mg/kg**
WM-45	WM-45-2_1.5-2.0_03162011_FD	03/16/2011	1.5 - 2	ft	Lab	FD		< 1000 mg/kg	**3250 * mg/kg**
WM-45	WM-45-3_3.0-3.5_03162011	03/16/2011	3 - 3.5	ft	Lab	N		**2160 mg/kg**	**1990 mg/kg**
WM-45	WM-45-4_5.0-5.5_03162011	03/16/2011	5 - 5.5	ft	Lab	N		**1400 mg/kg**	**4040 mg/kg**
WM-46	WM-46-1_0.0-0.5_03162011	03/16/2011	0 - 0.5	ft	Lab	N		**6140 mg/kg**	**21300 mg/kg**
WM-46	WM-46-2_2.3-2.8_03162011	03/16/2011	2.3 - 2.8	ft	Lab	N		**8700 mg/kg**	**65700 mg/kg**
WM-46	WM-46-3_2.8-3.3_03162011	03/16/2011	2.8 - 3.3	ft	Lab	N		**17700 mg/kg**	**118000 mg/kg**
WM-46	WM-46-4_4.0-4.5_03162011	03/16/2011	4 - 4.5	ft	Lab	N		< 1000 mg/kg	**4500 mg/kg**
WM-47	WM-47-1_0.0-0.5_03162011	03/16/2011	0 - 0.5	ft	Lab	N		**2860 mg/kg**	**10500 mg/kg**
WM-47	WM-47-2_2.5-3.0_03162011	03/16/2011	2.5 - 3	ft	Lab	N		**10500 mg/kg**	**78000 mg/kg**
WM-47	WM-47-3_3.0-3.5_03162011	03/16/2011	3 - 3.5	ft	Lab	N		**4420 mg/kg**	**33600 mg/kg**
WM-47	WM-47-4_3.5-4.0_03162011	03/16/2011	3.5 - 4	ft	Lab	N		< 1000 mg/kg	**7000 mg/kg**
WM-48	WM-48-1_0.0-0.5_03172011	03/17/2011	0 - 0.5	ft	Lab	N		**5440 mg/kg**	**11400 mg/kg**
WM-48	WM-48-2_2.0-2.5_03172011	03/17/2011	2 - 2.5	ft	Lab	N		**3320 mg/kg**	**19300 mg/kg**
WM-48	WM-48-3_2.5-3.0_03172011	03/17/2011	2.5 - 3	ft	Lab	N		**4980 mg/kg**	**28800 mg/kg**
WM-48	WM-48-4_3.0-3.5_03172011	03/17/2011	3 - 3.5	ft	Lab	N		**1600 mg/kg**	**34200 mg/kg**
WM-49	WM-49-1_0.0-0.5_03172011	03/17/2011	0 - 0.5	ft	Lab	N		**2340 mg/kg**	**9510 h mg/kg**
WM-49	WM-49-2_2.5-3.0_03172011	03/17/2011	2.5 - 3	ft	Lab	N		**2200 mg/kg**	**17700 mg/kg**
WM-49	WM-49-2_2.5-3.0_03172011_FD	03/17/2011	2.5 - 3	ft	Lab	FD		**2510 mg/kg**	**13000 mg/kg**
WM-49	WM-49-3_4.8-5.3_03172011	03/17/2011	4.8 - 5.3	ft	Lab	N		**8390 mg/kg**	**31000 h mg/kg**
WM-49	WM-49-4_5.5-6.0_03172011	03/17/2011	5.5 - 6	ft	Lab	N		< 1000 mg/kg	< 1000 mg/kg
WM-50	WM-50-1_0.0-0.5_03172011	03/17/2011	0 - 0.5	ft	Lab	N		**4630 mg/kg**	**18900 h mg/kg**
WM-50	WM-50-2_1.0-1.5_03172011	03/17/2011	1 - 1.5	ft	Lab	N		**5640 mg/kg**	**25600 mg/kg**
WM-50	WM-50-3_2.5-3.0_03172011	03/17/2011	2.5 - 3	ft	Lab	N		**10500 mg/kg**	**45200 h mg/kg**
WM-50	WM-50-4_3.0-3.5_03172011	03/17/2011	3 - 3.5	ft	Lab	N		**1500 mg/kg**	**28500 mg/kg**
WM-51	WM-51-1_0.0-0.5_03182011	03/18/2011	0 - 0.5	ft	Lab	N		**8580 mg/kg**	**20100 mg/kg**

Table 11
Total Organic Carbon and Black Carbon Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

							Chemical Name Total or Dissolved	Carbon, black NA	Carbon, total organic NA
Sys Loc Code	Sys Sample Code	Sample Date	Depth Interval	Depth Unit	Analysis Location	Sample Type Code			
WM-51	WM-51-2_2.0-2.5_03182011	03/18/2011	2 - 2.5	ft	Lab	N		**6480 mg/kg**	**29400 mg/kg**
WM-51	WM-51-3_4.0-4.5_03182011	03/18/2011	4 - 4.5	ft	Lab	N		**1240 mg/kg**	**11000 mg/kg**
WM-51	WM-51-4_6.0-6.5_03182011	03/18/2011	6 - 6.5	ft	Lab	N		< 1000 mg/kg	**2290 mg/kg**
UC-52	UC-52-1_0.0-0.5_03182011	03/18/2011	0 - 0.5	ft	Lab	N		**5320 mg/kg**	**28800 mg/kg**
UC-52	UC-52-2_2.0-2.5_03182011	03/18/2011	2 - 2.5	ft	Lab	N		**2250 mg/kg**	**27900 mg/kg**
UC-52	UC-52-3_4.0-4.5_03182011	03/18/2011	4 - 4.5	ft	Lab	N		**1220 mg/kg**	**20200 mg/kg**
UC-52	UC-52-4_5.0-5.5_03182011	03/18/2011	5 - 5.5	ft	Lab	N		< 1000 mg/kg	**8280 mg/kg**
UC-53	UC-53-1_0.0-0.5_03182011	03/18/2011	0 - 0.5	ft	Lab	N		**19400 mg/kg**	**58000 mg/kg**
UC-53	UC-53-2_2.0-2.5_03182011	03/18/2011	2 - 2.5	ft	Lab	N		**26900 mg/kg**	**49600 mg/kg**
UC-53	UC-53-3_3.0-3.5_03182011	03/18/2011	3 - 3.5	ft	Lab	N		**18900 mg/kg**	**82800 mg/kg**
UC-53	UC-53-4_4.5-5.0_03182011	03/18/2011	4.5 - 5	ft	Lab	N		**3540 mg/kg**	**83400 mg/kg**
UC-54	UC-54-1_0.0-0.5_03182011	03/18/2011	0 - 0.5	ft	Lab	N		**3160 mg/kg**	**23400 mg/kg**
UC-54	UC-54-2_0.5-1.0_03182011	03/18/2011	0.5 - 1	ft	Lab	N		< 1000 mg/kg	**10400 mg/kg**
UC-54	UC-54-3_1.0-1.5_03182011	03/18/2011	1 - 1.5	ft	Lab	N		< 1000 mg/kg	**2250 mg/kg**
UC-55	UC-55-1_0.0-0.5_03182011	03/18/2011	0 - 0.5	ft	Lab	N		**60600 mg/kg**	**112000 mg/kg**
UC-55	UC-55-2_2.0-2.5_03182011	03/18/2011	2 - 2.5	ft	Lab	N		< 1000 mg/kg	**9920 mg/kg**
UC-55	UC-55-2_2.0-2.5_03182011_FD	03/18/2011	2 - 2.5	ft	Lab	FD		< 1000 mg/kg	**8850 mg/kg**
UC-55	UC-55-3_3.0-3.5_03182011	03/18/2011	3 - 3.5	ft	Lab	N		**6510 mg/kg**	**2320 mg/kg**
UC-55	UC-55-4_4.0-4.5_03182011	03/18/2011	4 - 4.5	ft	Lab	N		< 1000 mg/kg	**38700 mg/kg**
UC-56	UC-56-1_0.0-0.5_03192011	03/19/2011	0 - 0.5	ft	Lab	N		**9080 mg/kg**	**115000 mg/kg**
UC-56	UC-56-2_1.0-1.5_03192011	03/19/2011	1 - 1.5	ft	Lab	N		**19700 mg/kg**	**33700 mg/kg**
UC-56	UC-56-3_3.0-3.5_03192011	03/19/2011	3 - 3.5	ft	Lab	N		**1700 mg/kg**	**33200 mg/kg**
UC-56	UC-56-4_3.9-4.4_03192011	03/19/2011	3.9 - 4.4	ft	Lab	N		**1700 mg/kg**	**33500 mg/kg**
UC-57	UC-57-1_0.0-0.5_03192011	03/19/2011	0 - 0.5	ft	Lab	N		**19300 mg/kg**	**52500 mg/kg**
UC-57	UC-57-2_0.5-1.0_03192011	03/19/2011	0.5 - 1	ft	Lab	N		**30300 mg/kg**	**54200 mg/kg**
UC-57	UC-57-3_1.5-2.0_03192011	03/19/2011	1.5 - 2	ft	Lab	N		**11200 mg/kg**	**36200 mg/kg**
UC-57	UC-57-4_2.0-2.5_03192011	03/19/2011	2 - 2.5	ft	Lab	N		**1980 mg/kg**	**14600 mg/kg**
WM-58	WM-58-1_0.0-0.5_03192011	03/19/2011	0 - 0.5	ft	Lab	N		**6160 mg/kg**	**25200 mg/kg**
WM-58	WM-58-2_0.5-1.0_03192011	03/19/2011	0.5 - 1	ft	Lab	N		**9110 mg/kg**	**54200 mg/kg**
WM-58	WM-58-3_1.0-1.5_03192011	03/19/2011	1 - 1.5	ft	Lab	N		**9780 mg/kg**	**70800 mg/kg**
WM-58	WM-58-4_2.0-2.5_03192011	03/19/2011	2 - 2.5	ft	Lab	N		**6870 mg/kg**	**202000 mg/kg**
WM-59	WM-59-1_0.0-0.5_03212011	03/21/2011	0 - 0.5	ft	Lab	N		**3710 mg/kg**	**19900 mg/kg**
WM-59	WM-59-2_0.5-1.0_03212011	03/21/2011	0.5 - 1	ft	Lab	N		**10400 mg/kg**	**91200 mg/kg**
WM-59	WM-59-3_1.0-1.5_03212011	03/21/2011	1 - 1.5	ft	Lab	N		**7660 mg/kg**	**164000 mg/kg**
WM-59	WM-59-4_1.5-2.0_03212011	03/21/2011	1.5 - 2	ft	Lab	N		**4500 mg/kg**	**143000 mg/kg**
WM-60	WM-60-1_0.0-0.5_03212011	03/21/2011	0 - 0.5	ft	Lab	N		**2930 mg/kg**	**6990 mg/kg**
WM-60	WM-60-2_0.5-1.0_03212011	03/21/2011	0.5 - 1	ft	Lab	N		**2680 mg/kg**	**40100 mg/kg**
WM-60	WM-60-3_1.0-1.4_03212011	03/21/2011	1 - 1.4	ft	Lab	N		**2030 mg/kg**	**22000 mg/kg**
WM-61	WM-61-1_0.0-0.5_03212011	03/21/2011	0 - 0.5	ft	Lab	N		**2400 mg/kg**	**9550 mg/kg**

Table 11
Total Organic Carbon and Black Carbon Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

							Chemical Name Total or Dissolved	Carbon, black NA	Carbon, total organic NA
Sys Loc Code	Sys Sample Code	Sample Date	Depth Interval	Depth Unit	Analysis Location	Sample Type Code			
WM-61	WM-61-1_0.0-0.5_03212011_FD	03/21/2011	0 - 0.5	ft	Lab	FD		**1560 mg/kg**	**14300 mg/kg**
WM-61	WM-61-2_1.0-1.5_03212011	03/21/2011	1 - 1.5	ft	Lab	N		< 1000 mg/kg	**9370 mg/kg**
WM-61	WM-61-3_1.5-2.0_03212011	03/21/2011	1.5 - 2	ft	Lab	N		< 1000 mg/kg	**5120 mg/kg**
WM-61	WM-61-4_2.5-3.0_03212011	03/21/2011	2.5 - 3	ft	Lab	N		< 1000 mg/kg	**4970 mg/kg**
WM-62	WM-62-1_0.0-0.5_03212011	03/21/2011	0 - 0.5	ft	Lab	N		**1320 mg/kg**	**7590 mg/kg**
WM-62	WM-62-2_0.5-1.0_03212011	03/21/2011	0.5 - 1	ft	Lab	N		**2300 mg/kg**	**4400 mg/kg**
WM-62	WM-62-3_1.0-1.5_03212011	03/21/2011	1 - 1.5	ft	Lab	N		**1580 mg/kg**	**4480 mg/kg**
WM-62	WM-62-4_1.5-2.0_03212011	03/21/2011	1.5 - 2	ft	Lab	N		**1160 mg/kg**	**3350 mg/kg**
WM-63	WM-63-1_0.0-0.5_03212011	03/21/2011	0 - 0.5	ft	Lab	N		**3540 mg/kg**	**22300 mg/kg**
WM-63	WM-63-2_0.5-1.0_03212011	03/21/2011	0.5 - 1	ft	Lab	N		**9630 mg/kg**	**51900 mg/kg**
WM-63	WM-63-3_1.0-1.5_03212011	03/21/2011	1 - 1.5	ft	Lab	N		**13100 mg/kg**	**74900 mg/kg**
WM-63	WM-63-4_1.8-2.2_03212011	03/21/2011	1.8 - 2.2	ft	Lab	N		**1160 mg/kg**	**14300 mg/kg**
WM-64	WM-64-1_0.0-0.5_03102011	03/10/2011	0 - 0.5	ft	Lab	N		**2270 mg/kg**	**18000 mg/kg**
WM-64	WM-64-2_1.0-1.5_03102011	03/10/2011	1 - 1.5	ft	Lab	N		**7440 mg/kg**	**44100 h mg/kg**
WM-64	WM-64-3_2.0-2.5_03102011	03/10/2011	2 - 2.5	ft	Lab	N		**23100 mg/kg**	**97500 mg/kg**
WM-64	WM-64-4_3.0-3.5_03102011	03/10/2011	3 - 3.5	ft	Lab	N		**1570 mg/kg**	**56600 h mg/kg**
WM-65	WM-65-1_0.0-0.5_03212011	03/21/2011	0 - 0.5	ft	Lab	N		**6160 mg/kg**	**31800 mg/kg**
WM-65	WM-65-2_1.0-1.5_03212011	03/21/2011	1 - 1.5	ft	Lab	N		**9820 mg/kg**	**69400 mg/kg**
WM-65	WM-65-3_2.0-2.5_03212011	03/21/2011	2 - 2.5	ft	Lab	N		**22800 mg/kg**	**139000 mg/kg**
WM-65	WM-65-4_3.0-3.5_03212011	03/21/2011	3 - 3.5	ft	Lab	N		**1380 mg/kg**	**20500 mg/kg**
WM-66	WM-66-1_0.0-0.5_03222011	03/22/2011	0 - 0.5	ft	Lab	N		**4280 mg/kg**	**25700 mg/kg**
WM-66	WM-66-2_1.0-1.5_03222011	03/22/2011	1 - 1.5	ft	Lab	N		**9280 mg/kg**	**35200 mg/kg**
WM-66	WM-66-2_1.0-1.5_03222011_FD	03/22/2011	1 - 1.5	ft	Lab	FD		**8920 mg/kg**	**35100 mg/kg**
WM-66	WM-66-3_2.0-2.5_03222011	03/22/2011	2 - 2.5	ft	Lab	N		**17200 mg/kg**	**118000 mg/kg**
WM-66	WM-66-4_3.0-3.5_03222011	03/22/2011	3 - 3.5	ft	Lab	N		< 1000 mg/kg	**8560 mg/kg**
WM-67	WM-67-1_0.0-0.5_03222011	03/22/2011	0 - 0.5	ft	Lab	N		**3700 mg/kg**	**18500 mg/kg**
WM-67	WM-67-2_1.0-1.5_03222011	03/22/2011	1 - 1.5	ft	Lab	N		**7980 mg/kg**	**26300 mg/kg**
WM-67	WM-67-3_2.5-3.0_03222011	03/22/2011	2.5 - 3	ft	Lab	N		**11900 mg/kg**	**78500 mg/kg**
WM-67	WM-67-4_3.1-3.5_03222011	03/22/2011	3.1 - 3.5	ft	Lab	N		**3220 mg/kg**	**30000 mg/kg**
WM-68	WM-68-1_0.0-0.5_03232011	03/23/2011	0 - 0.5	ft	Lab	N		**1630 mg/kg**	**8480 mg/kg**
WM-68	WM-68-2_0.5-1.0_03232011	03/23/2011	0.5 - 1	ft	Lab	N		**6540 mg/kg**	**17900 mg/kg**
WM-68	WM-68-3_1.0-1.4_03232011	03/23/2011	1 - 1.4	ft	Lab	N		**6640 mg/kg**	**19400 mg/kg**
WM-69	WM-69-1_0.0-0.5_03232011	03/23/2011	0 - 0.5	ft	Lab	N		**2750 mg/kg**	**11300 mg/kg**
WM-69	WM-69-2_0.5-1.0_03232011	03/23/2011	0.5 - 1	ft	Lab	N		**3310 mg/kg**	**11500 mg/kg**
WM-69	WM-69-3_1.0-1.5_03232011	03/23/2011	1 - 1.5	ft	Lab	N		**3380 mg/kg**	**22500 mg/kg**
WM-69	WM-69-4_1.5-2.0_03232011	03/23/2011	1.5 - 2	ft	Lab	N		**6040 mg/kg**	**121000 mg/kg**
WM-70	WM-70-1_0.0-0.5_03232011	03/23/2011	0 - 0.5	ft	Lab	N		**4020 mg/kg**	**23100 mg/kg**
WM-70	WM-70-2_2.0-2.5_03232011	03/23/2011	2 - 2.5	ft	Lab	N		**9840 mg/kg**	**70700 mg/kg**
WM-70	WM-70-2_2.0-2.5_03232011_FD	03/23/2011	2 - 2.5	ft	Lab	FD		**11200 mg/kg**	**72100 mg/kg**

Table 11
Total Organic Carbon and Black Carbon Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

							Chemical Name Total or Dissolved	Carbon, black NA	Carbon, total organic NA
Sys Loc Code	Sys Sample Code	Sample Date	Depth Interval	Depth Unit	Analysis Location	Sample Type Code			
WM-70	WM-70-3_2.5-3.0_03232011	03/23/2011	2.5 - 3	ft	Lab	N		**15100 mg/kg**	**100000 mg/kg**
WM-70	WM-70-4_3.0-3.5_03232011	03/23/2011	3 - 3.5	ft	Lab	N		**1280 mg/kg**	**16600 mg/kg**
WM-71	WM-71-1_0.0-0.5_03232011	03/23/2011	0 - 0.5	ft	Lab	N		< 1000 mg/kg	**2280 mg/kg**
WM-71	WM-71-2_1.0-1.5_03232011	03/23/2011	1 - 1.5	ft	Lab	N		< 1000 mg/kg	**2880 mg/kg**
WM-71	WM-71-3_2.0-2.5_03232011	03/23/2011	2 - 2.5	ft	Lab	N		**1640 mg/kg**	**2040 mg/kg**
WM-71	WM-71-4_3.0-3.5_03232011	03/23/2011	3 - 3.5	ft	Lab	N		< 1000 mg/kg	< 1000 mg/kg
WM-72	WM-72-1_0.0-0.5_03232011	03/23/2011	0 - 0.5	ft	Lab	N		< 1000 mg/kg	**1110 mg/kg**
WM-72	WM-72-2_1.0-1.5_03232011	03/23/2011	1 - 1.5	ft	Lab	N		**3320 mg/kg**	**18900 mg/kg**
WM-72	WM-72-3_2.0-2.5_03232011	03/23/2011	2 - 2.5	ft	Lab	N		< 1000 mg/kg	**5100 mg/kg**
WM-72	WM-72-4_3.0-3.5_03232011	03/23/2011	3 - 3.5	ft	Lab	N		< 1000 mg/kg	**2660 mg/kg**
WM-73	WM-73-1_0.0-0.5_03242011	03/24/2011	0 - 0.5	ft	Lab	N		**14200 mg/kg**	**56900 mg/kg**
WM-73	WM-73-2_0.5-1.0_03242011	03/24/2011	0.5 - 1	ft	Lab	N		**12100 mg/kg**	**37300 mg/kg**
WM-73	WM-73-3_1.0-1.5_03242011	03/24/2011	1 - 1.5	ft	Lab	N		**9380 mg/kg**	**44700 mg/kg**
WM-73	WM-73-4_1.5-2.0_03242011	03/24/2011	1.5 - 2	ft	Lab	N		**5320 mg/kg**	**24700 mg/kg**
WM-74	WM-74-1_0.0-0.5_03242011	03/24/2011	0 - 0.5	ft	Lab	N		**4860 mg/kg**	**21200 mg/kg**
WM-74	WM-74-2_2.5-3.0_03242011	03/24/2011	2.5 - 3	ft	Lab	N		**10200 mg/kg**	**56300 mg/kg**
WM-74	WM-74-3_3.0-3.5_03242011	03/24/2011	3 - 3.5	ft	Lab	N		**22200 mg/kg**	**98300 mg/kg**
WM-74	WM-74-4_4.0-4.5_03242011	03/24/2011	4 - 4.5	ft	Lab	N		< 1000 mg/kg	**7550 mg/kg**
UC-75	UC-75-1_0.0-0.5_06082011	06/08/2011	0 - 0.5	ft	Lab	N		**93000 * mg/kg**	**170000 mg/kg**
UC-75	UC-75-2_0.5-1.0_06082011	06/08/2011	0.5 - 1	ft	Lab	N		**130000 mg/kg**	**150000 mg/kg**
UC-75	UC-75-3_1.0-1.5_06082011	06/08/2011	1 - 1.5	ft	Lab	N		**110000 mg/kg**	**120000 mg/kg**
UC-75	UC-75-4_1.5-2.0_06082011	06/08/2011	1.5 - 2	ft	Lab	N		**76000 mg/kg**	**89000 mg/kg**
UC-76	UC-76-1_0.0-0.5_06082011	06/08/2011	0 - 0.5	ft	Lab	N		**110000 mg/kg**	**120000 mg/kg**
UC-76	UC-76-2_0.5-1.0_06082011	06/08/2011	0.5 - 1	ft	Lab	N		**200000 mg/kg**	**200000 mg/kg**
UC-76	UC-76-3_1.0-1.5_06082011	06/08/2011	1 - 1.5	ft	Lab	N		**110000 mg/kg**	**94000 * mg/kg**
UC-77	UC-77-1_0.0-0.5_06092011	06/09/2011	0 - 0.5	ft	Lab	N		**44000 mg/kg**	**85000 mg/kg**
UC-77	UC-77-2_0.5-1.0_06092011	06/09/2011	0.5 - 1	ft	Lab	N		**38000 * mg/kg**	**51000 * mg/kg**
UC-77	UC-77-3_1.0-1.5_06092011	06/09/2011	1 - 1.5	ft	Lab	N		**35000 mg/kg**	**29000 mg/kg**
UC-78	UC-78-1_0.0-0.5_06092011	06/09/2011	0 - 0.5	ft	Lab	N		**68000 mg/kg**	**90000 * mg/kg**
UC-78	UC-78-2_0.5-1.0_06092011	06/09/2011	0.5 - 1	ft	Lab	N		**87000 mg/kg**	**83000 mg/kg**
UC-78	UC-78-3_1.0-1.7_06092011	06/09/2011	1 - 1.7	ft	Lab	N		**38000 mg/kg**	**84000 mg/kg**
UC-79	UC-79-1_0.0-0.5_06092011	06/09/2011	0 - 0.5	ft	Lab	N		**77000 mg/kg**	**120000 mg/kg**
UC-79	UC-79-2_0.5-1.0_06092011	06/09/2011	0.5 - 1	ft	Lab	N		**93000 * mg/kg**	**67000 mg/kg**
UC-80	UC-80-1_0.0-0.5_06102011	06/10/2011	0 - 0.5	ft	Lab	N		**48000 mg/kg**	**86000 mg/kg**
UC-80	UC-80-1_0.0-0.5_06102011_FD	06/10/2011	0 - 0.5	ft	Lab	FD		**42000 mg/kg**	**68000 * mg/kg**
UC-80	UC-80-2_0.5-1.3_06102011	06/10/2011	0.5 - 1.3	ft	Lab	N		**78000 mg/kg**	**120000 mg/kg**
UC-81	UC-81-1_0.0-0.5_06102011	06/10/2011	0 - 0.5	ft	Lab	N		**83000 * mg/kg**	**53000 * mg/kg**
UC-81	UC-81-2_0.5-1.0_06102011	06/10/2011	0.5 - 1	ft	Lab	N		**97000 * mg/kg**	**94000 *h mg/kg**
UC-81	UC-81-3_1.0-1.5_06102011	06/10/2011	1 - 1.5	ft	Lab	N		**120000 * mg/kg**	**210000 *h mg/kg**

Table 11
Total Organic Carbon and Black Carbon Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

							Chemical Name Total or Dissolved	Carbon, black NA	Carbon, total organic NA
Sys Loc Code	Sys Sample Code	Sample Date	Depth Interval	Depth Unit	Analysis Location	Sample Type Code			
UC-82	UC-82-1_0.0-0.5_06102011	06/10/2011	0 - 0.5	ft	Lab	N		**110000 * mg/kg**	**69000 *h mg/kg**
UC-82	UC-82-2_1.0-1.5_06102011	06/10/2011	1 - 1.5	ft	Lab	N		**96000 * mg/kg**	**97000 mg/kg**
UC-82	UC-82-3_2.0-2.5_06102011	06/10/2011	2 - 2.5	ft	Lab	N		**180000 * mg/kg**	**340000 *h mg/kg**
UC-82	UC-82-4_2.9-3.4_06102011	06/10/2011	2.9 - 3.4	ft	Lab	N		**120000 * mg/kg**	**110000 mg/kg**
UC-83	UC-83-2_0.5-1.0_06132011	06/13/2011	0.5 - 1	ft	Lab	N		**66000 * mg/kg**	**140000 mg/kg**
UC-83	UC-83-3_1.0-1.5_06132011	06/13/2011	1 - 1.5	ft	Lab	N		**91000 * mg/kg**	**300000 mg/kg**
UC-83	UC-83-4_2.0-2.5_06132011	06/13/2011	2 - 2.5	ft	Lab	N		**61000 * mg/kg**	**100000 mg/kg**
UC-83	UC-83-1_0.0-0.5_06132011	06/13/2011	0 - 0.5	ft	Lab	N		**41000 * mg/kg**	**240000 mg/kg**
WM-84	WM-84-1_0.0-0.5_06132011	06/13/2011	0 - 0.5	ft	Lab	N		< 1000 mg/kg	**5500 mg/kg**
WM-84	WM-84-2_0.5-1.0_06132011	06/13/2011	0.5 - 1	ft	Lab	N		**3800 mg/kg**	**17000 mg/kg**
WM-84	WM-84-3_1.0-1.5_06132011	06/13/2011	1 - 1.5	ft	Lab	N		**4600 mg/kg**	**24000 mg/kg**
WM-84	WM-84-2_0.5-1.0_06132011_FD	06/13/2011	0.5 - 1	ft	Lab	FD		**4400 * mg/kg**	**15000 mg/kg**
WM-85	WM-85-1_0.0-0.5_06132011	06/13/2011	0 - 0.5	ft	Lab	N		**22000 * mg/kg**	**230000 mg/kg**
WM-85	WM-85-2_1.0-1.5_06132011	06/13/2011	1 - 1.5	ft	Lab	N		**9600 mg/kg**	**220000 mg/kg**
WM-85	WM-85-3_2.0-2.5_06132011	06/13/2011	2 - 2.5	ft	Lab	N		**2100 mg/kg**	**46000 mg/kg**
WM-85	WM-85-4_2.9-3.4_06132011	06/13/2011	2.9 - 3.4	ft	Lab	N		**2000 mg/kg**	**49000 mg/kg**
WM-86	WM-86-1_0.0-0.5_06152011	06/15/2011	0 - 0.5	ft	Lab	N		**10000 * mg/kg**	**170000 mg/kg**
WM-86	WM-86-2_0.5-1.0_06152011	06/15/2011	0.5 - 1	ft	Lab	N		**25000 mg/kg**	**310000 mg/kg**
WM-86	WM-86-3_1.0-1.5_06152011	06/15/2011	1 - 1.5	ft	Lab	N		**29000 mg/kg**	**310000 mg/kg**
WM-87	WM-87-1_0.0-0.5_06152011	06/15/2011	0 - 0.5	ft	Lab	N		**48000 mg/kg**	**300000 mg/kg**
WM-87	WM-87-2_0.5-1.0_06152011	06/15/2011	0.5 - 1	ft	Lab	N		**47000 mg/kg**	**320000 mg/kg**
WM-88	WM-88-1_0.0-0.5_11152011	11/15/2011	0 - 0.5	ft	Lab	N		**5800 mg/kg**	**50000 mg/kg**
WM-88	WM-88-2_2.0-2.5_11152011	11/15/2011	2 - 2.5	ft	Lab	N		**11000 mg/kg**	**65000 mg/kg**
WM-88	WM-88-3_3.25-3.75_11152011	11/15/2011	3.25 - 3.75	ft	Lab	N		**44000 mg/kg**	**71000 mg/kg**
WM-88	WM-88-4_4.0-4.5_11152011	11/15/2011	4 - 4.5	ft	Lab	N		**4100 mg/kg**	**34000 mg/kg**
WM-89	WM-89-1_0.0-0.5_11152011	11/15/2011	0 - 0.5	ft	Lab	N		**6200 mg/kg**	**47000 mg/kg**
WM-89	WM-89-2_2.0-2.5_11152011	11/15/2011	2 - 2.5	ft	Lab	N		**10000 mg/kg**	**77000 mg/kg**
WM-89	WM-89-3_3.5-4.0_11152011	11/15/2011	3.5 - 4	ft	Lab	N		**13000 mg/kg**	**56000 mg/kg**
WM-89	WM-89-4_5.0-5.5_11152011	11/15/2011	5 - 5.5	ft	Lab	N		**2700 mg/kg**	**89000 e mg/kg**
UC-90	UC-90-1_0.0-0.5_11162011	11/16/2011	0 - 0.5	ft	Lab	N		**12000 mg/kg**	**47000 mg/kg**
UC-90	UC-90-2_0.5-1.0_11162011	11/16/2011	0.5 - 1	ft	Lab	N		**9300 mg/kg**	**48000 mg/kg**
UC-90	UC-90-3_2.0-2.5_11162011	11/16/2011	2 - 2.5	ft	Lab	N		**3500 mg/kg**	**21000 mg/kg**
UC-90	UC-90-4_3.0-3.5_11162011	11/16/2011	3 - 3.5	ft	Lab	N		**2500 mg/kg**	**28000 mg/kg**
UC-91	UC-91-1_0.0-0.5_11162011	11/16/2011	0 - 0.5	ft	Lab	N		**5500 mg/kg**	**42000 mg/kg**
UC-91	UC-91-2_2.5-3.0_11162011	11/16/2011	2.5 - 3	ft	Lab	N		**12000 mg/kg**	**45000 mg/kg**
UC-91	UC-91-3_4.0-4.5_11162011	11/16/2011	4 - 4.5	ft	Lab	N		**10000 mg/kg**	**62000 mg/kg**
UC-91	UC-91-4_5.0-5.5_11162011	11/16/2011	5 - 5.5	ft	Lab	N		**1900 mg/kg**	**36000 mg/kg**
UC-96	UC-96-1_0.0-0.5_11012011	11/01/2011	0 - 0.5	ft	Lab	N		**140000 e mg/kg**	**200000 e mg/kg**
UC-96	UC-96-2_5.0-7.5_11022011	11/02/2011	5 - 7.5	ft	Lab	N		**69000 mg/kg**	**99000 e mg/kg**

Table 11
Total Organic Carbon and Black Carbon Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

							Chemical Name **Total or Dissolved**	**Carbon, black** **NA**	**Carbon, total organic** **NA**
Sys Loc Code	Sys Sample Code	Sample Date	Depth Interval	Depth Unit	Analysis Location	Sample Type Code			
UC-96	UC-96-3_7.5-10.0_11022011	11/02/2011	7.5 - 10	ft	Lab	N		**29000 mg/kg**	**60000 mg/kg**
UC-96	UC-96-4_10.0-12.5_11022011	11/02/2011	10 - 12.5	ft	Lab	N		**15000 mg/kg**	**40000 mg/kg**
UC-97	UC-97-1_0.0-2.5_11022011	11/02/2011	0 - 2.5	ft	Lab	N		**51000 * mg/kg**	**110000 e* mg/kg**
UC-97	UC-97-2_5.0-7.5_11022011	11/02/2011	5 - 7.5	ft	Lab	N		**40000 mg/kg**	**68000 mg/kg**
UC-97	UC-97-3_7.5-10.0_11022011	11/02/2011	7.5 - 10	ft	Lab	N		**33000 mg/kg**	**74000 e mg/kg**
UC-97	UC-97-4_15.0-17.5_11022011	11/02/2011	15 - 17.5	ft	Lab	N		< 1000 mg/kg	**1500 * mg/kg**
WM-101	WM-101-1_0.0-1.0_11162011	11/16/2011	0 - 1	ft	Lab	N		**7900 mg/kg**	**55000 mg/kg**
WM-101	WM-101-2_5.0-7.5_11162011	11/16/2011	5 - 7.5	ft	Lab	N		**9100 mg/kg**	**16000 mg/kg**
WM-101	WM-101-3_15.0-17.5_11162011	11/16/2011	15 - 17.5	ft	Lab	N		**8400 mg/kg**	**16000 mg/kg**
WM-101	WM-101-4_20.0-22.5_11162011	11/16/2011	20 - 22.5	ft	Lab	N		**9900 mg/kg**	**19000 mg/kg**
WM-102	WM-102-1_0.0-2.5_11162011	11/16/2011	0 - 2.5	ft	Lab	N		**4300 mg/kg**	**18000 mg/kg**
WM-102	WM-102-2_2.5-5.0_11162011	11/16/2011	2.5 - 5	ft	Lab	N		< 1000 mg/kg	**2700 mg/kg**
WM-102	WM-102-3_15.0-17.5_11162011	11/16/2011	15 - 17.5	ft	Lab	N		**3700 mg/kg**	**7500 mg/kg**
WM-102	WM-102-4_27.5-30.0_11162011	11/16/2011	27.5 - 30	ft	Lab	N		**1700 mg/kg**	**2300 mg/kg**

Table 11
Total Organic Carbon and Black Carbon Data Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

Data Qualifiers/Footnotes	
Qualifier	**Definition**
--	Not analyzed/not available.
a	Estimated value, calculated using some or all values that are estimates.
b	Potential false positive value based on blank data validation procedures.
c	Coeluting compound.
e	Estimated value, exceeded the instrument calibration range.
h	EPA recommended sample preservation, extraction or analysis holding time was exceeded.
I	Indeterminate value based on failure of blind duplicate data to meet quality assurance criteria.
j	Reported value is less than the stated laboratory quantitation limit and is considered an estimated value.
p	Relative percent difference is >40% (25% CLP pesticides) between primary and confirmation GC columns.
pp	Small peak in chromatogram below method detection limit.
r	The presence of the compound is suspect based on the ID criteria of the retention time and relative retention time obtained from the examination of the chromatograms.
s	Potential false positive value based on statistical analysis of blank sample data.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
N	Sample Type: Normal
FD	Sample Type: Field Duplicate
AT	Sample chromatogram is noted to be atypical of a petroleum product.
DLND	Not detected, detection limit not determined.
DF	Did not flash
EMPC	Estimated maximum possible concentration.
NA – (Not applicable)	NA indicates that a fractional portion of the sample is not part of the analytical testing or field collection procedures.
ND	Not detected.
TIC	Tentatively identified compound

Table 12
Bioavailability AVS/SEM Metals
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

						Chemical Name Total or Dissolved	Carbon, total organic NA	Sulfide, acid-volatile NA	Sulfide, acid-volatile NA	AVS-Cadmium NA	AVS-Copper NA	AVS-Lead NA	AVS-Mercury NA	AVS-Nickel NA	AVS-Zinc NA
Sys Loc Code	Sample Date	Depth Interval	Depth Unit	Analysis Location	Sample Type Code										
WM-3	02/20/2011	0 - 1	ft	Lab	N		**48000 mg/kg**	**40.5 mg/kg**	**1.26 umol/g**	< 2.2 mg/kg	**1.5 j mg/kg**	< 4.6 mg/kg	< 0.23 mg/kg	**1.2 j mg/kg**	**8.9 jb mg/kg**
WM-3	02/20/2011	2 - 4	ft	Lab	N		**23800 mg/kg**	**48.1 mg/kg**	**1.5 umol/g**	< 1.7 mg/kg	**4.6 j mg/kg**	**1.4 j mg/kg**	< 0.17 mg/kg	**2.6 j mg/kg**	**13.6 mg/kg**
WM-3	02/20/2011	4.2 - 4.75	ft	Lab	N		**18200 mg/kg**	**29.9 mg/kg**	**0.931 umol/g**	< 1.6 mg/kg	**2.9 j mg/kg**	< 3.2 mg/kg	< 0.16 mg/kg	**2.3 j mg/kg**	**11.3 b mg/kg**
WM-3	02/20/2011	4.75 - 5.25	ft	Lab	N		**4060 mg/kg**	**30.1 mg/kg**	**0.938 umol/g**	< 1.5 mg/kg	**2.4 j mg/kg**	< 3.2 mg/kg	< 0.16 mg/kg	**1.3 j mg/kg**	**7.4 b mg/kg**
WM-10	02/25/2011	0 - 1	ft	Lab	N		**38600 h mg/kg**	**134 mg/kg**	**4.17 umol/g**	**0.72 mg/kg**	**65.9 mg/kg**	**131 mg/kg**	< 0.18 mg/kg	**16.3 mg/kg**	**514 mg/kg**
WM-10	02/25/2011	1 - 2	ft	Lab	N		**79800 h mg/kg**	**149 mg/kg**	**4.64 umol/g**	**0.63 mg/kg**	**118 mg/kg**	**172 mg/kg**	< 0.19 mg/kg	**13.1 j mg/kg**	**532 mg/kg**
WM-10	02/25/2011	2 - 2.8	ft	Lab	N		**169000 h mg/kg**	**207 mg/kg**	**6.45 umol/g**	< 0.46 mg/kg	**6.0 j mg/kg**	**3.0 j mg/kg**	< 0.41 mg/kg	**3.9 j mg/kg**	**13.3 j mg/kg**
UC-11	02/26/2011	0 - 1	ft	Lab	N		**57800 h mg/kg**	**201 mg/kg**	**6.26 umol/g**	**1.1 mg/kg**	**12.0 j mg/kg**	**102 mg/kg**	< 0.30 mg/kg	**3.5 j mg/kg**	**225 mg/kg**
UC-11	02/26/2011	1 - 2	ft	Lab	N		**47400 h mg/kg**	**343 mg/kg**	**10.7 umol/g**	**1.1 mg/kg**	**14.9 mg/kg**	**148 mg/kg**	< 0.24 mg/kg	**3.3 j mg/kg**	**319 mg/kg**
UC-11	02/26/2011	2 - 3	ft	Lab	N		**68000 h mg/kg**	**487 mg/kg**	**15.2 umol/g**	**2.3 mg/kg**	**20.5 mg/kg**	**388 mg/kg**	< 0.22 mg/kg	**5.3 j mg/kg**	**629 mg/kg**
WM-18	03/01/2011	0 - 0.7	ft	Lab	N		**37800 h mg/kg**	**214 mg/kg**	**6.67 umol/g**	< 0.30 mg/kg	**6.3 j mg/kg**	**21.6 mg/kg**	< 0.27 mg/kg	**3.2 j mg/kg**	**91.5 mg/kg**
WM-18	03/01/2011	0.7 - 1.7	ft	Lab	N		**81200 mg/kg**	**81.2 mg/kg**	**2.53 umol/g**	**0.31 mg/kg**	**22.2 mg/kg**	**56.9 mg/kg**	< 0.22 mg/kg	**3.3 j mg/kg**	**164 mg/kg**
WM-18	03/01/2011	1.7 - 2.7	ft	Lab	N		**42000 h mg/kg**	**100 mg/kg**	**3.12 umol/g**	< 0.24 mg/kg	**1.4 j mg/kg**	< 4.3 mg/kg	< 0.21 mg/kg	**1.0 j mg/kg**	**8.0 j mg/kg**
WM-21	03/04/2011	0 - 0.5	ft	Lab	N		**26500 h mg/kg**	**196 mg/kg**	**6.11 umol/g**	< 0.27 mg/kg	< 11.9 mg/kg	**2.9 j mg/kg**	< 0.24 mg/kg	**2.0 j mg/kg**	**22.9 mg/kg**
WM-21	03/04/2011	2 - 2.5	ft	Lab	N		**35500 h mg/kg**	**347 mg/kg**	**10.8 umol/g**	< 0.23 mg/kg	**5.1 j mg/kg**	**11.1 mg/kg**	< 0.20 mg/kg	**2.6 j mg/kg**	**51.4 mg/kg**
WM-21	03/04/2011	4 - 4.5	ft	Lab	N		**157000 h mg/kg**	**310 mg/kg**	**9.66 umol/g**	**1.4 mg/kg**	**72.7 mg/kg**	**163 mg/kg**	< 0.29 mg/kg	**8.4 j mg/kg**	**298 mg/kg**
WM-21	03/04/2011	5 - 5.5	ft	Lab	N		**44500 h mg/kg**	**118 mg/kg**	**3.68 umol/g**	< 0.25 mg/kg	**3.1 j mg/kg**	< 4.5 mg/kg	< 0.22 mg/kg	**2.2 j mg/kg**	**12.2 mg/kg**
UC-23	03/02/2011	0 - 0.5	ft	Lab	N		**48800 mg/kg**	**468 mg/kg**	**14.6 umol/g**	**0.47 mg/kg**	**14.0 j mg/kg**	**42.4 mg/kg**	< 0.37 mg/kg	**6.3 j mg/kg**	**130 mg/kg**
UC-23	03/02/2011	1.5 - 2	ft	Lab	N		**53800 mg/kg**	**187 mg/kg**	**5.83 umol/g**	**0.65 mg/kg**	**8.7 j mg/kg**	**111 mg/kg**	< 0.27 mg/kg	**1.4 j mg/kg**	**241 mg/kg**
UC-23	03/02/2011	2.5 - 3	ft	Lab	N		**61900 mg/kg**	**335 mg/kg**	**10.4 umol/g**	**1.6 mg/kg**	**14.2 mg/kg**	**212 mg/kg**	< 0.28 mg/kg	**3.4 j mg/kg**	**391 mg/kg**
UC-23	03/02/2011	3.75 - 4.25	ft	Lab	N		**6800 mg/kg**	**55.2 mg/kg**	**1.72 umol/g**	< 0.15 mg/kg	**1.0 j mg/kg**	**1.3 j mg/kg**	< 0.14 mg/kg	**1.1 j mg/kg**	**40.0 mg/kg**
UC-29	03/03/2011	0 - 0.5	ft	Lab	N		**54200 h mg/kg**	**495 mg/kg**	**15.4 umol/g**	**0.66 mg/kg**	**14.2 j mg/kg**	**64.2 mg/kg**	< 0.30 mg/kg	**5.6 j mg/kg**	**183 mg/kg**
UC-29	03/03/2011	1 - 1.5	ft	Lab	N		**57600 h mg/kg**	**229 mg/kg**	**7.13 umol/g**	**0.94 mg/kg**	**11.4 j mg/kg**	**154 mg/kg**	< 0.26 mg/kg	**2.4 j mg/kg**	**315 mg/kg**
UC-29	03/03/2011	2 - 2.5	ft	Lab	N		**61800 h mg/kg**	**367 mg/kg**	**11.4 umol/g**	**2.3 mg/kg**	**17.6 mg/kg**	**204 mg/kg**	< 0.28 mg/kg	**4.7 j mg/kg**	**473 mg/kg**
UC-29	03/03/2011	2.5 - 3	ft	Lab	N		**20800 h mg/kg**	**92.9 mg/kg**	**2.89 umol/g**	< 0.17 mg/kg	**1.9 j mg/kg**	**1.8 j mg/kg**	< 0.15 mg/kg	**1.6 j mg/kg**	**7.6 mg/kg**
WM-30	03/08/2011	0 - 0.5	ft	Lab	N		**36500 mg/kg**	**72.4 mg/kg**	**2.26 umol/g**	**0.84 mg/kg**	**2.0 j mg/kg**	< 3.6 mg/kg	< 0.18 mg/kg	**1.8 j mg/kg**	**8.9 mg/kg**
WM-30	03/08/2011	1 - 1.5	ft	Lab	N		**4360 mg/kg**	**39.7 mg/kg**	**1.24 umol/g**	**0.27 mg/kg**	**1.8 j mg/kg**	< 3.1 mg/kg	< 0.16 mg/kg	**1.5 j mg/kg**	**5.4 j mg/kg**
WM-30	03/08/2011	2 - 2.5	ft	Lab	N		**16200 mg/kg**	**36.0 mg/kg**	**1.12 umol/g**	< 0.19 mg/kg	**2.2 j mg/kg**	< 3.4 mg/kg	< 0.17 mg/kg	**1.9 j mg/kg**	**8.4 mg/kg**
WM-30	03/08/2011	3.5 - 4	ft	Lab	N		**12000 mg/kg**	**45.7 mg/kg**	**1.42 umol/g**	< 0.18 mg/kg	**3.9 j mg/kg**	**1.2 j mg/kg**	< 0.16 mg/kg	**1.8 j mg/kg**	**7.7 mg/kg**
WM-32	03/13/2011	0 - 0.5	ft	Lab	N		**21800 mg/kg**	**70.5 mg/kg**	**2.2 umol/g**	< 0.18 mg/kg	**2.4 j mg/kg**	**2.1 j mg/kg**	< 0.16 mg/kg	**1.2 j mg/kg**	**10.7 mg/kg**
WM-32	03/13/2011	0.5 - 1	ft	Lab	N		**24400 mg/kg**	**103 mg/kg**	**3.21 umol/g**	< 0.19 mg/kg	**3.7 j mg/kg**	**3.0 j mg/kg**	< 0.17 mg/kg	**2.2 j mg/kg**	**13.9 mg/kg**
WM-32	03/13/2011	1 - 1.5	ft	Lab	N		**20300 mg/kg**	**94.9 mg/kg**	**2.96 umol/g**	< 0.25 mg/kg	**1.3 j mg/kg**	< 4.4 mg/kg	< 0.22 mg/kg	< 17.6 mg/kg	**6.2 j mg/kg**
WM-32	03/13/2011	3.5 - 4	ft	Lab	N		< 1000 mg/kg	**35.1 mg/kg**	**1.09 umol/g**	**0.81 mg/kg**	**1.8 j mg/kg**	< 2.8 mg/kg	< 0.14 mg/kg	**1.5 j mg/kg**	**7.3 mg/kg**

** assumes molecular weight of 32.1 (sulfur)
mg/kg = ug/g divided by g/mol

Data Qualifiers/Footnotes	
Qualifier	**Definition**
--	Not analyzed/not available.
a	Estimated value, calculated using some or all values that are estimates.
b	Potential false positive value based on blank data validation procedures.
c	Coeluting compound.
e	Estimated value, exceeded the instrument calibration range.
h	EPA recommended sample preservation, extraction or analysis holding time was exceeded.
I	Indeterminate value based on failure of blind duplicate data to meet quality assurance criteria.
j	Reported value is less than the stated laboratory quantitation limit and is considered an estimated value.
p	Relative percent difference is >40% (25% CLP pesticides) between primary and confirmation GC columns.
pp	Small peak in chromatogram below method detection limit.
r	The presence of the compound is suspect based on the ID criteria of the retention time and relative retention time obtained from the examination of the chromatograms.
s	Potential false positive value based on statistical analysis of blank sample data.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
N	Sample Type: Normal
FD	Sample Type: Field Duplicate
AT	Sample chromatogram is noted to be atypical of a petroleum product.
DLND	Not detected, detection limit not determined.
DF	Did not flash
EMPC	Estimated maximum possible concentration.
NA – (Not applicable)	NA indicates that a fractional portion of the sample is not part of the analytical testing or field collection procedures.
ND	Not detected.
TIC	Tentatively identified compound

Table 13
Sediment Toxicity Screening Calculation Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				MPCA Guidance				EPA Guidance			Carbon Ratio
				PEC-Q Total PAH13 @0.5DL	Mean PEC-Q Metals	PEC-Q PCBs @ 0DL	Mean PEC-Q Total	ESB Tufcv PAH34 @ 0.5DL	Estimated ESB Tufcv PAH34 @ 0.5DL	ESB Metals (umol/g oc)	Black Carbon/TOC (%)
Sys Sample Code	Sample Date	Analysis Location	Sample Type Code								
WM-1-1_0.0-0.7_02172011	2/17/2011	LB	N	0.00347	0.11	--	0.06	0.016	--	--	114
WM-1-2_0.7-1.9_02172011	2/17/2011	LB	N	0.00408	0.12	--	0.06	0.022	--	--	97.6
WM-1-3_1.9-2.1_02172011	2/17/2011	LB	N	12.8	0.89	--	6.85	12.7	--	--	96.3
WM-1-4_2.5-3.0_02172011	2/17/2011	LB	N	0.0137	0.15	--	0.08	0.027	--	--	99.3
WM-2-1_0.0-0.5_02192011	2/19/2011	LB	N	0.00409	0.1	--	0.05	0.0182	--	--	105
WM-2-2_1.2-1.4_02192011	2/19/2011	LB	N	3.47	0.67	--	2.07	--	5.04	--	112
WM-2-3_1.4-1.9_02192011	2/19/2011	LB	N	0.0288	0.11	--	0.07	--	0.454	--	102
WM-3-1_0.0-1.0_02202011	2/20/2011	LB	N	0.0027	0.11	0	0.06	0.0052	--	-22.1	101
WM-3-2_2.0-4.0_02202011	2/20/2011	LB	N	0.00188	0.13	0	0.07	0.0081	--	-48.7	102
WM-3-3_4.2-4.75_02202011	2/20/2011	LB	N	0.00498	0.13	0	0.07	0.034	--	-36.2	102
WM-3-4_4.75-5.25_02202011	2/20/2011	LB	N	0.00144	0.16	0	0.05	0.030	--	-185	109
WM-4-1_0.0-0.5_02212011	2/21/2011	LB	N	0.176	0.43	--	0.30	0.133	--	--	102
WM-4-2_0.5-1.0_02212011	2/21/2011	LB	N	0.511	0.17	--	0.34	0.296	--	--	102
WM-5-1_0.0-0.5_02222011	2/22/2011	LB	N	0.0113	0.14	--	0.08	0.033	--	--	25.9
WM-5-2_1.0-1.5_02222011	2/22/2011	LB	N	0.0138	0.37	--	0.19	--	0.281	--	23.6
WM-6-1_0.0-1.0_02222011	2/22/2011	LB	N	0.188	0.45	--	0.32	0.141	--	--	14.3
WM-6-1_0.0-1.0_02222011_FD	2/22/2011	LB	FD	0.133	0.36	--	0.25	0.120	--	--	18.1
WM-6-2_1.4-1.8_02222011	2/22/2011	LB	N	0.0774	0.19	--	0.13	0.051	--	--	9.75
WM-7-1_0.0-0.5_02222011	2/22/2011	LB	N	0.0181	0.13	--	0.07	0.034	--	--	8.71
WM-7-2_1.1-1.6_02222011	2/22/2011	LB	N	0.132	0.06	--	0.10	--	0.33	--	2.46
WM-8-1_0.0-0.5_02242011	2/24/2011	LB	N	0.0572	0.12	--	0.09	0.085	--	--	11.8
WM-8-2_0.75-1.25_02242011	2/24/2011	LB	N	0.62	0.38	--	0.50	0.662	--	--	23.8
WM-8-3_1.25-1.75_02242011	2/24/2011	LB	N	0.00417	0.12	--	0.06	0.006	--	--	5.39
WM-9-1_0.0-0.5_03072011	3/7/2011	LB	N	0.273	0.13	--	0.20	0.130	--	--	17.4
WM-9-2_0.5-1.0_03072011	3/7/2011	LB	N	0.719	0.34	--	0.53	--	0.67	--	17.4
WM-9-3_1.5-2.0_03072011	3/7/2011	LB	N	0.239	0.36	--	0.30	--	0.41	--	21.5
WM-9-4_2.0-2.5_03072011	3/7/2011	LB	N	0.0567	0.2	--	0.13	--	0.29	--	14.1
WM-10-1_0.0-1.0_02252011	2/25/2011	LB	N	0.355	1.8	0	0.72	1.09	--	146	16.3
WM-10-2_1.0-2.0_02252011	2/25/2011	LB	N	11.4	1.52	0	4.31	8.22	--	80.3	15.9
WM-10-3_2.0-2.8_02252011	2/25/2011	LB	N	0.0988	0.09	0	0.06	0.050	--	-50.5	2.97
UC-11-1_0.0-1.0_02262011	2/26/2011	LB	N	5.3	0.27	0.059	1.88	9.81	--	-35.8	47.1
UC-11-2_1.0-2.0_02262011	2/26/2011	LB	N	1.45	0.41	0	0.62	1.74	--	-101	57
UC-11-3_2.0-3.0_02262011	2/26/2011	LB	N	0.833	0.41	0.06	0.43	1.05	--	-47.8	40.7
UC-11-4_3.0-3.5_02262011	2/26/2011	LB	N	0.187	0.08	--	0.13	0.110	--	--	5.72
UC-12-1_0.0-0.5_02272011	2/27/2011	LB	N	0.443	0.17	--	0.31	0.350	--	--	24.3
UC-12-2_1.5-2.0_02272011	2/27/2011	LB	N	1.4	0.66	--	1.03	--	2.14	--	45.7
UC-12-3_2.5-3.1_02272011	2/27/2011	LB	N	0.819	0.65	--	0.74	--	1.25	--	27.7
UC-12-4_3.1-3.6_02272011	2/27/2011	LB	N	0.0251	0.14	--	0.08	--	0.288	--	5.25
WM-13-1_0.0-0.5_03042011	3/4/2011	LB	N	0.00231	0.11	--	0.06	0.011	--	--	7.36
WM-13-2_1.5-2.0_03042011	3/4/2011	LB	N	0.00629	0.11	--	0.06	--	0.308	--	39.9
WM-13-3_3.25-3.75_03042011	3/4/2011	LB	N	0.00375	0.12	--	0.06	--	0.271	--	6.34
WM-13-4_3.75-4.25_03042011	3/4/2011	LB	N	0.00119	0.14	--	0.07	--	0.283	--	14.3
WM-14-1_0.0-0.5_02272011	2/27/2011	LB	N	0.00411	0.1	--	0.05	0.017	--	--	16.7
WM-14-2_0.5-1.0_02272011	2/27/2011	LB	N	0.0369	0.14	--	0.09	--	0.353	--	19.3
WM-14-3_1.0-1.5_02272011	2/27/2011	LB	N	14.3	0.79	--	7.55	--	11	--	15
WM-14-4_1.5-2.0_02272011	2/27/2011	LB	N	0.016	0.09	--	0.05	--	0.269	--	3.05
UC-15-1_0.0-1.0_02272011	2/27/2011	LB	N	0.0178	0.1	--	0.06	0.056	--	--	32.9
UC-15-2_1.0-2.0_02272011	2/27/2011	LB	N	0.0366	0.14	--	0.09	0.082	--	--	21.2
UC-15-3_2.0-3.0_02272011	2/27/2011	LB	N	0.159	0.36	--	0.26	0.344	--	--	21.6
UC-15-3_2.0-3.0_02272011_FD	2/27/2011	LB	FD	0.779	0.38	--	0.58	1.71	--	--	23.2
UC-15-4_3.0-4.0_02272011	2/27/2011	LB	N	0.175	0.17	--	0.17	0.297	--	--	6.37
UC-15-4_3.0-4.0_02272011_FD	2/27/2011	LB	FD	0.2828	0.16	--	0.22	--	0.976	--	--
UC-16-1_0.0-0.5_02282011	2/28/2011	LB	N	0.265	0.13	--	0.20	0.317	--	--	14.6
UC-16-2_2.0-2.5_02282011	2/28/2011	LB	N	0.722	0.6	--	0.66	--	1.23	--	40.5
UC-16-3_3.0-3.5_02282011	2/28/2011	LB	N	0.588	0.66	--	0.62	--	0.99	--	27
UC-16-4_4.0-4.5_02282011	2/28/2011	LB	N	0.0104	0.14	--	0.08	--	0.278	--	7.83
UC-17-1_0.0-0.5_03012011	3/1/2011	LB	N	0.225	0.16	--	0.19	0.298	--	--	16.6
UC-17-2_1.0-1.5_03012011	3/1/2011	LB	N	0.651	0.25	--	0.45	1.23	--	--	30.6
UC-17-3_2.0-2.5_03012011	3/1/2011	LB	N	0.55	0.64	--	0.60	1.06	--	--	32.5
UC-17-4_2.5-3.0_03012011	3/1/2011	LB	N	0.3	0.49	--	0.40	0.576	--	--	24.6
WM-18-1_0.0-0.7_03012011	3/1/2011	LB	N	0.0282	0.33	0	0.12	0.065	--	-132	18.8
WM-18-2_0.7-1.7_03012011	3/1/2011	LB	N	15.8	1.2	0	5.67	14.4	--	8.14	20.7
WM-18-3_1.7-2.7_03012011	3/1/2011	LB	N	0.233	0.1	0	0.11	0.360	--	-70.1	5.62
WM-19-1_0.0-0.5_03022011	3/2/2011	LB	N	0.0362	0.13	--	0.08	0.0427	--	--	8.83
WM-19-2_0.75-1.25_03022011	3/2/2011	LB	N	6.63	0.85	--	3.74	--	5.55	--	15.7
WM-19-3_1.25-1.75_03022011	3/2/2011	LB	N	0.00686	0.14	--	0.07	--	0.276	--	19.9
UC-20-1_0.0-0.5_03022011	3/2/2011	LB	N	0.518	0.16	--	0.34	0.876	--	--	16.7
UC-20-2_1.5-2.0_03022011	3/2/2011	LB	N	2.02	0.9	--	1.46	--	2.99	--	44.8
UC-20-3_2.5-3.0_03022011	3/2/2011	LB	N	0.217	0.6	--	0.41	--	0.525	--	27.9
UC-20-4_3.5-4.0_03022011	3/2/2011	LB	N	0.256	0.1	--	0.18	--	0.999	--	9.27
WM-21-1_0.0-0.5_03042011	3/4/2011	LB	N	0.00915	0.11	0	0.04	0.021	--	-212	22.5
WM-21-2_2.0-2.5_03042011	3/4/2011	LB	N	0.0357	0.18	0	0.07	0.070	--	-277	22.5
WM-21-3_4.0-4.5_03042011	3/4/2011	LB	N	49.9	0.5	0	16.8	20.5	--	-25.1	15.3
WM-21-4_5.0-5.5_03042011	3/4/2011	LB	N	0.0232	0.15	0	0.06	0.032	--	-76.2	6.11
WM-22-1_0.0-0.5_03062011	3/6/2011	LB	N	0.00293	0.08	--	0.04	0.014	--	--	36.4
WM-22-2_1.5-2.0_03062011	3/6/2011	LB	N	0.0116	0.14	--	0.08	0.034	--	--	19.4
WM-22-3_4.0-4.5_03062011	3/6/2011	LB	N	0.00229	0.06	--	0.03	0.171	--	--	30.9
WM-22-4_5.5-6.0_03062011	3/6/2011	LB	N	0.0108	0.09	--	0.05	0.066	--	--	14.3
UC-23-1_0.0-0.5_03022011	3/2/2011	LB	N	1.25	0.22	0	0.49	2.03	--	-247	29.1
UC-23-2_1.5-2.0_03022011	3/2/2011	LB	N	5.18	0.66	0	1.95	7.33	--	-26.7	44.8
UC-23-3_2.5-3.0_03022011	3/2/2011	LB	N	0.953	0.93	0	0.63	1.43	--	-50.7	42.2
UC-23-4_3.75-4.25_03022011	3/2/2011	LB	N	0.0128	0.11	0	0.04	0.119	--	-157	29.4
WM-24-1_0.0-0.5_03072011	3/7/2011	LB	N	0.208	0.18	--	0.19	0.397	--	--	17.6
WM-24-2_1.0-1.5_03072011	3/7/2011	LB	N	18	0.36	--	9.18	--	13.8	--	19.2
WM-24-2_1.0-1.5_03072011_FD	3/7/2011	LB	FD	13.7	0.38	--	7.04	--	10.7	--	18.2
WM-24-3_2.0-2.5_03072011	3/7/2011	LB	N	0.254	0.1	--	0.18	--	0.462	--	4.63
WM-24-4_3.0-3.5_03072011	3/7/2011	LB	N	0.133	0.08	--	0.11	--	0.348	--	40.6
WM-25-1_0.0-0.5_03072011	3/7/2011	LB	N	0.0175	0.09	--	0.05	0.039	--	--	17.5
WM-25-2_2.5-3.0_03072011	3/7/2011	LB	N	0.104	0.2	--	0.15	--	0.554	--	18.1
WM-25-3_5.5-6.0_03072011	3/7/2011	LB	N	18.5	0.64	--	9.57	--	10.4	--	18
WM-25-4_6.0-6.5_03072011	3/7/2011	LB	N	0.0139	0.17	--	0.09	--	0.286	--	6.06

Table 13
Sediment Toxicity Screening Calculation Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				MPCA Guidance				EPA Guidance			Carbon Ratio
				PEC-Q Total PAH13 @0.5DL	Mean PEC-Q Metals	PEC-Q PCBs @ 0DL	Mean PEC-Q Total	ESB Tufcv PAH34 @ 0.5DL	Estimated ESB Tufcv PAH34 @ 0.5DL	ESB Metals (umol/g oc)	Black Carbon/TOC (%)
Sys Sample Code	Sample Date	Analysis Location	Sample Type Code								
WM-26-1_0.0-0.5_03112011	3/11/2011	LB	N	0.00574	0.12	--	0.06	0.011	--	--	14.9
WM-26-2_0.5-1.0_03112011	3/11/2011	LB	N	0.0428	0.38	--	0.21	--	0.334	--	18.2
WM-26-3_1.3-1.8_03112011	3/11/2011	LB	N	7.11	0.58	--	3.85	--	5.73	--	13.1
WM-26-4_1.8-2.1_03112011	3/11/2011	LB	N	0.076	0.2	--	0.14	--	0.385	--	5.58
WM-27-1_0.0-0.5_03132011	3/13/2011	LB	N	0.0101	0.14	--	0.08	0.023	--	--	15.4
WM-27-2_0.5-1.0_03132011	3/13/2011	LB	N	0.0124	0.2	--	0.11	--	0.281	--	18.7
WM-27-3_1.4-1.9_03132011	3/13/2011	LB	N	1.16	0.54	--	0.85	--	1.58	--	14.9
WM-28-1_0.0-0.5_03132011	3/13/2011	LB	N	0.0117	0.14	--	0.08	0.024	--	--	9.63
WM-28-2_2.0-2.5_03132011	3/13/2011	LB	N	1.25	1.01	--	1.13	--	1.44	--	15.1
WM-28-2_2.0-2.5_03132011_FD	3/13/2011	LB	FD	0.989	1.02	--	1	--	1.18	--	15.5
WM-28-3_2.5-3.0_03132011	3/13/2011	LB	N	4.82	0.33	--	2.58	--	5.55	--	23.6
WM-28-4_3.0-3.5_03132011	3/13/2011	LB	N	0.0274	0.19	--	0.11	--	0.313	--	10.1
UC-29-1_0.0-0.5_03032011	3/3/2011	LB	N	1.05	0.23	0	0.43	1.17	--	-221	31.7
UC-29-2_1.0-1.5_03032011	3/3/2011	LB	N	5.97	0.54	0	2.17	5.48	--	-23.4	54
UC-29-2_1.0-1.5_03032011_FD	3/3/2011	LB	FD	4.9	0.67	0	1.86	2.85	--	--	58
UC-29-3_2.0-2.5_03032011	3/3/2011	LB	N	0.515	0.52	0	0.35	0.499	--	-45.9	26.7
UC-29-4_2.5-3.0_03032011	3/3/2011	LB	N	0.00435	0.1	0	0.03	0.016	--	-130	14.7
WM-30-1_0.0-0.5_03082011	3/8/2011	LB	N	0.00835	0.17	0	0.09	0.025	--	-55.9	12.1
WM-30-2_1.0-1.5_03082011	3/8/2011	LB	N	0.00131	0.09	0	0.05	0.052	--	-250	11.5
WM-30-3_2.0-2.5_03082011	3/8/2011	LB	N	0.00249	0.15	0	0.08	0.021	--	-56.6	6.54
WM-30-4_3.5-4.0_03082011	3/8/2011	LB	N	0.888	0.16	0	0.52	3.52	--	-101	59.3
UC-31-1_0.0-0.5_03092011	3/9/2011	LB	N	4.44	0.34	--	2.39	3.71	--	--	38.8
UC-31-2_0.5-1.0_03092011	3/9/2011	LB	N	1.28	0.38	--	0.83	--	1.71	--	37.2
UC-31-3_1.0-1.5_03092011	3/9/2011	LB	N	0.311	0.39	--	0.35	--	0.917	--	16.4
UC-31-3_1.0-1.5_03092011_FD	3/9/2011	LB	FD	0.183	0.33	--	0.26	--	0.554	--	21.7
UC-31-4_2.0-2.5_03092011	3/9/2011	LB	N	0.00671	0.09	--	0.05	0.406	--	--	16.9
UC-31-4_2.0-2.5_03092011_FD	3/9/2011	LB	FD	0.009104	--	--	--	--	0.486	--	--
WM-32-1_0.0-0.5_03132011	3/13/2011	LB	N	0.0359	0.21	0	0.08	0.064	--	-90.1	46.3
WM-32-2_0.5-1.0_03132011	3/13/2011	LB	N	0.0132	0.19	0	0.07	0.036	--	-118	27.7
WM-32-3_1.0-1.5_03132011	3/13/2011	LB	N	0.00184	0.09	0	0.03	0.0065	--	-132	6.11
WM-32-4_3.5-4.0_03132011	3/13/2011	LB	N	0.00118	0.1	0	0.03	0.186	--	-1830	100
WM-33-1_0.0-0.5_03082011	3/8/2011	LB	N	0.214	0.27	--	0.24	0.724	--	--	25.5
WM-33-2_0.5-1.0_03082011	3/8/2011	LB	N	0.0128	0.04	--	0.03	--	0.260	--	7.51
WM-33-3_1.5-2.0_03082011	3/8/2011	LB	N	0.0989	0.13	--	0.11	--	0.336	--	5.62
WM-33-4_2.5-3.0_03082011	3/8/2011	LB	N	0.00313	0.18	--	0.09	--	0.260	--	7.46
WM-34-1_0.0-0.5_03142011	3/14/2011	LB	N	2.1	0.32	--	1.21	1.29	--	--	17.2
WM-34-2_0.5-1.0_03142011	3/14/2011	LB	N	0.383	0.06	--	0.22	--	0.534	--	3.56
WM-34-3_1.0-1.5_03142011	3/14/2011	LB	N	0.0145	0.17	--	0.09	--	0.266	--	6.97
UC-35-1_0.0-0.5_03092011	3/9/2011	LB	N	0.673	0.31	--	0.49	0.634	--	--	31.3
UC-35-2_0.5-1.0_03092011	3/9/2011	LB	N	0.161	0.1	--	0.13	--	0.373	--	6.74
UC-35-3_2.0-2.5_03092011	3/9/2011	LB	N	0.00116	0.1	--	0.05	--	0.298	--	18
UC-35-4_4.0-4.5_03092011	3/9/2011	LB	N	0.00107	0.13	--	0.07	--	--	--	47.2
UC-36-1_0.0-0.5_03092011	3/9/2011	LB	N	0.468	0.16	--	0.31	0.716	--	--	25.7
UC-36-2_1.0-1.5_03092011	3/9/2011	LB	N	0.634	0.26	--	0.45	0.55	--	--	21.1
UC-36-3_2.0-2.5_03092011	3/9/2011	LB	N	0.0117	0.12	--	0.07	0.019	--	--	4.35
UC-36-4_2.5-3.0_03092011	3/9/2011	LB	N	0.0136	0.08	--	0.05	0.0075	--	--	3.05
UC-37-1_0.0-0.5_03102011	3/10/2011	LB	N	0.229	0.22	--	0.23	0.425	--	--	20.7
UC-37-2_0.5-1.0_03102011	3/10/2011	LB	N	0.0294	0.11	--	0.07	--	0.409	--	9.66
UC-37-3_3.0-3.5_03102011	3/10/2011	LB	N	0.00186	0.13	--	0.07	--	0.266	--	26.5
UC-37-4_5.5-6.0_03102011	3/10/2011	LB	N	0.0013	0.15	--	0.08	--	0.264	--	11.2
UC-38-1_0.0-0.5_03112011	3/11/2011	LB	N	0.519	0.16	--	0.34	0.393	--	--	21.3
UC-38-2_1.5-2.0_03112011	3/11/2011	LB	N	1.06	1	--	1.03	--	1.45	--	39.5
UC-38-3_2.0-2.5_03112011	3/11/2011	LB	N	0.668	1.61	--	1.14	--	1	--	36.1
UC-38-4_2.9-3.4_03112011	3/11/2011	LB	N	0.0022	0.21	--	0.11	--	0.262	--	8.14
UC-39-1_0.0-0.5_03032011	3/3/2011	LB	N	0.211	0.24	--	0.23	0.166	--	--	12.4
UC-39-2_2.0-2.5_03032011	3/3/2011	LB	N	1.33	1	--	1.17	--	1.97	--	42.9
UC-39-3_3.0-3.5_03032011	3/3/2011	LB	N	0.563	0.53	--	0.55	--	0.93	--	32.5
UC-39-4_4.0-4.5_03032011	3/3/2011	LB	N	0.0237	0.24	--	0.13	--	0.293	--	8.33
UC-40-1_0.0-0.5_03102011	3/10/2011	LB	N	0.0882	0.28	--	0.18	0.106	--	--	13.2
UC-40-2_1.5-2.0_03102011	3/10/2011	LB	N	0.717	0.26	--	0.49	--	1.33	--	24.3
UC-40-3_3.0-3.5_03102011	3/10/2011	LB	N	0.719	0.78	--	0.75	--	1.2	--	28.1
UC-40-3_3.0-3.5_03102011_FD	3/10/2011	LB	FD	0.476	0.39	--	0.43	--	0.894	--	23.4
UC-40-4_4.5-5.0_03102011	3/10/2011	LB	N	0.0104	0.16	--	0.09	--	0.276	--	5.58
UC-40-4_4.5-5.0_03102011_FD	3/10/2011	LB	FD	--	0.22	--	--	--	--	--	--
WM-41-1_0.0-0.5_03152011	3/15/2011	LB	N	0.0158	0.11	--	0.06	0.048	--	--	4.25
WM-41-2_1.0-1.5_03152011	3/15/2011	LB	N	0.00219	0.17	--	0.09	--	0.259	--	3.88
WM-41-3_2.0-2.5_03152011	3/15/2011	LB	N	0.00133	0.13	--	0.07	--	0.266	--	10
WM-41-4_3.0-3.4_03152011	3/15/2011	LB	N	0.00158	0.17	--	0.09	--	0.260	--	4.64
WM-42-1_0.0-0.5_03152011	3/15/2011	LB	N	0.143	0.11	--	0.13	0.0962	--	--	5.51
WM-42-2_1.0-1.5_03152011	3/15/2011	LB	N	0.00396	0.05	--	0.03	--	0.260	--	2.7
WM-42-3_2.0-2.5_03152011	3/15/2011	LB	N	0.00202	0.1	--	0.05	--	0.259	--	4.17
WM-42-4_2.5-3.0_03152011	3/15/2011	LB	N	0.00133	0.14	--	0.07	--	0.262	--	5.86
WM-43-1_0.0-0.5_03152011	3/15/2011	LB	N	0.00453	0.15	--	0.08	0.0126	--	--	21.9
WM-43-2_1.7-2.2_03152011	3/15/2011	LB	N	2.74	1.02	--	1.88	--	2.48	--	11.9
WM-43-3_2.2-2.7_03152011	3/15/2011	LB	N	27.1	0.52	--	13.8	--	16.2	--	15.2
WM-43-4_5.0-5.5_03152011	3/15/2011	LB	N	0.00113	0.1	--	0.05	--	0.312	--	31.3
WM-44-1_0.0-0.5_03162011	3/16/2011	LB	N	0.00274	0.1	--	0.05	0.011	--	--	33.9
WM-44-2_0.5-1.0_03162011	3/16/2011	LB	N	0.33	0.15	--	0.24	--	1.67	--	18.3
WM-44-3_1.0-1.5_03162011	3/16/2011	LB	N	0.278	0.14	--	0.21	--	1.48	--	13.2
WM-44-4_2.0-2.5_03162011	3/16/2011	LB	N	0.00148	0.09	--	0.05	--	0.272	--	17.3
WM-45-1_0.0-0.5_03162011	3/16/2011	LB	N	0.00248	0.09	--	0.05	0.0260	--	--	13.2
WM-45-2_1.5-2.0_03162011	3/16/2011	LB	N	0.0593	0.09	--	0.07	--	2.99	--	28.2
WM-45-2_1.5-2.0_03162011_FD	3/16/2011	LB	FD	0.00116	0.1	--	0.05	--	0.284	--	15.4
WM-45-3_3.0-3.5_03162011	3/16/2011	LB	N	0.00113	0.06	--	0.03	--	0.30	--	109
WM-45-4_5.0-5.5_03162011	3/16/2011	LB	N	0.00155	0.08	--	0.04	--	0.284	--	34.7
WM-46-1_0.0-0.5_03162011	3/16/2011	LB	N	0.00561	0.12	--	0.06	0.020	--	--	28.8
WM-46-2_2.3-2.8_03162011	3/16/2011	LB	N	0.29	0.83	--	0.56	--	0.544	--	13.2
WM-46-3_2.8-3.3_03162011	3/16/2011	LB	N	17.6	0.82	--	9.21	--	10.3	--	15
WM-46-4_4.0-4.5_03162011	3/16/2011	LB	N	0.00197	0.13	--	0.07	--	0.289	--	11.1
WM-47-1_0.0-0.5_03162011	3/16/2011	LB	N	0.00403	0.1	--	0.05	0.026	--	--	27.2
WM-47-2_2.5-3.0_03162011	3/16/2011	LB	N	4.71	0.48	--	2.6	--	4.19	--	13.5

Table 13
Sediment Toxicity Screening Calculation Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				MPCA Guidance				EPA Guidance			Carbon Ratio
				PEC-Q Total PAH13 @0.5DL	Mean PEC-Q Metals	PEC-Q PCBs @ 0DL	Mean PEC-Q Total	ESB Tufcv PAH34 @ 0.5DL	Estimated ESB Tufcv PAH34 @ 0.5DL	ESB Metals (umol/g oc)	Black Carbon/TOC (%)
Sys Sample Code	Sample Date	Analysis Location	Sample Type Code								
WM-47-3_3.0-3.5_03162011	3/16/2011	LB	N	0.646	0.25	--	0.45	--	1.56	--	13.2
WM-47-4_3.5-4.0_03162011	3/16/2011	LB	N	0.0047	0.18	--	0.09	--	0.303	--	7.14
WM-48-1_0.0-0.5_03172011	3/17/2011	LB	N	0.00294	0.09	--	0.05	0.019	--	--	47.7
WM-48-2_2.0-2.5_03172011	3/17/2011	LB	N	0.267	0.33	--	0.30	--	1.22	--	17.2
WM-48-3_2.5-3.0_03172011	3/17/2011	LB	N	1.33	0.22	--	0.78	--	3.5	--	17.3
WM-48-4_3.0-3.5_03172011	3/17/2011	LB	N	0.197	0.17	--	0.18	--	0.635	--	4.68
WM-49-1_0.0-0.5_03172011	3/17/2011	LB	N	0.00314	0.08	--	0.04	0.023	--	--	24.6
WM-49-2_2.5-3.0_03172011	3/17/2011	LB	N	0.00541	0.12	--	0.06	--	0.278	--	12.4
WM-49-2_2.5-3.0_03172011_FD	3/17/2011	LB	FD	0.00447	0.13	--	0.07	--	0.283	--	19.3
WM-49-3_4.8-5.3_03172011	3/17/2011	LB	N	0.0086	0.3	--	0.15	--	0.276	--	27.1
WM-49-4_5.5-6.0_03172011	3/17/2011	LB	N	0.00182	0.06	--	0.03	--	0.532	--	100
WM-50-1_0.0-0.5_03172011	3/17/2011	LB	N	0.00725	0.12	--	0.06	0.023	--	--	24.5
WM-50-2_1.0-1.5_03172011	3/17/2011	LB	N	0.0306	0.21	--	0.12	--	0.342	--	22
WM-50-3_2.5-3.0_03172011	3/17/2011	LB	N	0.399	0.45	--	0.43	--	0.876	--	23.2
WM-50-4_3.0-3.5_03172011	3/17/2011	LB	N	0.00327	0.17	--	0.09	--	0.266	--	5.26
WM-51-1_0.0-0.5_03182011	3/18/2011	LB	N	0.00471	0.12	--	0.06	0.016	--	--	42.7
WM-51-2_2.0-2.5_03182011	3/18/2011	LB	N	0.0122	0.29	--	0.15	--	0.286	--	22
WM-51-3_4.0-4.5_03182011	3/18/2011	LB	N	0.0021	0.11	--	0.06	--	0.272	--	11.3
WM-51-4_6.0-6.5_03182011	3/18/2011	LB	N	0.00119	0.16	--	0.08	--	0.296	--	21.8
UC-52-1_0.0-0.5_03182011	3/18/2011	LB	N	0.0298	0.16	--	0.09	0.068	--	--	18.5
UC-52-2_2.0-2.5_03182011	3/18/2011	LB	N	0.158	0.23	--	0.19	--	0.652	--	8.06
UC-52-3_4.0-4.5_03182011	3/18/2011	LB	N	0.00182	0.16	--	0.08	--	0.264	--	6.04
UC-52-4_5.0-5.5_03182011	3/18/2011	LB	N	0.00218	0.09	--	0.05	--	0.281	--	6.04
UC-53-1_0.0-0.5_03182011	3/18/2011	LB	N	0.421	0.17	--	0.30	0.349	--	--	33.4
UC-53-2_2.0-2.5_03182011	3/18/2011	LB	N	1.41	0.44	--	0.93	--	2.31	--	54.2
UC-53-3_3.0-3.5_03182011	3/18/2011	LB	N	0.71	0.6	--	0.66	--	0.918	--	22.8
UC-53-4_4.5-5.0_03182011	3/18/2011	LB	N	0.0153	0.14	--	0.08	--	0.269	--	4.24
UC-54-1_0.0-0.5_03182011	3/18/2011	LB	N	0.299	0.11	--	0.21	0.60	--	--	13.5
UC-54-2_0.5-1.0_03182011	3/18/2011	LB	N	0.00351	0.09	--	0.05	--	0.286	--	4.81
UC-54-3_1.0-1.5_03182011	3/18/2011	LB	N	0.00297	0.21	--	0.11	--	0.365	--	22.2
UC-55-1_0.0-0.5_03182011	3/18/2011	LB	N	2.87	0.18	--	1.53	1.22	--	--	54.1
UC-55-2_2.0-2.5_03182011	3/18/2011	LB	N	0.00197	0.08	--	0.04	--	0.274	--	5.04
UC-55-2_2.0-2.5_03182011_FD	3/18/2011	LB	FD	0.00167	0.1	--	0.05	--	0.274	--	5.65
UC-55-3_3.0-3.5_03182011	3/18/2011	LB	N	0.0259	0.11	--	0.07	--	1.08	--	281
UC-55-4_4.0-4.5_03182011	3/18/2011	LB	N	0.00116	0.12	--	0.06	--	0.259	--	1.29
UC-56-1_0.0-0.5_03192011	3/19/2011	LB	N	0.349	0.11	--	0.23	0.158	--	--	7.9
UC-56-2_1.0-1.5_03192011	3/19/2011	LB	N	0.203	0.23	--	0.22	--	0.72	--	58.5
UC-56-3_3.0-3.5_03192011	3/19/2011	LB	N	0.00683	0.09	--	0.05	--	0.272	--	5.12
UC-56-4_3.9-4.4_03192011	3/19/2011	LB	N	0.00232	0.09	--	0.05	--	0.262	--	5.07
UC-57-1_0.0-0.5_03192011	3/19/2011	LB	N	7.56	0.36	--	3.96	6.1	--	--	36.8
UC-57-2_0.5-1.0_03192011	3/19/2011	LB	N	3.54	0.94	--	2.24	--	4.53	--	55.9
UC-57-3_1.5-2.0_03192011	3/19/2011	LB	N	0.391	0.67	--	0.53	--	1.03	--	30.9
UC-57-4_2.0-2.5_03192011	3/19/2011	LB	N	0.00133	0.1	--	0.05	--	0.264	--	13.6
WM-58-1_0.0-0.5_03192011	3/19/2011	LB	N	0.187	2.42	--	1.3	0.954	--	--	24.4
WM-58-2_0.5-1.0_03192011	3/19/2011	LB	N	0.396	2.38	--	1.39	--	0.753	--	16.8
WM-58-3_1.0-1.5_03192011	3/19/2011	LB	N	5.98	1.72	--	3.85	--	5.9	--	13.8
WM-58-4_2.0-2.5_03192011	3/19/2011	LB	N	0.00552	0.04	--	0.02	--	0.630	--	3.4
WM-59-1_0.0-0.5_03212011	3/21/2011	LB	N	0.0283	0.12	--	0.07	0.067	--	--	18.6
WM-59-2_0.5-1.0_03212011	3/21/2011	LB	N	2.2	0.92	--	1.56	--	1.86	--	11.4
WM-59-3_1.0-1.5_03212011	3/21/2011	LB	N	0.0373	0.06	--	0.05	--	0.28	--	4.67
WM-59-4_1.5-2.0_03212011	3/21/2011	LB	N	0.00498	0.08	--	0.04	--	0.29	--	3.15
WM-60-1_0.0-0.5_03212011	3/21/2011	LB	N	0.00179	0.09	--	0.05	0.021	--	--	41.9
WM-60-2_0.5-1.0_03212011	3/21/2011	LB	N	0.00677	0.18	--	0.09	--	0.269	--	6.68
WM-60-3_1.0-1.4_03212011	3/21/2011	LB	N	0.00207	0.13	--	0.07	--	0.264	--	9.23
WM-61-1_0.0-0.5_03212011	3/21/2011	LB	N	0.00413	0.15	--	0.08	0.051	--	--	25.1
WM-61-1_0.0-0.5_03212011_FD	3/21/2011	LB	FD	0.00409	0.17	--	0.09	0.032	--	--	10.9
WM-61-2_1.0-1.5_03212011	3/21/2011	LB	N	0.00127	0.11	--	0.06	--	0.267	--	5.34
WM-61-3_1.5-2.0_03212011	3/21/2011	LB	N	0.00147	0.11	--	0.06	--	0.281	--	9.77
WM-61-4_2.5-3.0_03212011	3/21/2011	LB	N	0.00119	0.09	--	0.05	--	0.276	--	10.1
WM-62-1_0.0-0.5_03212011	3/21/2011	LB	N	0.0023	0.11	--	0.06	0.025	--	--	17.4
WM-62-2_0.5-1.0_03212011	3/21/2011	LB	N	0.00137	0.1	--	0.05	--	0.283	--	52.3
WM-62-3_1.0-1.5_03212011	3/21/2011	LB	N	0.00119	0.09	--	0.05	--	0.278	--	35.3
WM-62-4_1.5-2.0_03212011	3/21/2011	LB	N	0.00308	0.1	--	0.05	--	0.325	--	34.6
WM-63-1_0.0-0.5_03212011	3/21/2011	LB	N	0.272	1.17	--	0.72	0.947	--	--	15.9
WM-63-2_0.5-1.0_03212011	3/21/2011	LB	N	0.407	1.59	--	0.99	--	0.773	--	18.6
WM-63-3_1.0-1.5_03212011	3/21/2011	LB	N	19	1.28	--	10.1	--	17.2	--	17.5
WM-63-4_1.8-2.2_03212011	3/21/2011	LB	N	0.0103	0.09	--	0.05	--	0.307	--	8.11
WM-64-1_0.0-0.5_03102011	3/10/2011	LB	N	0.00472	0.15	--	0.08	0.019	--	--	12.6
WM-64-2_1.0-1.5_03102011	3/10/2011	LB	N	0.121	1.95	--	1.04	0.403	--	--	16.9
WM-64-3_2.0-2.5_03102011	3/10/2011	LB	N	23	1.25	--	12.1	12.1	--	--	23.7
WM-64-4_3.0-3.5_03102011	3/10/2011	LB	N	0.00605	0.14	--	0.07	0.0066	--	--	2.77
WM-65-1_0.0-0.5_03212011	3/21/2011	LB	N	0.00587	0.12	--	0.06	0.0163	--	--	19.4
WM-65-2_1.0-1.5_03212011	3/21/2011	LB	N	0.24	2.13	--	1.19	--	0.483	--	14.1
WM-65-3_2.0-2.5_03212011	3/21/2011	LB	N	27.4	0.8	--	14.1	--	15.1	--	16.4
WM-65-4_3.0-3.5_03212011	3/21/2011	LB	N	0.00269	0.12	--	0.06	--	0.267	--	6.73
WM-66-1_0.0-0.5_03222011	3/22/2011	LB	N	0.00366	0.17	--	0.09	0.013	--	--	16.7
WM-66-2_1.0-1.5_03222011	3/22/2011	LB	N	0.01265	0.29	--	0.15	--	0.283	--	26.36
WM-66-2_1.0-1.5_03222011_FD	3/22/2011	LB	FD	0.00829	0.3	--	0.15	--	0.272	--	25.4
WM-66-3_2.0-2.5_03222011	3/22/2011	LB	N	40.9	0.87	--	20.9	--	22.8	--	14.6
WM-66-4_3.0-3.5_03222011	3/22/2011	LB	N	0.0022	0.13	--	0.07	--	0.276	--	5.84
WM-67-1_0.0-0.5_03222011	3/22/2011	LB	N	0.00266	0.13	--	0.07	0.012	--	--	20
WM-67-2_1.0-1.5_03222011	3/22/2011	LB	N	0.00328	0.14	--	0.07	--	0.267	--	30.3
WM-67-3_2.5-3.0_03222011	3/22/2011	LB	N	5	1.45	--	3.23	--	4.36	--	15.2
WM-67-4_3.1-3.5_03222011	3/22/2011	LB	N	0.871	0.2	--	0.54	--	2.14	--	10.7
WM-68-1_0.0-0.5_03232011	3/23/2011	LB	N	0.00236	0.06	--	0.03	0.022	--	--	19.2
WM-68-2_0.5-1.0_03232011	3/23/2011	LB	N	0.00272	0.1	--	0.05	--	0.269	--	36.5
WM-68-3_1.0-1.4_03232011	3/23/2011	LB	N	0.00243	0.11	--	0.06	--	0.266	--	34.2
WM-69-1_0.0-0.5_03232011	3/23/2011	LB	N	0.00193	0.1	--	0.05	0.014	--	--	24.3
WM-69-2_0.5-1.0_03232011	3/23/2011	LB	N	0.00595	0.12	--	0.06	--	0.291	--	28.8
WM-69-3_1.0-1.5_03232011	3/23/2011	LB	N	0.438	0.18	--	0.31	--	1.55	--	15
WM-69-4_1.5-2.0_03232011	3/23/2011	LB	N	1.17	0.12	--	0.65	--	0.90	--	4.99

Table 13
Sediment Toxicity Screening Calculation Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

				MPCA Guidance				EPA Guidance			Carbon Ratio
				PEC-Q Total PAH13 @0.5DL	Mean PEC-Q Metals	PEC-Q PCBs @ 0DL	Mean PEC-Q Total	ESB Tufcv PAH34 @ 0.5DL	Estimated ESB Tufcv PAH34 @ 0.5DL	ESB Metals (umol/g oc)	Black Carbon/TOC (%)
Sys Sample Code	Sample Date	Analysis Location	Sample Type Code								
WM-70-1_0.0-0.5_03232011	3/23/2011	LB	N	0.00503	0.15	--	0.08	0.017	--	--	17.4
WM-70-2_2.0-2.5_03232011	3/23/2011	LB	N	0.326	1.77	--	1.05	--	0.563	--	13.9
WM-70-2_2.0-2.5_03232011_FD	3/23/2011	LB	FD	0.224	1.68	--	0.95	--	0.464	--	15.5
WM-70-3_2.5-3.0_03232011	3/23/2011	LB	N	19.2	0.8	--	10	--	12.9	--	15.1
WM-70-4_3.0-3.5_03232011	3/23/2011	LB	N	0.0171	0.15	--	0.08	--	0.327	--	7.71
WM-71-1_0.0-0.5_03232011	3/23/2011	LB	N	0.00221	0.09	--	0.05	0.095	--	--	21.9
WM-71-2_1.0-1.5_03232011	3/23/2011	LB	N	5.71	0.06	--	2.89	--	129	--	17.4
WM-71-3_2.0-2.5_03232011	3/23/2011	LB	N	0.00133	0.07	--	0.04	--	0.313	--	80.4
WM-71-4_3.0-3.5_03232011	3/23/2011	LB	N	0.00385	0.07	--	0.04	--	0.777	--	100
WM-72-1_0.0-0.5_03232011	3/23/2011	LB	N	0.0135	0.06	--	0.04	--	--	--	45
WM-72-2_1.0-1.5_03232011	3/23/2011	LB	N	0.00359	0.13	--	0.07	--	0.269	--	17.6
WM-72-3_2.0-2.5_03232011	3/23/2011	LB	N	0.00785	0.05	--	0.03	--	0.361	--	9.8
WM-72-4_3.0-3.5_03232011	3/23/2011	LB	N	0.00336	0.05	--	0.03	--	0.339	--	18.8
WM-73-1_0.0-0.5_03242011	3/24/2011	LB	N	0.133	0.78	--	0.46	0.229	--	--	25
WM-73-2_0.5-1.0_03242011	3/24/2011	LB	N	1.67	0.4	--	1.04	--	3.33	--	32.4
WM-73-3_1.0-1.5_03242011	3/24/2011	LB	N	0.0688	0.16	--	0.11	--	0.354	--	21
WM-73-4_1.5-2.0_03242011	3/24/2011	LB	N	0.0036	0.11	--	0.06	--	0.267	--	21.5
WM-74-1_0.0-0.5_03242011	3/24/2011	LB	N	0.00804	0.13	--	0.07	0.026	--	--	22.9
WM-74-2_2.5-3.0_03242011	3/24/2011	LB	N	0.0774	0.92	--	0.50	--	0.339	--	18.1
WM-74-3_3.0-3.5_03242011	3/24/2011	LB	N	23.2	0.98	--	12.1	--	15.8	--	22.6
WM-74-4_4.0-4.5_03242011	3/24/2011	LB	N	0.0131	0.1	--	0.06	--	0.368	--	6.62
UC-75-1_0.0-0.5_06082011	6/8/2011	LB	N	61.6	0.33	--	31	23.9	--	--	54.7
UC-75-2_0.5-1.0_06082011	6/8/2011	LB	N	89.5	0.24	--	44.9	34.2	--	--	86.7
UC-75-3_1.0-1.5_06082011	6/8/2011	LB	N	11.8	0.4	--	6.1	4.73	--	--	91.7
UC-75-4_1.5-2.0_06082011	6/8/2011	LB	N	2.89	0.39	--	1.64	1.82	--	--	85.4
UC-76-1_0.0-0.5_06082011	6/8/2011	LB	N	15.3	0.31	--	7.81	6.13	--	--	91.7
UC-76-2_0.5-1.0_06082011	6/8/2011	LB	N	7.69	0.33	--	4.01	--	4.48	--	100
UC-76-3_1.0-1.5_06082011	6/8/2011	LB	N	1.19	0.18	--	0.69	--	1.1	--	117
UC-77-1_0.0-0.5_06092011	6/9/2011	LB	N	2.44	0.23	--	1.34	1.45	--	--	51.8
UC-77-2_0.5-1.0_06092011	6/9/2011	LB	N	0.161	0.2	--	0.18	0.185	--	--	74.5
UC-77-3_1.0-1.5_06092011	6/9/2011	LB	N	6.78	0.21	--	3.5	10.8	--	--	121
UC-78-1_0.0-0.5_06092011	6/9/2011	LB	N	3.19	0.34	--	1.77	1.91	--	--	75.6
UC-78-2_0.5-1.0_06092011	6/9/2011	LB	N	6.39	0.3	--	3.35	--	5.21	--	105
UC-78-3_1.0-1.7_06092011	6/9/2011	LB	N	8.36	0.31	--	4.34	--	6.75	--	45.2
UC-79-1_0.0-0.5_06092011	6/9/2011	LB	N	19.9	0.51	--	10.2	7.82	--	--	64.2
UC-79-2_0.5-1.0_06092011	6/9/2011	LB	N	2.98	0.3	--	1.64	--	3.16	--	139
UC-80-1_0.0-0.5_06102011	6/10/2011	LB	N	15.3	0.5	--	7.9	8.37	--	--	55.8
UC-80-1_0.0-0.5_06102011_FD	6/10/2011	LB	FD	15.4	0.49	--	7.95	--	15	--	61.8
UC-80-2_0.5-1.3_06102011	6/10/2011	LB	N	7.04	0.38	--	3.71	--	4.02	--	65
UC-81-1_0.0-0.5_06102011	6/10/2011	LB	N	6.42	0.32	--	3.37	5.91	--	--	157
UC-81-2_0.5-1.0_06102011	6/10/2011	LB	N	88.6	0.25	--	44.4	44.7	--	--	103
UC-81-3_1.0-1.5_06102011	6/10/2011	LB	N	124	0.21	--	62.1	50.1	--	--	57.1
UC-82-1_0.0-0.5_06102011	6/10/2011	LB	N	70.9	0.4	--	35.7	47.1	--	--	159
UC-82-2_1.0-1.5_06102011	6/10/2011	LB	N	290	0.25	--	145	--	210	--	99
UC-82-3_2.0-2.5_06102011	6/10/2011	LB	N	13.9	0.85	--	7.38	--	7.93	--	52.9
UC-82-4_2.9-3.4_06102011	6/10/2011	LB	N	60	0.62	--	30.3	--	39.1	--	109
UC-83-1_0.0-0.5_06132011	6/13/2011	LB	N	34.1	0.39	--	17.2	12.9	--	--	17.1
UC-83-2_0.5-1.0_06132011	6/13/2011	LB	N	15.7	0.37	--	8.04	--	9.01	--	47.1
UC-83-3_1.0-1.5_06132011	6/13/2011	LB	N	14.5	0.44	--	7.47	--	8.32	--	30.3
UC-83-4_2.0-2.5_06132011	6/13/2011	LB	N	11.7	0.64	--	6.17	--	8.46	--	61
WM-84-1_0.0-0.5_06132011	6/13/2011	LB	N	0.24	1.77	--	1.01	4.07	--	--	9.09
WM-84-2_0.5-1.0_06132011	6/13/2011	LB	N	2.29	3.39	--	2.84	7.93	--	--	22.4
WM-84-2_0.5-1.0_06132011_FD	6/13/2011	LB	FD	3.83	1.78	--	2.81	16.1	--	--	29.3
WM-84-3_1.0-1.5_06132011	6/13/2011	LB	N	16.3	1.95	--	9.13	36.3	--	--	19.2
WM-85-1_0.0-0.5_06132011	6/13/2011	LB	N	0.148	0.13	--	0.14	0.099	--	--	9.57
WM-85-2_1.0-1.5_06132011	6/13/2011	LB	N	0.00835	0.09	--	0.05	--	0.260	--	4.36
WM-85-3_2.0-2.5_06132011	6/13/2011	LB	N	0.00377	0.19	--	0.10	--	0.264	--	4.57
WM-85-4_2.9-3.4_06132011	6/13/2011	LB	N	0.0173	0.21	--	0.11	--	0.279	--	4.08
WM-86-1_0.0-0.5_06152011	6/15/2011	LB	N	4.72	0.2	--	2.46	2.34	--	--	5.88
WM-86-2_0.5-1.0_06152011	6/15/2011	LB	N	0.0385	0.1	--	0.07	--	0.280	--	8.06
WM-86-3_1.0-1.5_06152011	6/15/2011	LB	N	0.0093	0.05	--	0.03	--	0.260	--	9.35
WM-87-1_0.0-0.5_06152011	6/15/2011	LB	N	0.024	0.12	--	0.07	0.018	--	--	16
WM-87-2_0.5-1.0_06152011	6/15/2011	LB	N	0.0133	0.03	--	0.02	--	0.260	--	14.7
WM-88-1_0.0-0.5_11152011	11/15/2011	LB	N	0.00587	0.33	--	0.17	0.0078	--	--	11.6
WM-88-2_2.0-2.5_11152011	11/15/2011	LB	N	0.0227	1.06	--	0.54	0.0315	--	--	16.9
WM-88-2_2.0-2.5_11152011_FD	11/15/2011	LB	FD	0.0337	1.01	--	0.52	0.0596	--	--	--
WM-88-3_3.25-3.75_11152011	11/15/2011	LB	N	0.463	0.76	--	0.61	0.379	--	--	62
WM-88-4_4.0-4.5_11152011	11/15/2011	LB	N	0.105	0.26	--	0.18	0.176	--	--	12.1
WM-89-1_0.0-0.5_11152011	11/15/2011	LB	N	0.00365	0.32	--	0.16	0.006	--	--	13.2
WM-89-2_2.0-2.5_11152011	11/15/2011	LB	N	0.032	1.06	--	0.55	--	0.284	--	13
WM-89-3_3.5-4.0_11152011	11/15/2011	LB	N	0.879	0.75	--	0.82	--	1.35	--	23.2
WM-89-4_5.0-5.5_11152011	11/15/2011	LB	N	0.00343	0.16	--	0.08	--	0.260	--	3.03
UC-90-1_0.0-0.5_11162011	11/16/2011	LB	N	0.0249	0.75	--	0.39	0.030	--	--	25.5
UC-90-2_0.5-1.0_11162011	11/16/2011	LB	N	0.0265	0.54	--	0.28	0.034	--	--	19.4
UC-90-3_2.0-2.5_11162011	11/16/2011	LB	N	0.00237	0.12	--	0.06	0.013	--	--	16.7
UC-90-4_3.0-3.5_11162011	11/16/2011	LB	N	0.00158	0.12	--	0.06	0.011	--	--	8.93
UC-91-1_0.0-0.5_11162011	11/16/2011	LB	N	0.00434	0.26	--	0.13	0.007	--	--	13.1
UC-91-2_2.5-3.0_11162011	11/16/2011	LB	N	0.0963	0.59	--	0.34	--	0.404	--	26.7
UC-91-3_4.0-4.5_11162011	11/16/2011	LB	N	0.991	0.67	--	0.83	--	1.35	--	16.1
UC-91-4_5.0-5.5_11162011	11/16/2011	LB	N	0.0198	0.13	--	0.07	--	0.295	--	5.28
UC-96-1_0.0-0.5_11012011	11/1/2011	LB	N	12.6	0.32	--	6.46	4.61	--	--	70
UC-96-2_5.0-7.5_11022011	11/2/2011	LB	N	100	0.48	--	50.2	--	69.1	--	69.7
UC-96-3_7.5-10.0_11022011	11/2/2011	LB	N	3.87	0.61	--	2.24	--	4.53	--	48.3
UC-96-4_10.0-12.5_11022011	11/2/2011	LB	N	0.252	0.1	--	0.18	--	0.679	--	37.5
UC-97-1_0.0-2.5_11022011	11/2/2011	LB	N	76	0.61	--	38.3	29.5	--	--	46.4
UC-97-2_5.0-7.5_11022011	11/2/2011	LB	N	12.3	0.58	--	6.44	7.94	--	--	58.8
UC-97-3_7.5-10.0_11022011	11/2/2011	LB	N	0.61	1.04	--	0.83	0.417	--	--	44.6
UC-97-4_15.0-17.5_11022011	11/2/2011	LB	N	0.00119	0.09	--	0.05	0.074	--	--	33.3
WM-101-1_0.0-1.0_11162011	11/16/2011	LB	N	0.069	2.46	--	1.26	0.199	--	--	14.4
WM-101-2_5.0-7.5_11162011	11/16/2011	LB	N	0.0101	0.11	--	0.06	0.0899	--	--	56.9
WM-101-3_15.0-17.5_11162011	11/16/2011	LB	N	0.00134	0.1	--	0.05	0.0075	--	--	52.5

Table 13
Sediment Toxicity Screening Calculation Summary
Spirit Lake Sediment Site
U.S. Steel Former Duluth Works

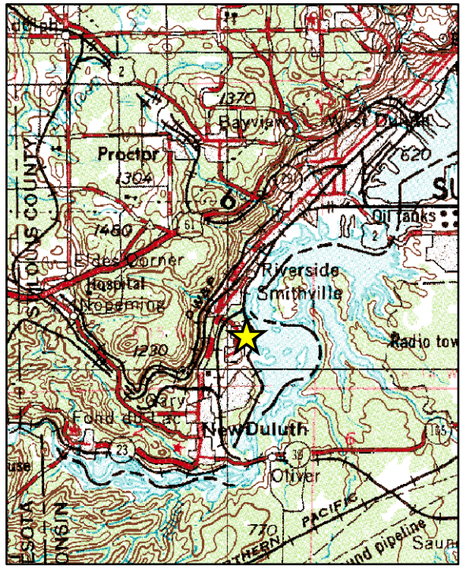
				MPCA Guidance				EPA Guidance			Carbon Ratio
				PEC-Q Total PAH13 @0.5DL	Mean PEC-Q Metals	PEC-Q PCBs @ 0DL	Mean PEC-Q Total	ESB Tufcv PAH34 @ 0.5DL	Estimated ESB Tufcv PAH34 @ 0.5DL	ESB Metals (umol/g oc)	Black Carbon/TOC (%)
Sys Sample Code	Sample Date	Analysis Location	Sample Type Code								
WM-101-4_20.0-22.5_11162011	11/16/2011	LB	N	0.00124	0.15	--	0.08	0.0057	--	--	52.1
WM-102-1_0.0-2.5_11162011	11/16/2011	LB	N	0.015	0.15	--	0.08	0.045	--	--	23.9
WM-102-2_2.5-5.0_11162011	11/16/2011	LB	N	0.0368	0.13	--	0.08	--	1.18	--	18.5
WM-102-2_2.5-5.0_11162011_FD	11/16/2011	LB	FD	0.00391	0.13	--	0.07	--	0.353	--	--
WM-102-3_15.0-17.5_11162011	11/16/2011	LB	N	0.0163	0.09	--	0.05	--	0.404	--	49.3
WM-102-3_15.0-17.5_11162011_FD	11/16/2011	LB	FD	0.0057	0.08	--	0.04	--	0.308	--	--
WM-102-4_27.5-30.0_11162011	11/16/2011	LB	N	0.00651	0.07	--	0.04	--	0.445	--	73.9

c-s3-06ac

Table 14
Focused Chemical Constituents of Interest (COIs)
Spirit Lake Sediment Site
Former U. S. Steel Duluth Works
Saint Louis River, Duluth, Minnesota

Focused Chemical Constituent of Interest (COI)	Delta Area	Chemical Abstract Number or Reference
Arsenic	Unnamed Creek and Wire Mill	7440-38-2
Chromium	Unnamed Creek and Wire Mill	7440-47-3
Copper	Wire Mill	7440-50-8
Lead	Unnamed Creek and Wire Mill	7439-92-1
Nickel	Wire Mill	7440-02-0
Zinc	Unnamed Creek and Wire Mill	7440-66-6
PAHs (list of 13)	Unnamed Creek and Wire Mill	(MPCA, 2007)
Risk-Screening Parameters of Interest		
Probable effects concentration-quotient (PEC-Q)- metals	Unnamed Creek and Wire Mill	(MPCA, 2007)
PEC-Q-PAHs	Unnamed Creek and Wire Mill	(MPCA, 2007)

Figures



Approximate U. S. Steel Operations Area (URS, 2008)

State Boundary

0 2,000 4,000

Feet

1 Inch = 2,000 Feet

Figure 1

SITE LOCATION
Spirit Lake Sediment Site -
Former U. S. Steel Duluth Works
Saint Louis River
Duluth, Minnesota
c-s3-06ac

Barr Footer: ArcGIS 10.0, 2012-08-07 10:41 File: I:\Client\USS_Duluth_Works\Work_Orders\Feasibility_Study_Work_Plan\Maps\Reports\Figure 1 Site Location.mxd User: JLC

Approximate Unnamed Creek Delta Sediment Investigation Area

Approximate Wire Mill Delta Sediment Investigation Area

Approximate U. S. Steel Operations Area (URS, 2008)

State Boundary

N

0 1,000 2,000

Feet

1 Inch = 1,000 Feet

Figure 2

SITE LAYOUT
Spirit Lake Sediment Site -
Former U. S. Steel Duluth Works
Saint Louis River
Duluth, Minnesota
c-s3-06ac

Barr Footer: ArcGIS 10.0, 2012-08-07 10:47 File: I:\Client\USS_Duluth_Works\Work_Orders\Feasibility_Study_Work_Plan\Maps\Reports\Figure 2 Site Layout.mxd User: JLC

Barr Footer: ArcGIS 10.0, 2012-11-06 15:26 File: I:\Client\USS_Duluth_Works\Work_Orders\Winter_2012\Maps\Reports\RI Report\Figure 3 Sediment Sample Locations From Previous Investigations.mxd User: JLC

- Barr (1986) Sediment and Soil Boring Locations (25 Boring Logs)
- Costa, et al. (2001) Sediment Sample Locations (No Boring Logs)
- MPCA (1993) Sediment Sample Locations (No Boring Logs)
- MPCA (1995) Sediment Sample Locations (No Boring Logs)
- MPCA/NRRI (1997) Sediment Sample Locations (No Boring Logs)
- URS (2008) Direct-Push Soil Boring Locations (Nine Boring Logs)
- URS (2008) Surface Sediment Sample Locations (No Boring Logs)
- Approximate U. S. Steel Operations Area (URS, 2008)

N

0 750 1,500

Feet

1 Inch = 750 Feet

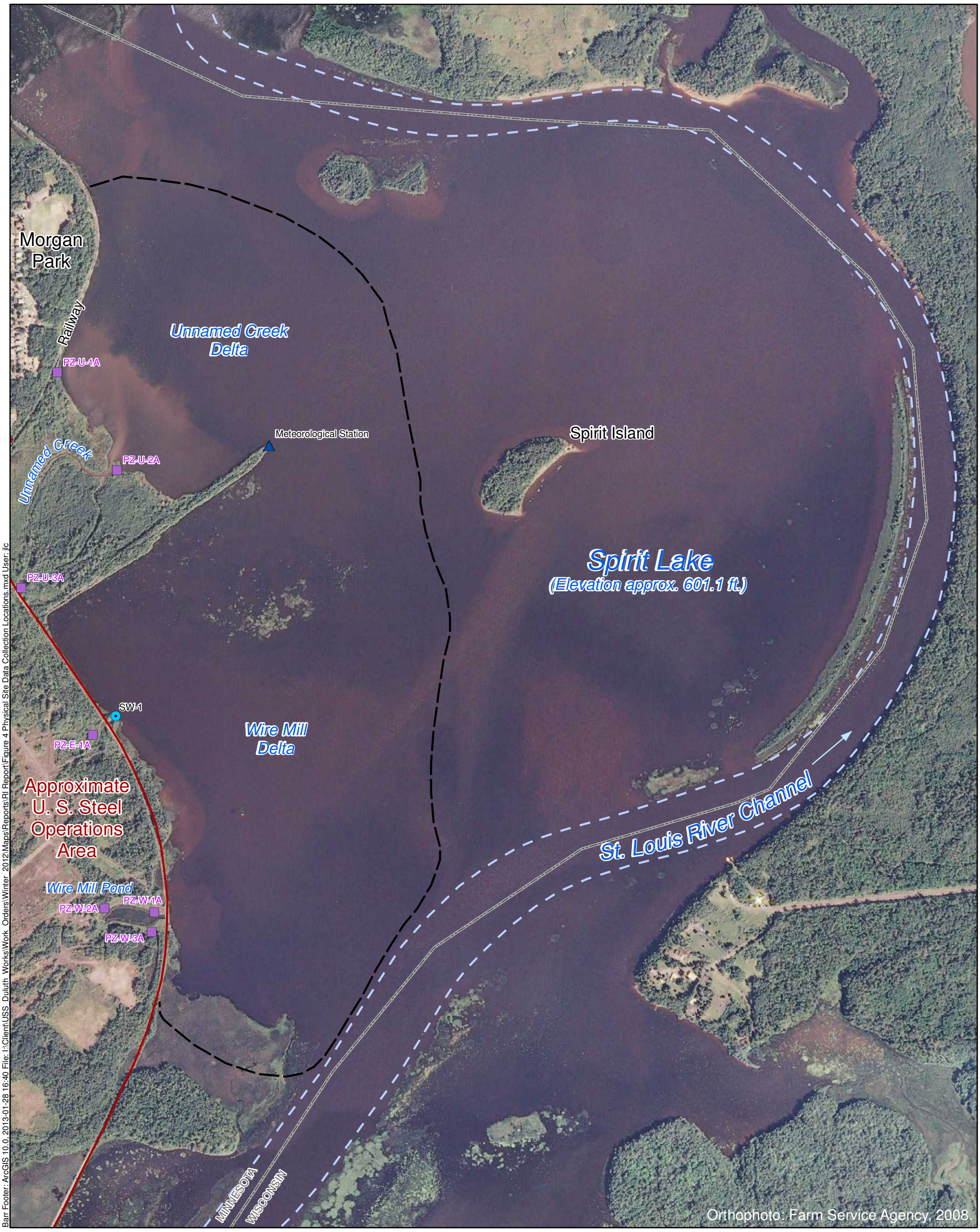
Figure 3

SEDIMENT SAMPLE LOCATIONS FROM PREVIOUS INVESTIGATIONS

Former U. S. Steel Duluth Works Site
Duluth, Minnesota

c-s3-06ac

MPCA sample locations are accurate to ± 50 meters. Barr sample locations are accurate to ± 10 meters. URS sample locations have the typical accuracy of a hand-held GPS unit.



Barr Footer: ArcGIS 10.0, 2013-01-28 16:40 File: I:\Client\USS_Duluth_Works\Work_Orders\Winter_2012\Maps\Reports\RI Report\Figure 4 Physical Site Data Collection Locations.mxd User: jlc

Approximate Outer Study Area Limit

Approximate Location of St. Louis River Channel, Based on Orthophoto Interpretation

Approximate U. S. Steel Operations Area (URS, 2008)

State Boundary

Piezometer Nest Location

Surface Water Level Gauge

Meteorological Station

N

0 800 1,600

Feet

Figure 4

PHYSICAL SITE DATA COLLECTION LOCATIONS

Spirit Lake Sediment Site -
Former U. S. Steel Duluth Works
Saint Louis River
Duluth, Minnesota

c-s3-06ac

Completed Sediment Sample Location

Surface Water Level Gauge

Meteorological Station

Piezometer Location

Approximate Outer Study Area Limit

Approximate Location of St. Louis River Channel, Based on Orthophoto Interpretation

Approximate U. S. Steel Operations Area (URS, 2008)

State Boundary

N

0 800 1,600

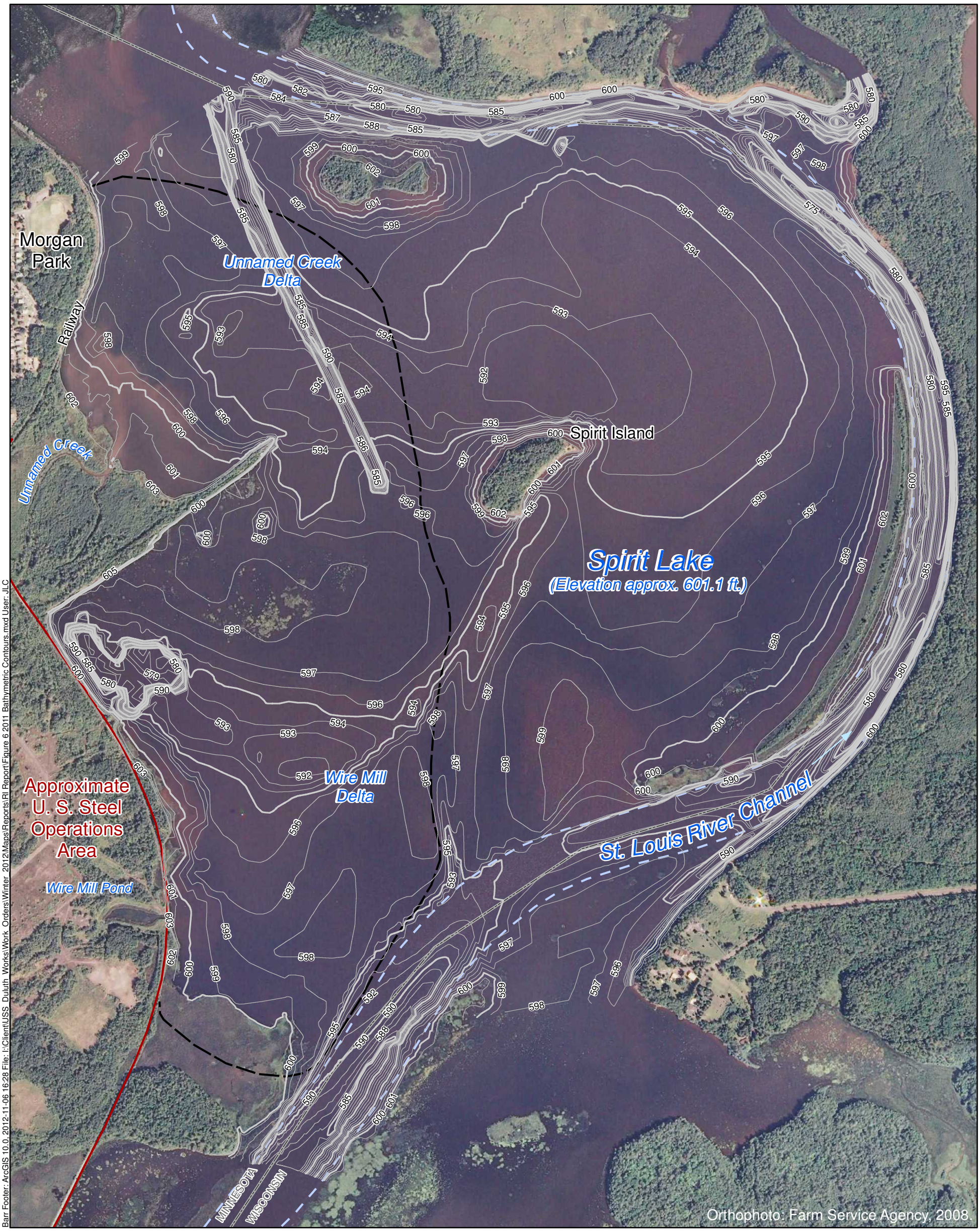
Feet

Figure 5

SEDIMENT SAMPLE LOCATIONS COMPLETED THROUGH DECEMBER 2011

Spirit Lake Sediment Site -
Former U. S. Steel Duluth Works
Saint Louis River
Duluth, Minnesota

c-s3-06ac



Bathymetry Contour (5-Foot)

Bathymetry Contour (1-Foot)

Approximate Outer Study Area Limit

Approximate Location of St. Louis River Channel, Based on Orthophoto Interpretation

Approximate U. S. Steel Operations Area (URS, 2008)

State Boundary

N

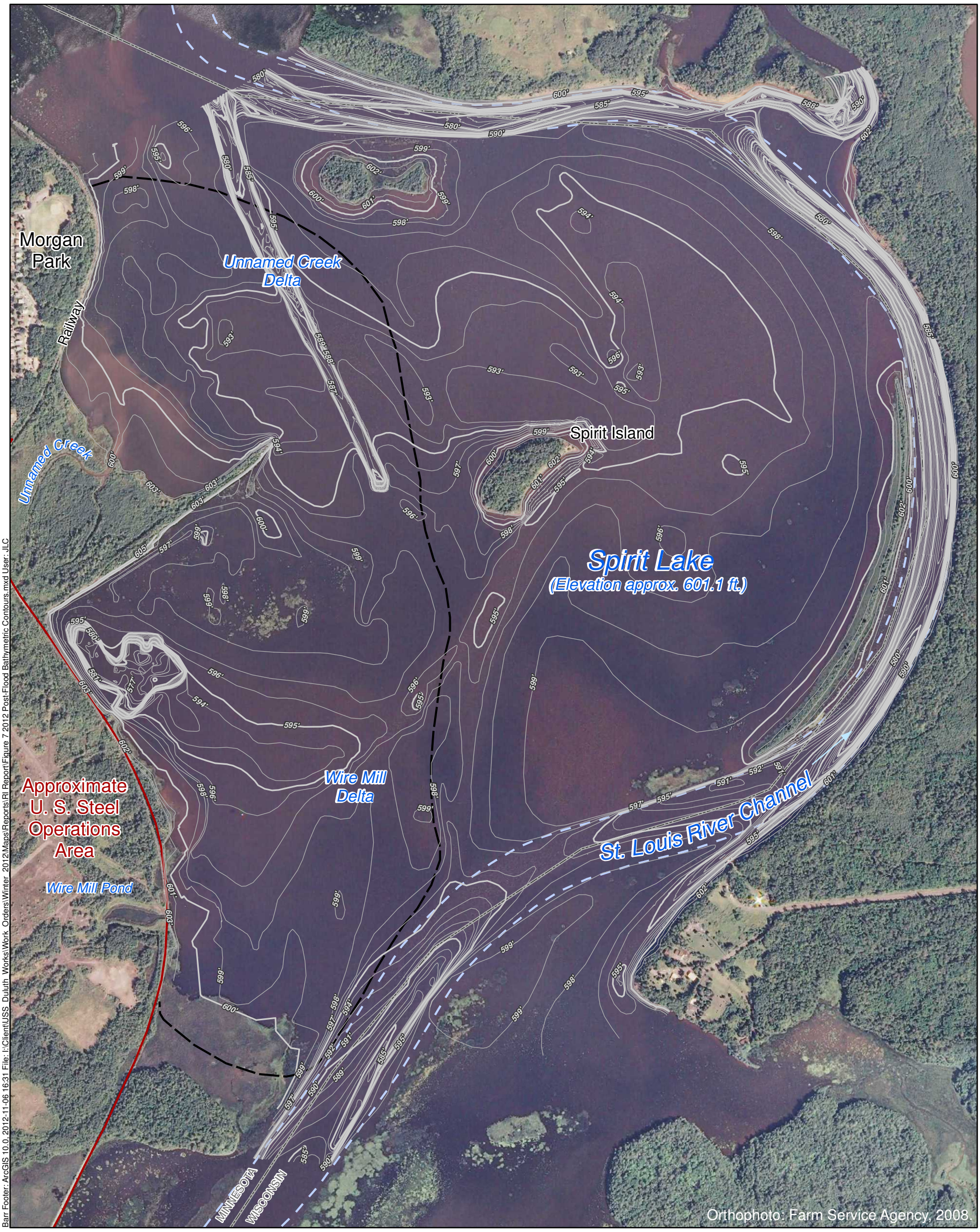
0 800 1,600

Feet

Figure 6

2011 BATHYMETRIC CONTOURS
Spirit Lake Sediment Site -
Former U. S. Steel Duluth Works
Saint Louis River
Duluth, Minnesota

c-s3-06ac



Bathymetry Contour (5-Foot)

Bathymetry Contour (1-Foot)

Approximate Outer Study Area Limit

Approximate Location of St. Louis River Channel, Based on Orthophoto Interpretation

Approximate U. S. Steel Operations Area (URS, 2008)

State Boundary

N

0 800 1,600

Feet

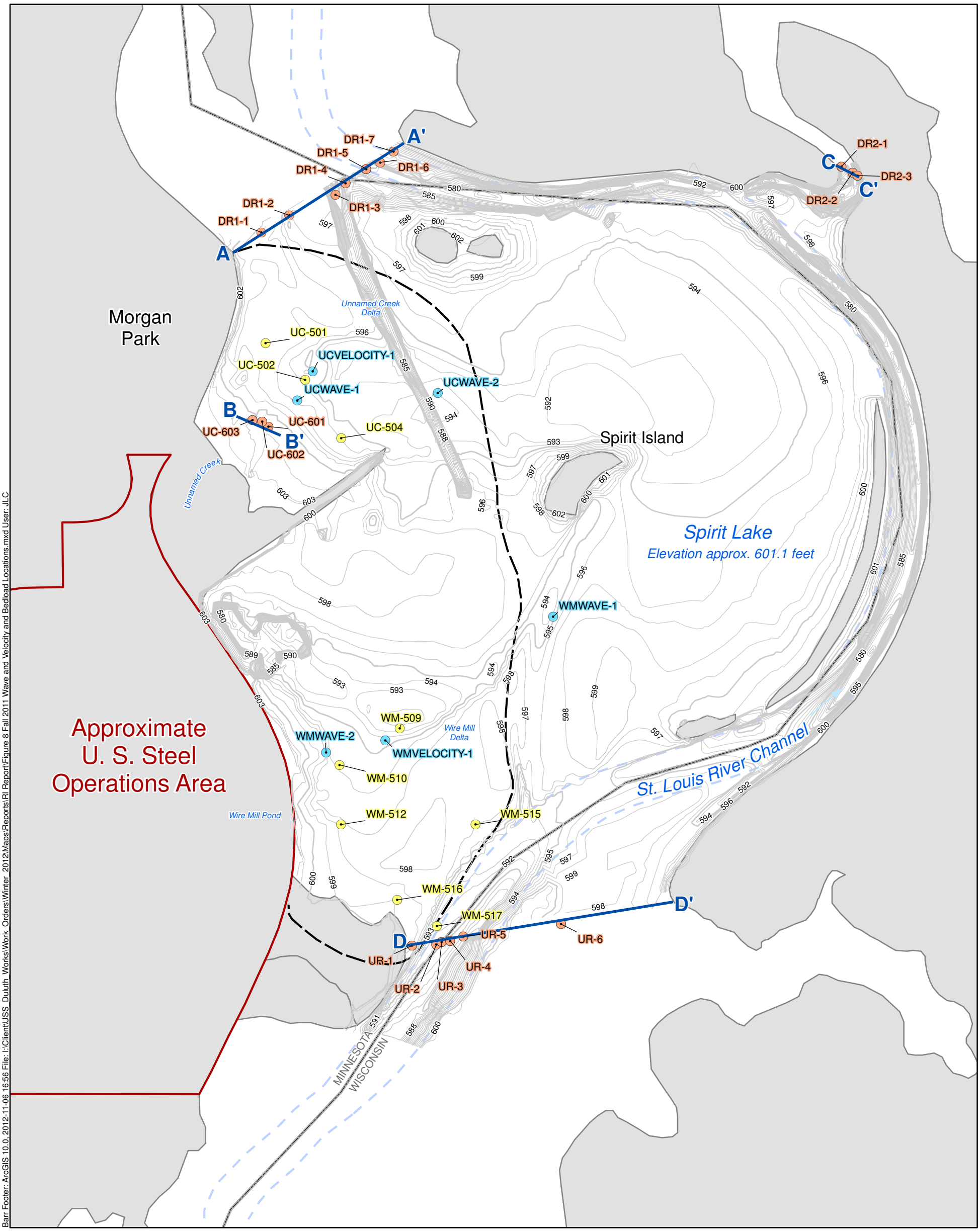
Figure 7

2012 POST-FLOOD BATHYMETRIC CONTOURS

Spirit Lake Sediment Site -
Former U. S. Steel Duluth Works
Saint Louis River
Duluth, Minnesota

c-s3-06ac

Barr Footer: ArcGIS 10.0, 2012-11-06 16:31 File: I:\Client\USS_Duluth_Works\Work_Orders\Winter_2012\Maps\Reports\RI Report\Figure 7 2012 Post-Flood Bathymetric Contours.mxd User: JLC



Barr Footer: ArcGIS 10.0, 2012-11-06 16:56 File: I:\Client\USS_Duluth_Works\Work_Orders\Winter_2012Maps\Reports\RI Report\Figure 8 Fall 2011 Wave and Velocity and Bedload Locations.mxd User: JLC

- Wave and Long-term Flow Monitoring Locations
- Short-term Flow, Suspended Sediment Concentration, and Bedload Sample Locations
- Bed Stability Sample Locations
- Hydrodynamic Measurement Transect Locations
- 2011 Bathymetry Contours (1-Foot)
- 2011 Bathymetry Contours (5-Foot)
- Approximate Outer Study Area Limit
- Approximate Location of St. Louis River Channel, Based on Orthophoto Interpretation
- Approximate U. S. Steel Operations Area (URS, 2008)

N

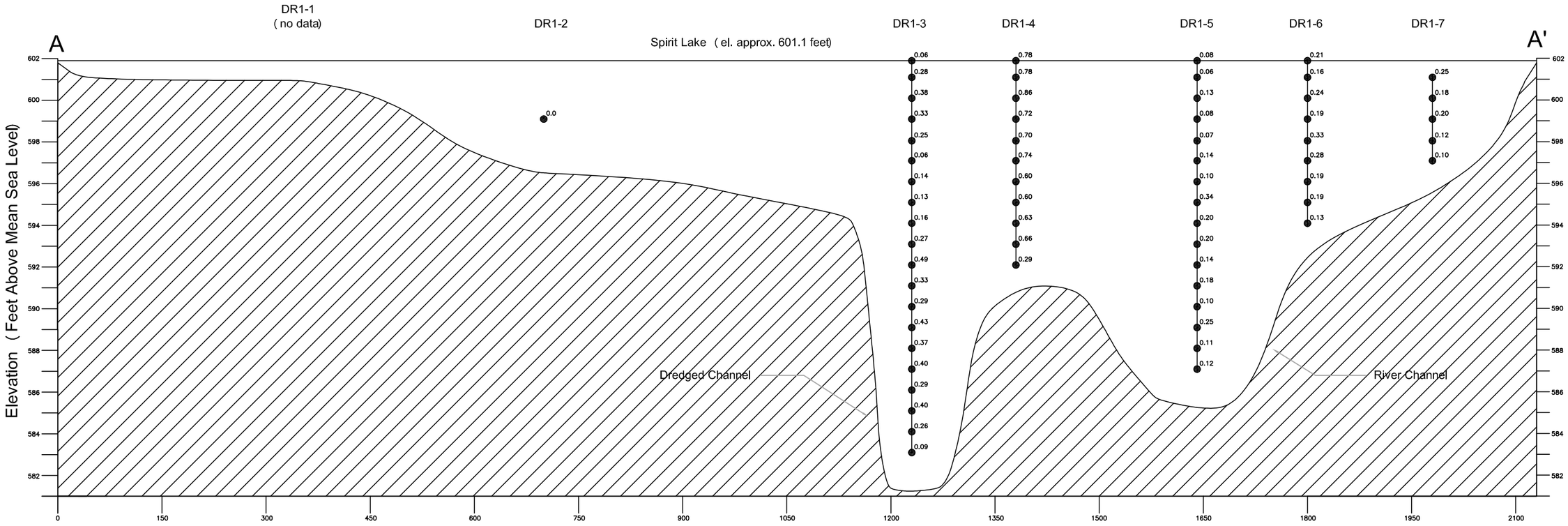
0 1,000 2,000

Feet

Figure 8

FALL 2011
HYDRODYNAMIC MEASUREMENT AND TRANSECT LOCATIONS
Spirit Lake Sediment Site -
Former U. S. Steel Duluth Works
Saint Louis River
Duluth, Minnesota

c-s3-06ac

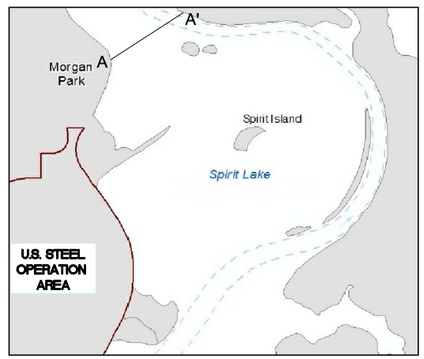


Sample Location	Date	Time Interval
DR1-2	Nov. 15 2011	1050
DR1-3	Nov. 16 2011	1112-1130
DR1-4	Nov. 16 2011	1258-1307
DR1-5	Nov. 16 2011	1506-1518
DR1-6	Nov. 17 2011	0850-0857
DR1-7	Nov. 17 2011	0953-0955

Legend

0.28 — Water Velocity (feet/second)
Sampling Location

Overview Map



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SPIRIT LAKE SEDIMENT SITE

FIGURE 9 – HYDRODYNAMIC MEASUREMENT TRANSECT DR1 (DOWN RIVER 1)

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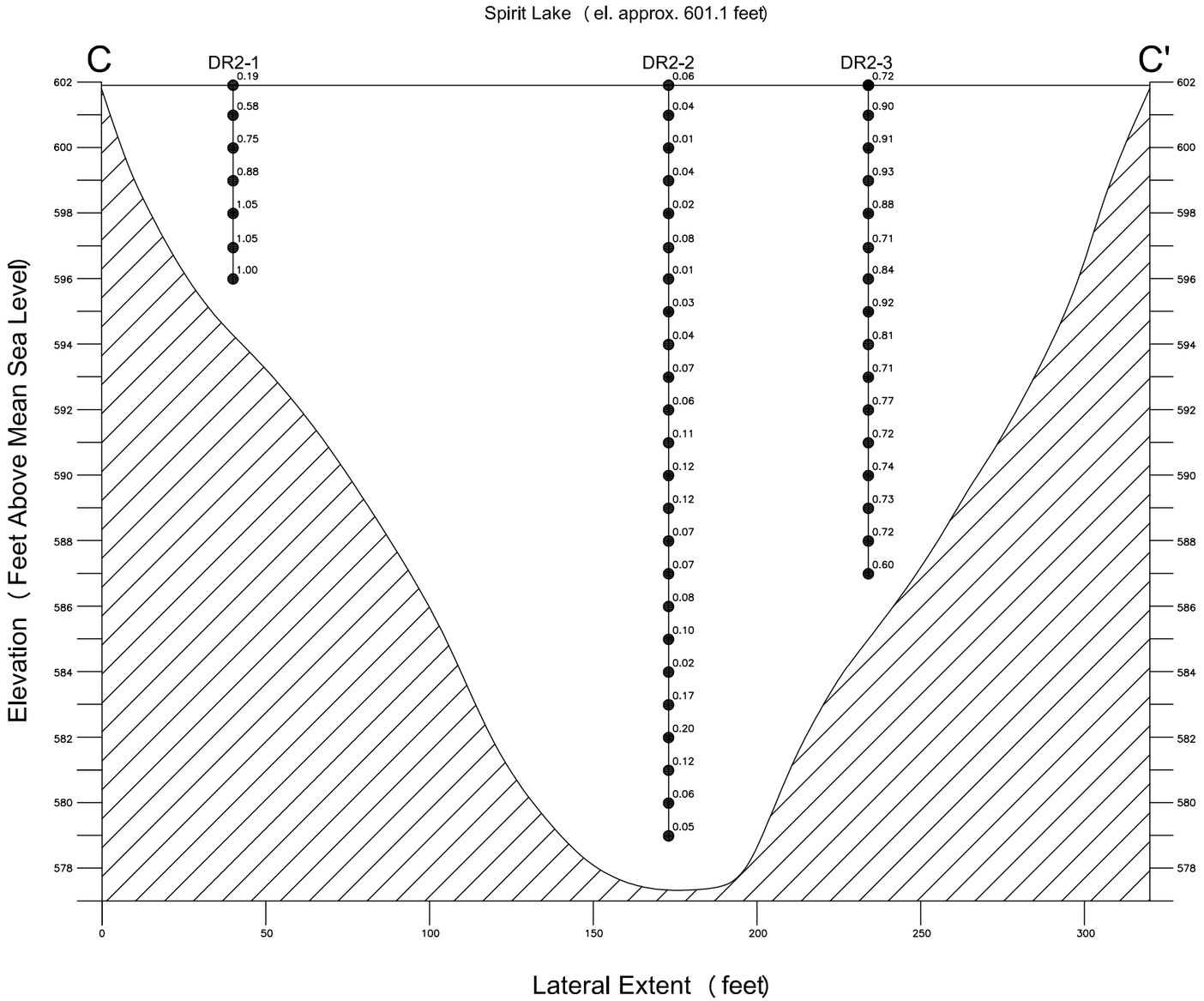

Sample Location	Date	Time Interval
DR2-1	Nov. 18 2011	1202-1206
DR2-2	Nov. 18 2011	1003-1020
DR2-3	Nov. 18 2011	1107-1117

Legend

0.28 — Water Velocity (feet/second)
Sampling Location

Overview Map

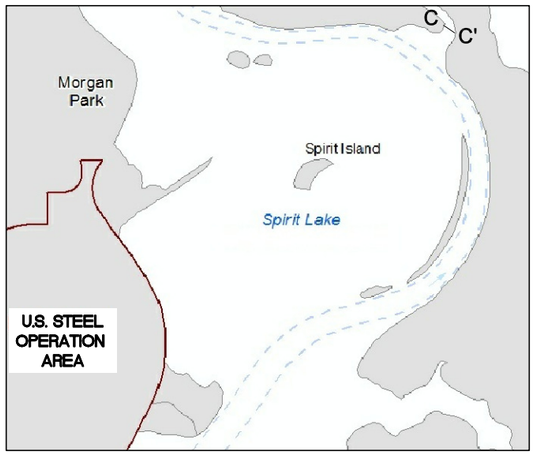

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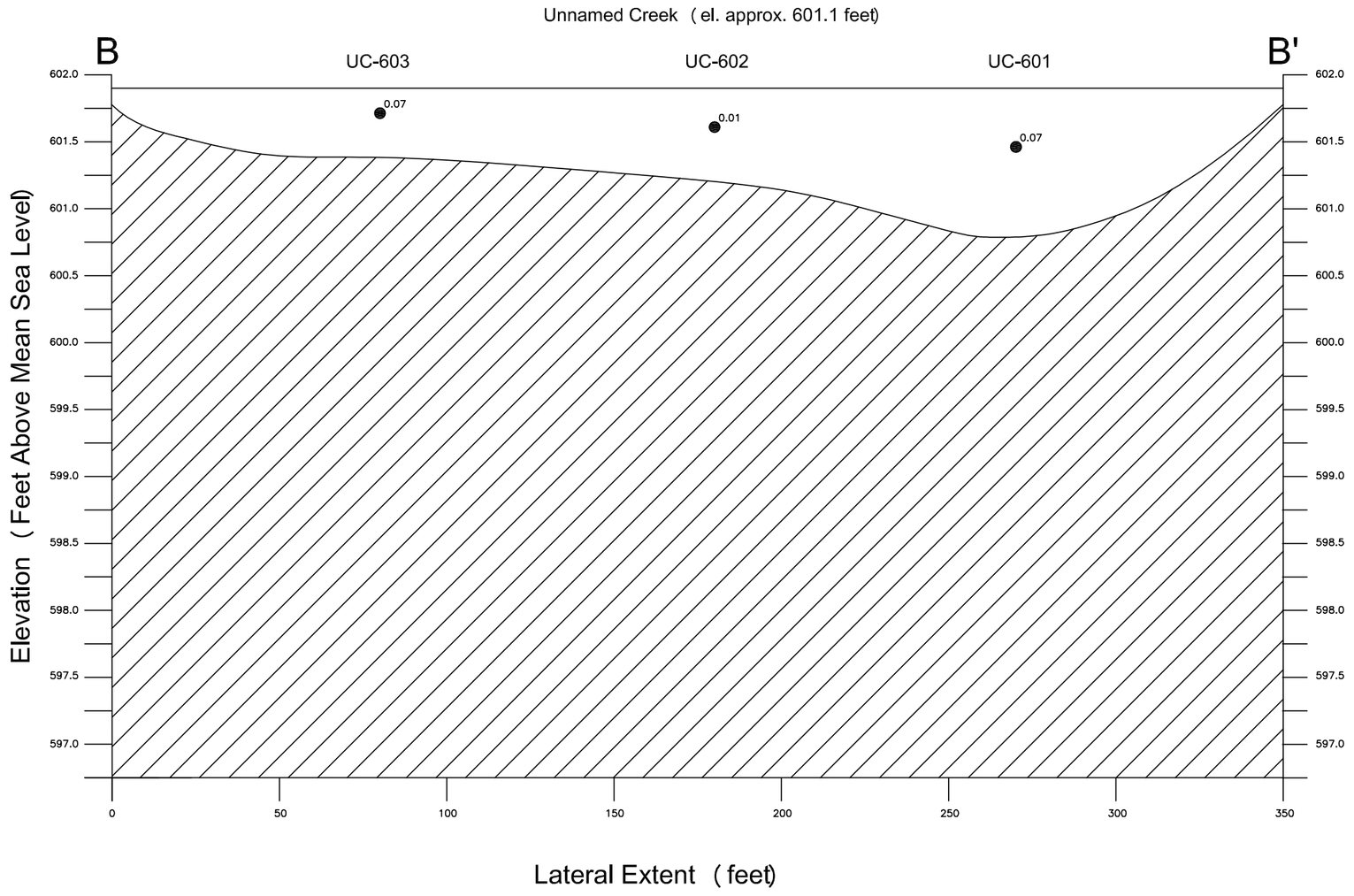
FIGURE 10 – HYDRODYNAMIC MEASUREMENT TRANSECT DR2 (DOWN RIVER 2) c-s3-06ac

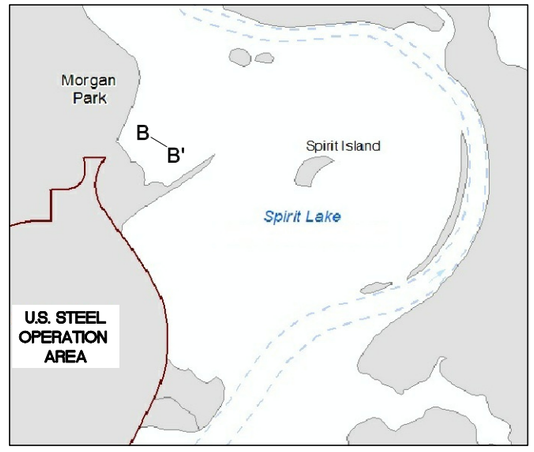
BARR PROJECT No.
CLIENT PROJECT No.
DWG No.
REV. No. 0



Legend

0.28 — Water Velocity (feet/second)
Sampling Location

Overview Map



Sample Location	Date	Time
UC-1	Nov. 14 2011	1400
UC-2	Nov. 14 2011	1445
UC-3	Nov. 14 2011	1530

CADD USER: Mark R. Betros FILE: M:\DESIGN\23691125 US STEEL\2011 FALL PROGRAM\FLOW TRANSECTS\FLOW TRANSECTS (FALL 2011)-TITLE REVISED.DWG PLOT SCALE: 1:2 PLOT DATE: 11/6/2012 3:22 PM

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FIGURE 11 – HYDRODYNAMIC MEASUREMENT TRANSECT UC (UNNAMED CREEK)

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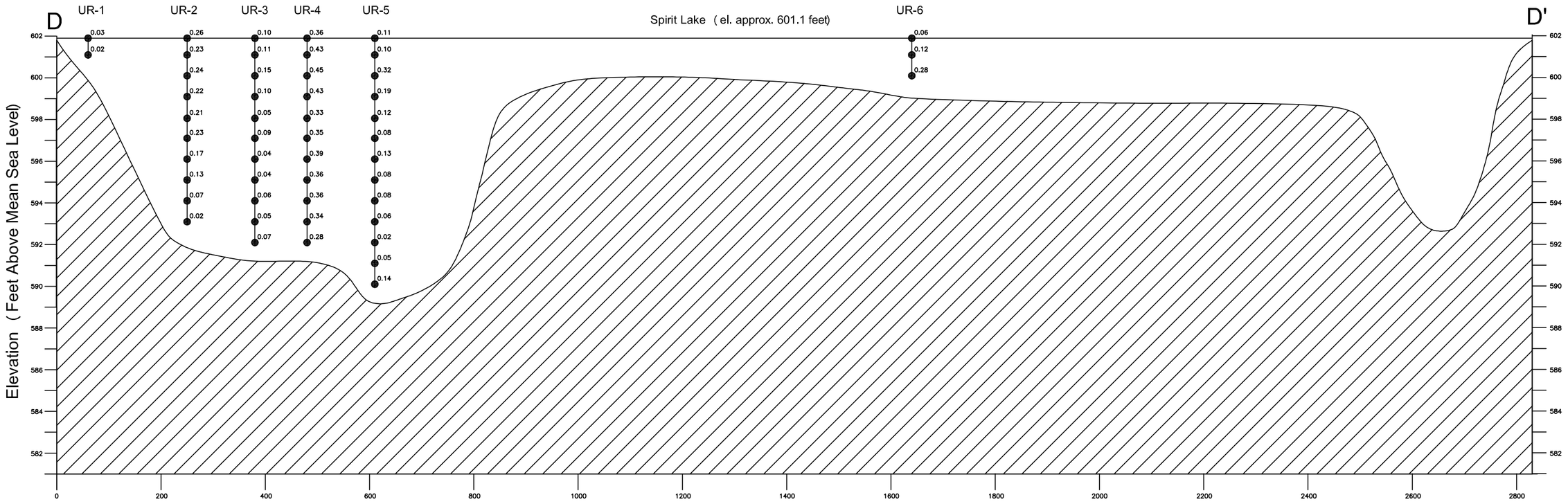
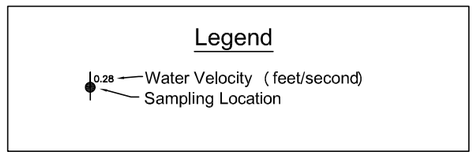
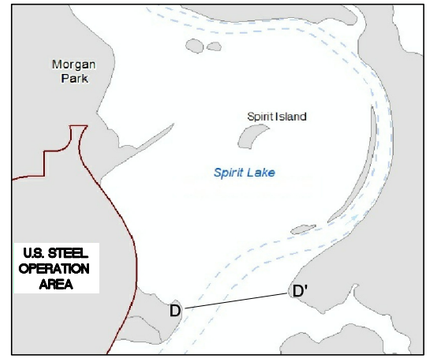


Sample Location	Date	Time Interval
UR-1	Nov. 17 2011	1250-1251
UR-2	Nov. 17 2011	1341-1348
UR-3	Nov. 18 2011	0812-0820
UR-4	Nov. 17 2011	1434-1441
UR-5	Nov. 17 2011	1526-1534
UR-6	Nov. 18 2011	0907-0909



Overview Map



CADD USER: Mark R. Betros FILE: M:\DESIGN\23691125 US STEEL\2011 FALL PROGRAM\FLOW TRANSECTS\FLOW TRANSECTS (FALL 2011)-TITLE REVISED.DWG PLOT SCALE: 1:2 PLOT DATE: 11/6/2012 3:22 PM

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNATURE _____

PRINTED NAME _____

DATE _____ REG. NO. _____

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DATE RELEASED

BARR
Corporate Headquarters:
Minneapolis, Minnesota
Ph: 1-800-632-2277

Project Office:
BARR ENGINEERING CO.
332 WEST SUPERIOR ST.
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DULUTH, MN. 55802
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Fax: (218) 727-6450
www.barr.com

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Date	11/6/12
Drawn	MRB2
Checked	IGM
Designed	
Approved	

FORMER U.S. STEEL DULUTH WORKS
DULUTH, MN

SPIRIT LAKE SEDIMENT SITE

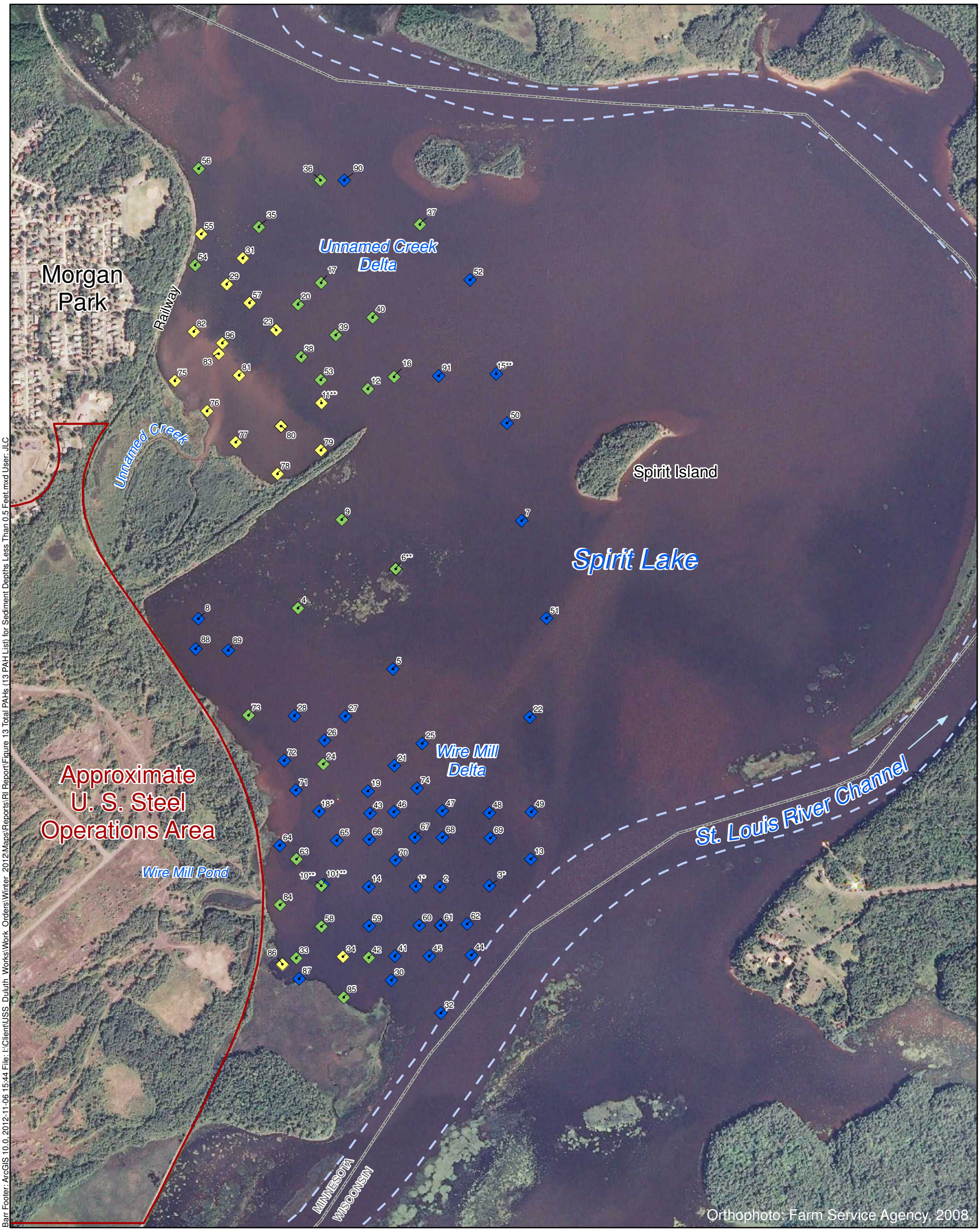
FIGURE 12 – HYDRODYNAMIC MEASUREMENT TRANSECT UR (UP RIVER)

BARR PROJECT No.

CLIENT PROJECT No.

DWG. No. c-s3-06ac

REV. No. 0



Total PAHs less than or equal to 1.6 mg/kg (Level I SQT)

Total PAHs greater than 1.6 mg/kg (Level I SQT) and less than or equal to 23 mg/kg (Level II SQT)

Total PAHs greater than 23 mg/kg (Level II SQT)

Approximate Location of St. Louis River Channel, Based on Orthophoto Interpretation

Approximate U. S. Steel Operations Area (URS, 2008)

State Boundary

Notes: SQT = Sediment quality target for the protection of sediment-dwelling organisms (MPCA, 2007)
Results shown are the surficial sample for a given location.
Results shown are the maximum value for the given depth range.

* Indicates sample taken at 0'-0.7' depth range.
** Indicates sample taken at 0'-1' depth range.

N

0 800 1,600

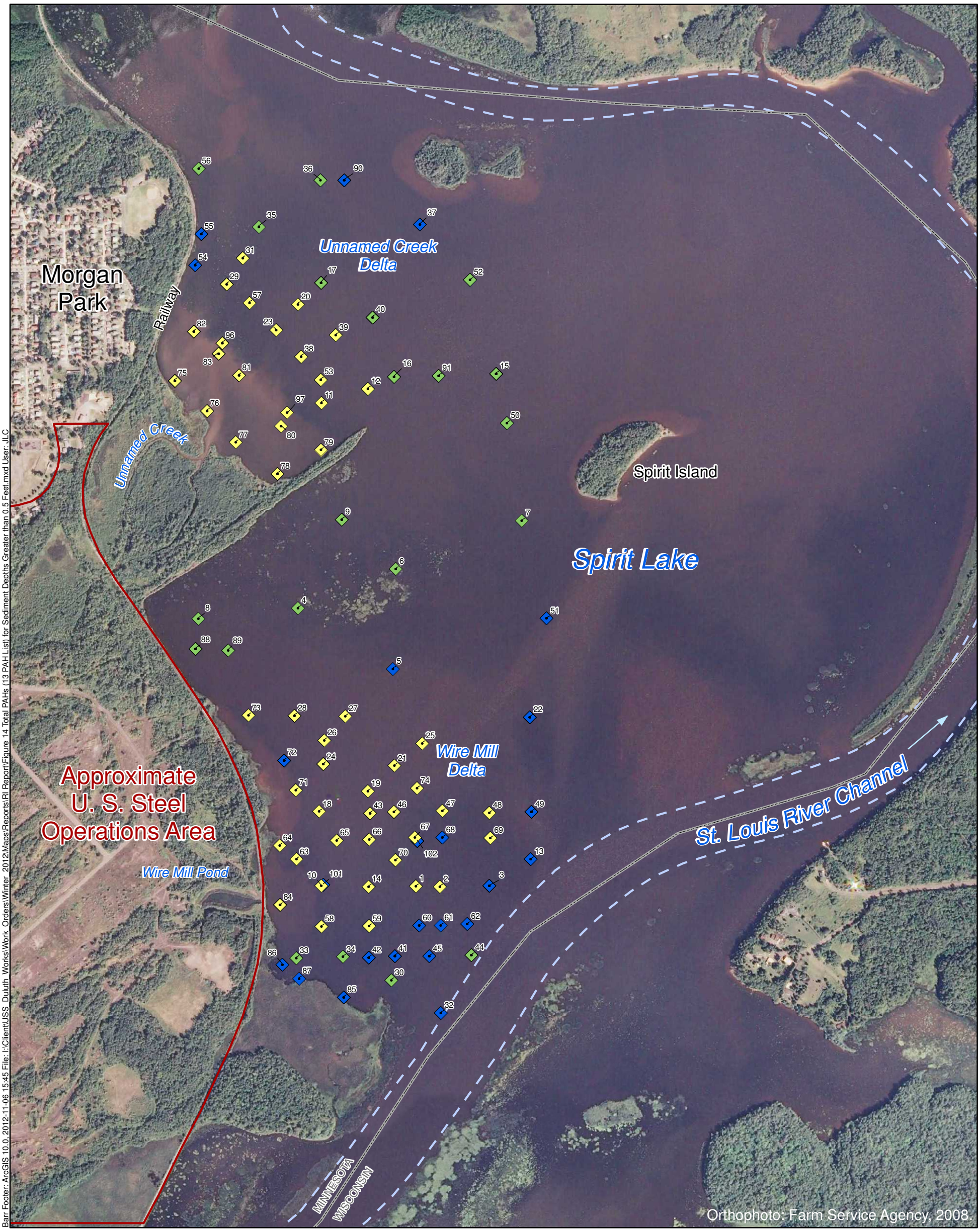
Feet

Figure 13

TOTAL PAHS (13 PAH LIST) SEDIMENT DEPTHS LESS THAN OR EQUAL TO 0.5 FEET

Spirit Lake Sediment Site -
Former U. S. Steel Duluth Works
Saint Louis River
Duluth, Minnesota

c-s3-06ac



Total PAHs less than or equal to 1.6 mg/kg (Level I SQT)

Total PAHs greater than 1.6 mg/kg (Level I SQT) and less than or equal to 23 mg/kg (Level II SQT)

Total PAHs greater than 23 mg/kg (Level II SQT)

Approximate Location of St. Louis River Channel, Based on Orthophoto Interpretation

Approximate U. S. Steel Operations Area (URS, 2008)

State Boundary

Notes: SQT = Sediment quality target for the protection of sediment-dwelling organisms (MPCA, 2007)
Results shown are the maximum value for the given depth range.

N

0 800 1,600

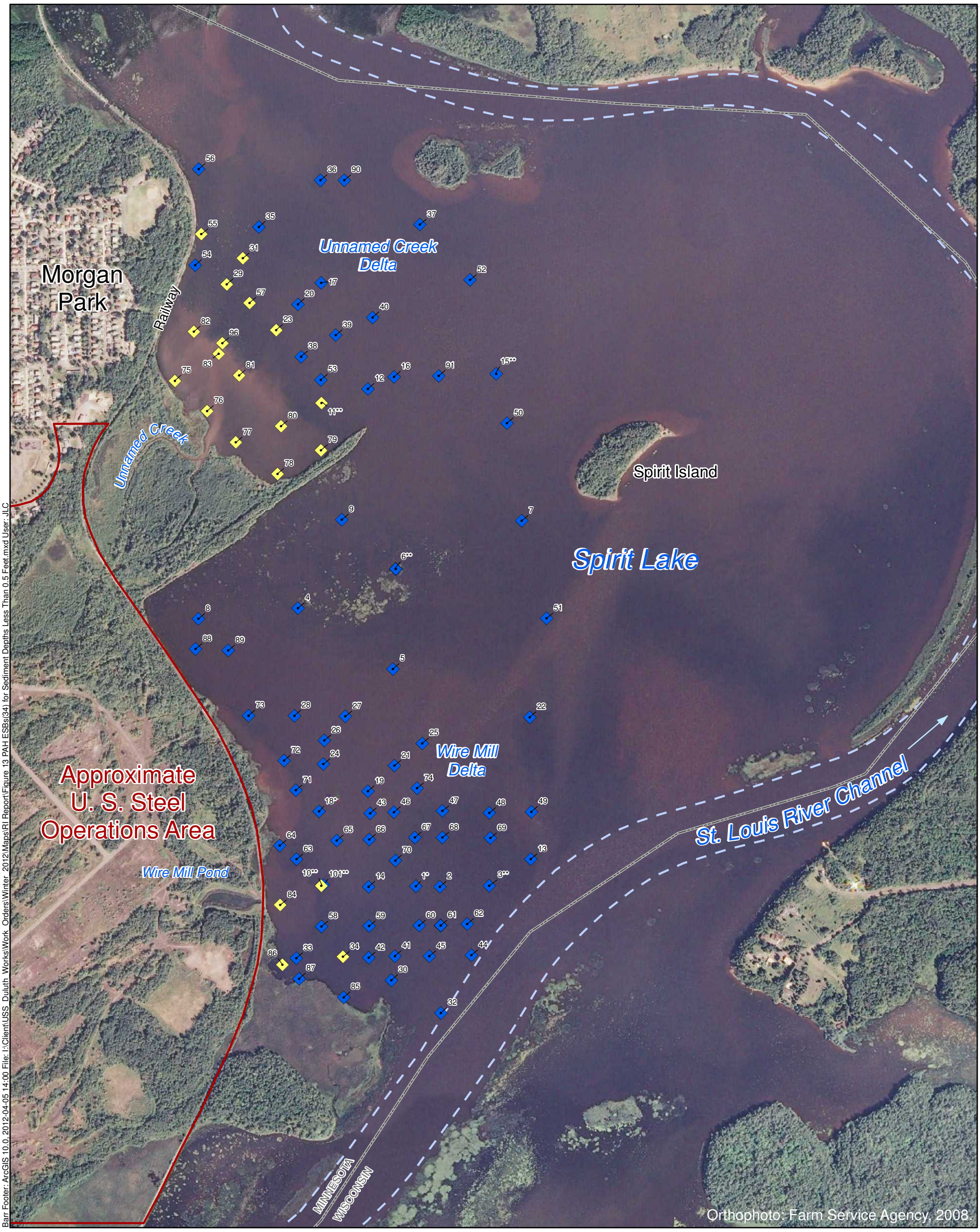
Feet

Figure 14

TOTAL PAHS (13 PAH LIST) SEDIMENT DEPTHS GREATER THAN 0.5 FEET

Spirit Lake Sediment Site -
Former U. S. Steel Duluth Works
Saint Louis River
Duluth, Minnesota

c-s3-06ac



Barr Footer: ArcGIS 10.0, 2012-04-05 14:00 File: I:\Client\USS_Duluth_Works\Work_Orders\Winter_2012\Maps\RI Report\Figure 13 PAH ESBs(34) for Sediment Depths Less Than 0.5 Feet.mxd User: JLC

PAH ESB less than or equal to 1.0

PAH ESB greater than 1.0

Approximate Location of St. Louis River Channel, Based on Orthophoto Interpretation

Approximate U. S. Steel Operations Area (URS, 2008)

State Boundary

Notes: Results shown are the surficial sample for the given location.
Results shown are the maximum value for the given depth range.

* Indicates sample taken at 0'-0.7' depth range.
** Indicates sample taken at 0'-1' depth range.

N

0 800 1,600

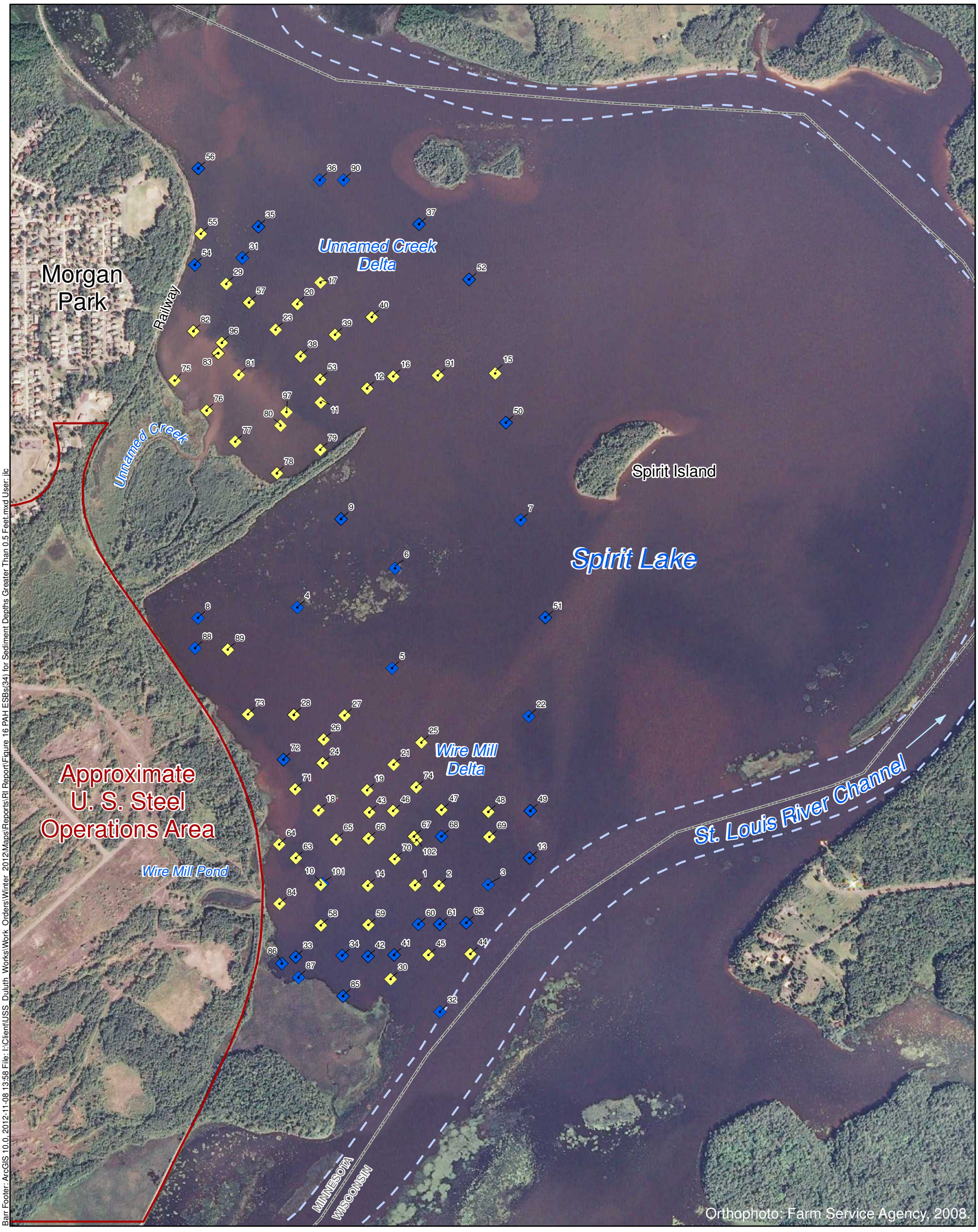
Feet

Figure 15

PAH ESBS(34) FOR SEDIMENT DEPTHS LESS THAN OR EQUAL TO 0.5 FEET

Spirit Lake Sediment Site -
Former U. S. Steel Duluth Works
Saint Louis River
Duluth, Minnesota

c-s3-06ac



PAH ESB less than or equal to 1.0

PAH ESB greater than 1.0

Approximate Location of St. Louis River Channel, Based on Orthophoto Interpretation

Approximate U. S. Steel Operations Area (URS, 2008)

State Boundary

Notes: PAH ESBs shown are the maximum value for the given depth range.
ESB PAH values shown use all available PAH data from the 2011 sampling events,
for locations that did not have the PAH34 list analyzed, the PAH17 list and
ESB PAH scaling equation (Appendix I) was used to calculate an equivalent ESB PAH value.

N

0 800 1,600

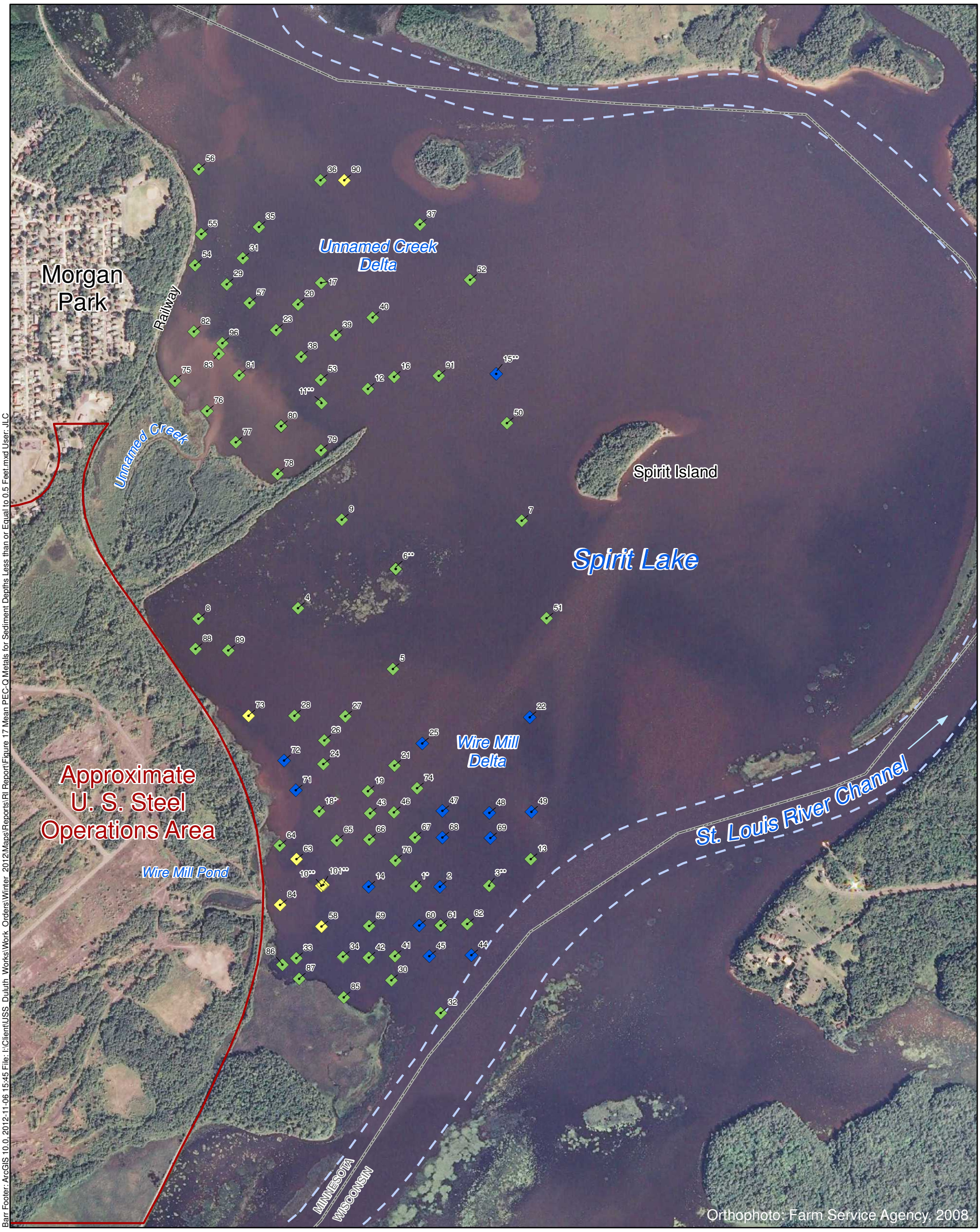
Feet

Figure 16

PAH ESBS(34) FOR SEDIMENT DEPTHS GREATER THAN 0.5 FEET

Spirit Lake Sediment Site -
Former U. S. Steel Duluth Works
Saint Louis River
Duluth, Minnesota

c-s3-06ac



Mean PEC-Q Metals less than or equal to 0.1

Mean PEC-Q Metals greater than 0.1 and less than or equal to 0.6

Mean PEC-Q Metals greater than 0.6

Approximate Location of St. Louis River Channel, Based on Orthophoto Interpretation

Approximate U. S. Steel Operations Area (URS, 2008)

State Boundary

Notes: Results shown are the surficial sample for the given location.
Results shown are the maximum value for the given depth range.

* Indicates sample taken at 0'-0.7' depth range.
** Indicates sample taken at 0'-1' depth range.

N

0 800 1,600

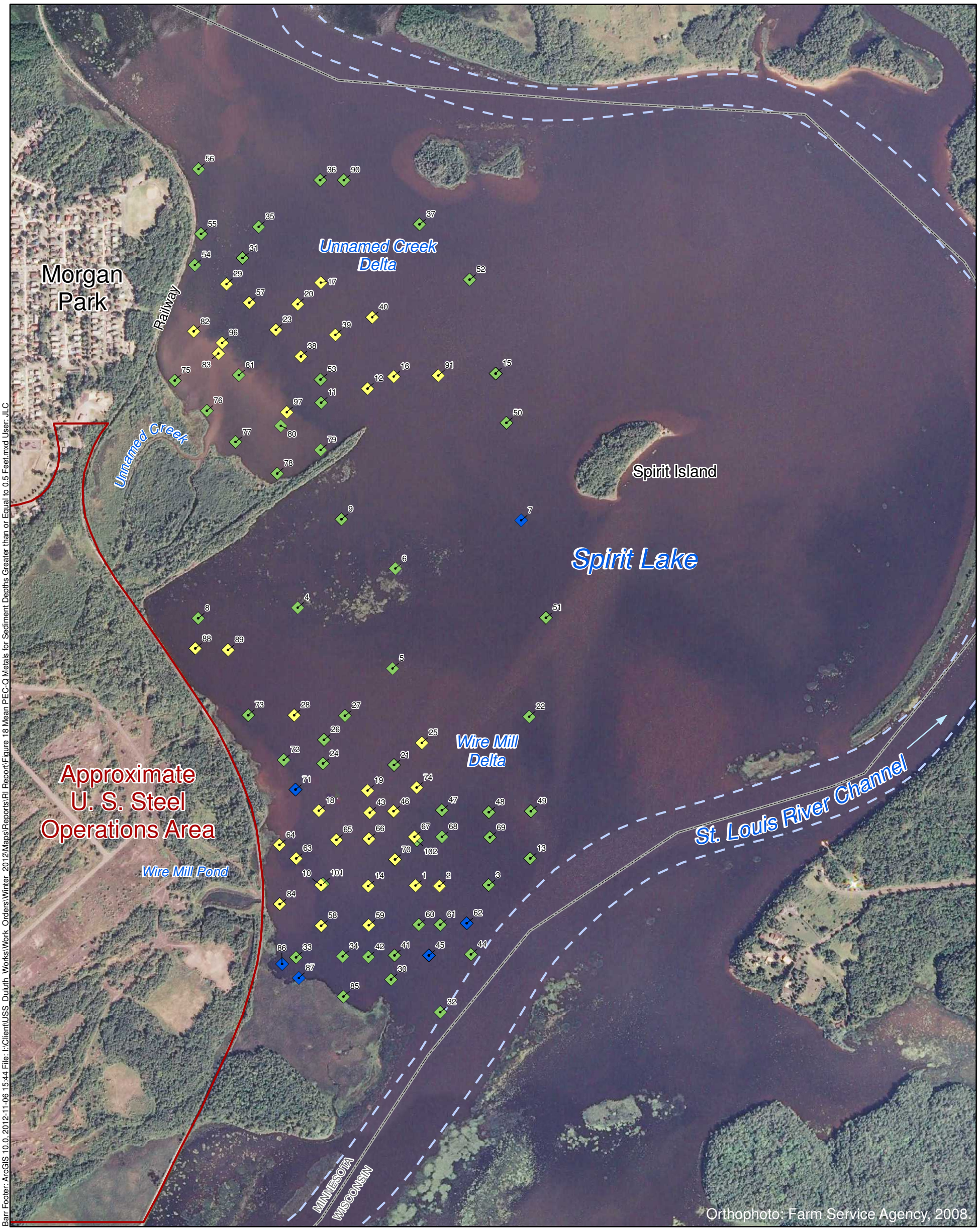
Feet

Figure 17

MEAN PEC-Q METALS FOR SEDIMENT DEPTHS LESS THAN OR EQUAL TO 0.5 FEET

Spirit Lake Sediment Site -
Former U. S. Steel Duluth Works
Saint Louis River
Duluth, Minnesota

c-s3-06ac



Barr Footer: ArcGIS 10.0, 2012-11-06 15:44 File: I:\Client\USS_Duluth_Works\Work_Orders\Winter_2012\Maps\Reports\RI Report\Figure 18 Mean PEC-Q Metals for Sediment Depths Greater than or Equal to 0.5 Feet.mxd User: JLC

- Mean PEC-Q Metals less than or equal to 0.1
- Mean PEC-Q Metals greater than 0.1 and less than or equal to 0.6
- Mean PEC-Q Metals greater than 0.6
- Approximate Location of St. Louis River Channel, Based on Orthophoto Interpretation
- Approximate U. S. Steel Operations Area (URS, 2008)
- State Boundary

Note: Mean PEC-Q Metals shown are the maximum value for the given depth range.

N

0 800 1,600

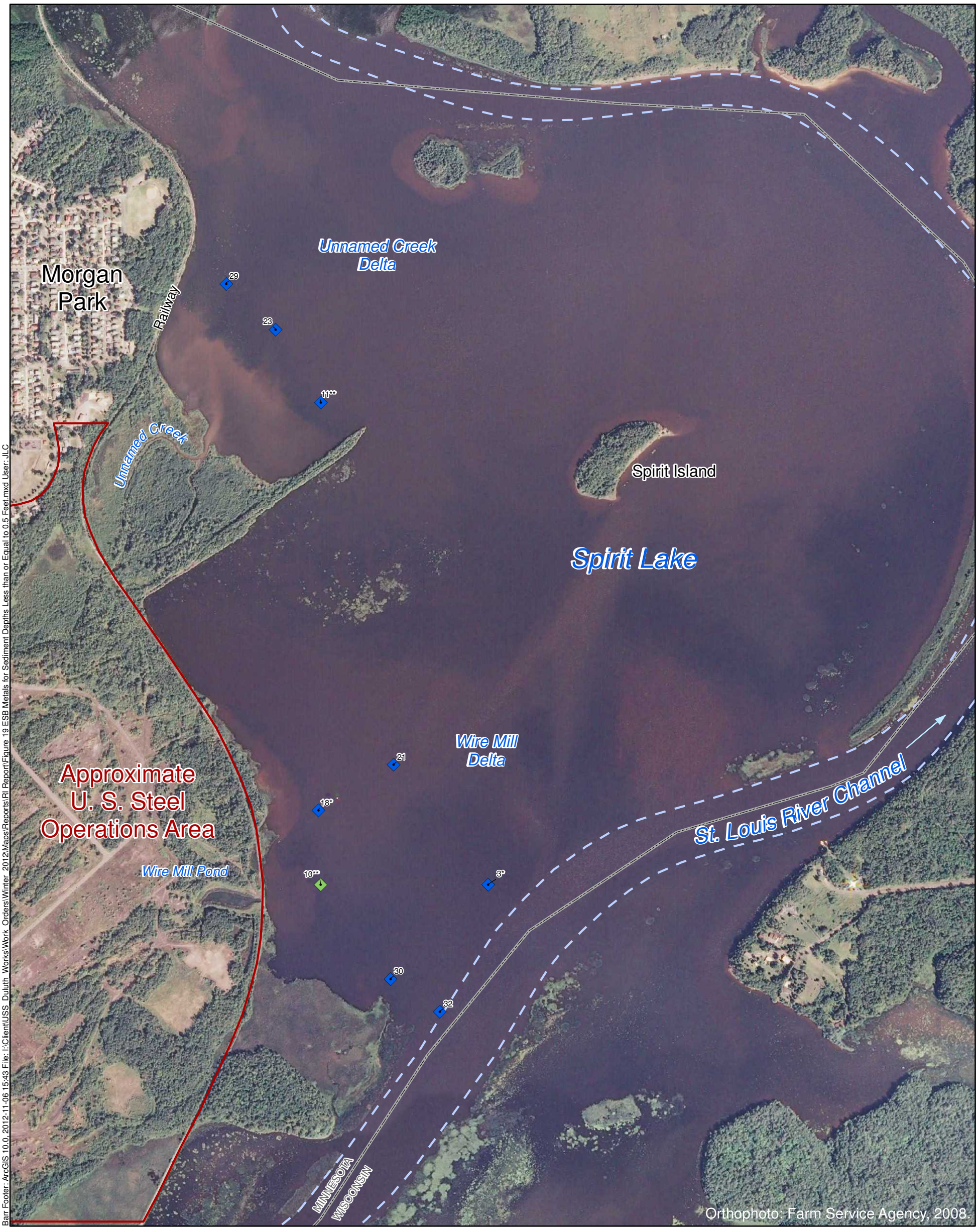
Feet

Figure 18

MEAN PEC-Q METALS FOR SEDIMENT DEPTHS GREATER THAN 0.5 FEET

Spirit Lake Sediment Site - Former U. S. Steel Duluth Works
Saint Louis River
Duluth, Minnesota

c-s3-06ac



Barr Footer: ArcGIS 10.0, 2012-11-06 15:43 File: I:\Client\USS_Duluth_Works\Work_Orders\Winter_2012\Maps\Reports\RI Report\Figure 19 ESB Metals for Sediment Depths Less than or Equal to 0.5 Feet.mxd User: JLC

ESB Metals less than or equal to 130 micromol/g_{oc}

ESB Metals greater than 130 micromol/g_{oc} and less than 3,000 micromol/g_{oc}

ESB Metals greater than or equal to 3,000 micromol/g_{oc}

Approximate Location of St. Louis River Channel, Based on Orthophoto Interpretation

Approximate U. S. Steel Operations Area (URS, 2008)

State Boundary

Note: Results shown are the surficial sample for a given location.
Results shown are the maximum value for the given depth range.

* Indicates sample taken at 0'-0.7' depth range.
** Indicates sample taken at 0'-1' depth range.

N

0 800 1,600

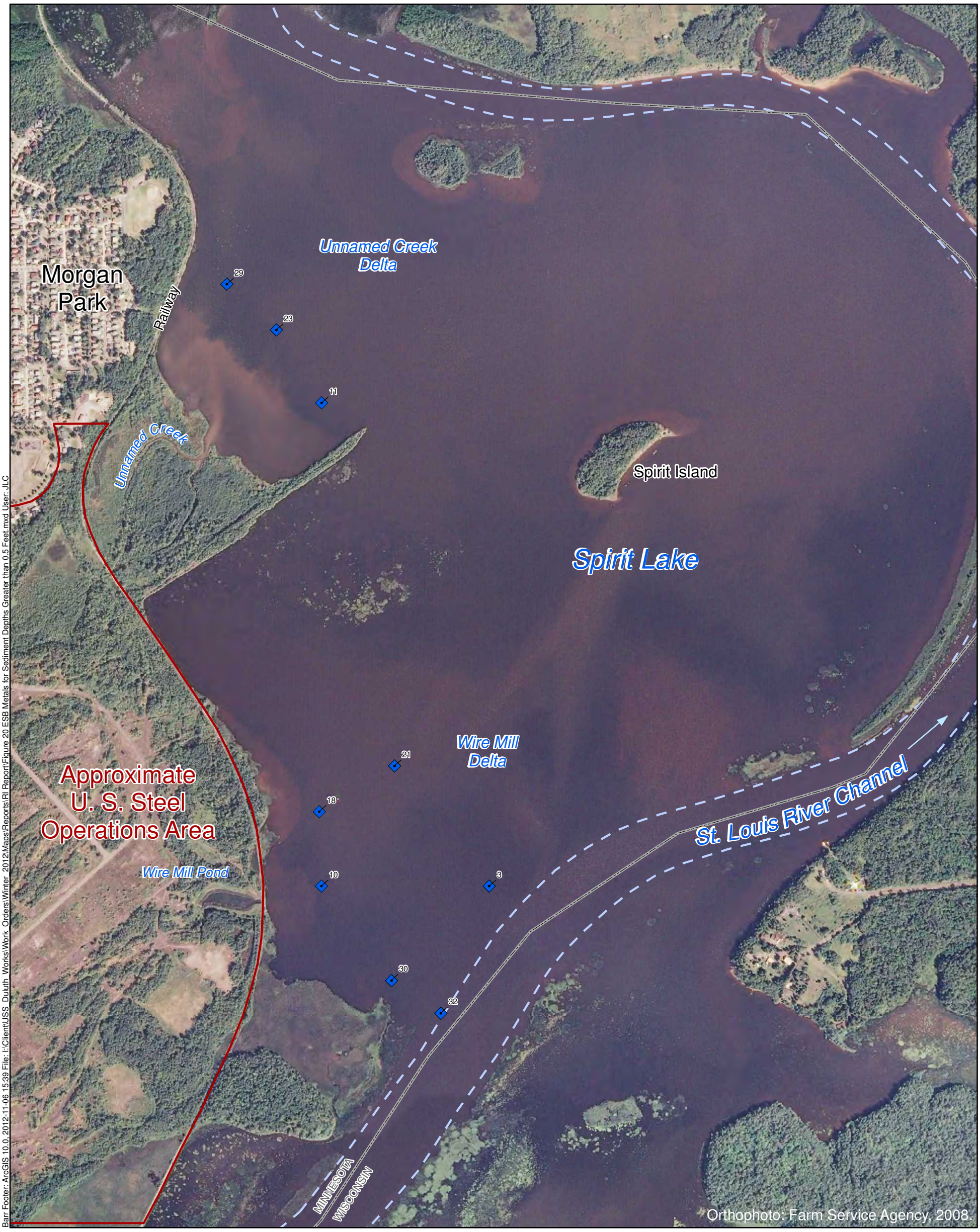
Feet

Figure 19

ESB METALS FOR SEDIMENT DEPTHS LESS THAN OR EQUAL TO 0.5 FEET

Spirit Lake Sediment Site -
Former U. S. Steel Duluth Works
Saint Louis River
Duluth, Minnesota

c-s3-06ac



Barr Footer: ArcGIS 10.0, 2012-11-06 15:39 File: I:\Client\USS_Duluth_Works\Work_Orders\Winter_2012\Maps\Reports\RI Report\Figure 20 ESB Metals for Sediment Depths Greater than 0.5 Feet.mxd User: JLC

- ESB Metals less than or equal to 130 micromol/g_{oc}
- ESB Metals greater than 130 micromol/g_{oc} and less than 3,000 micromol/g_{oc}
- ESB Metals greater than or equal to 3,000 micromol/g_{oc}
- Approximate Location of St. Louis River Channel, Based on Orthophoto Interpretation
- Approximate U. S. Steel Operations Area (URS, 2008)
- State Boundary

Note: ESB Metals shown are the maximum value for the given depth range.

N

0 800 1,600

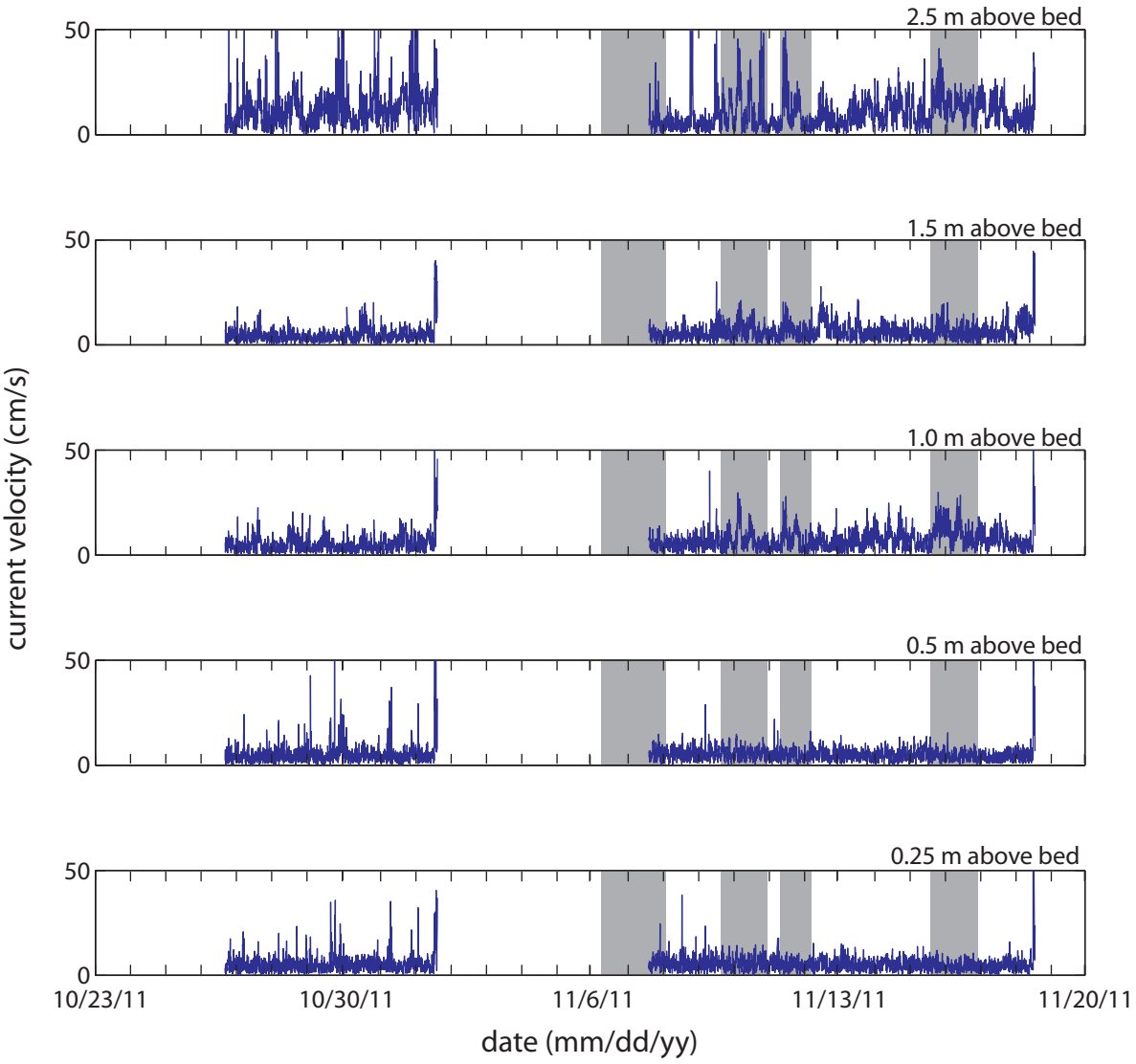
Feet

Figure 20

ESB METALS FOR SEDIMENT DEPTHS GREATER THAN 0.5 FEET

Spirit Lake Sediment Site -
Former U. S. Steel Duluth Works
Saint Louis River
Duluth, Minnesota

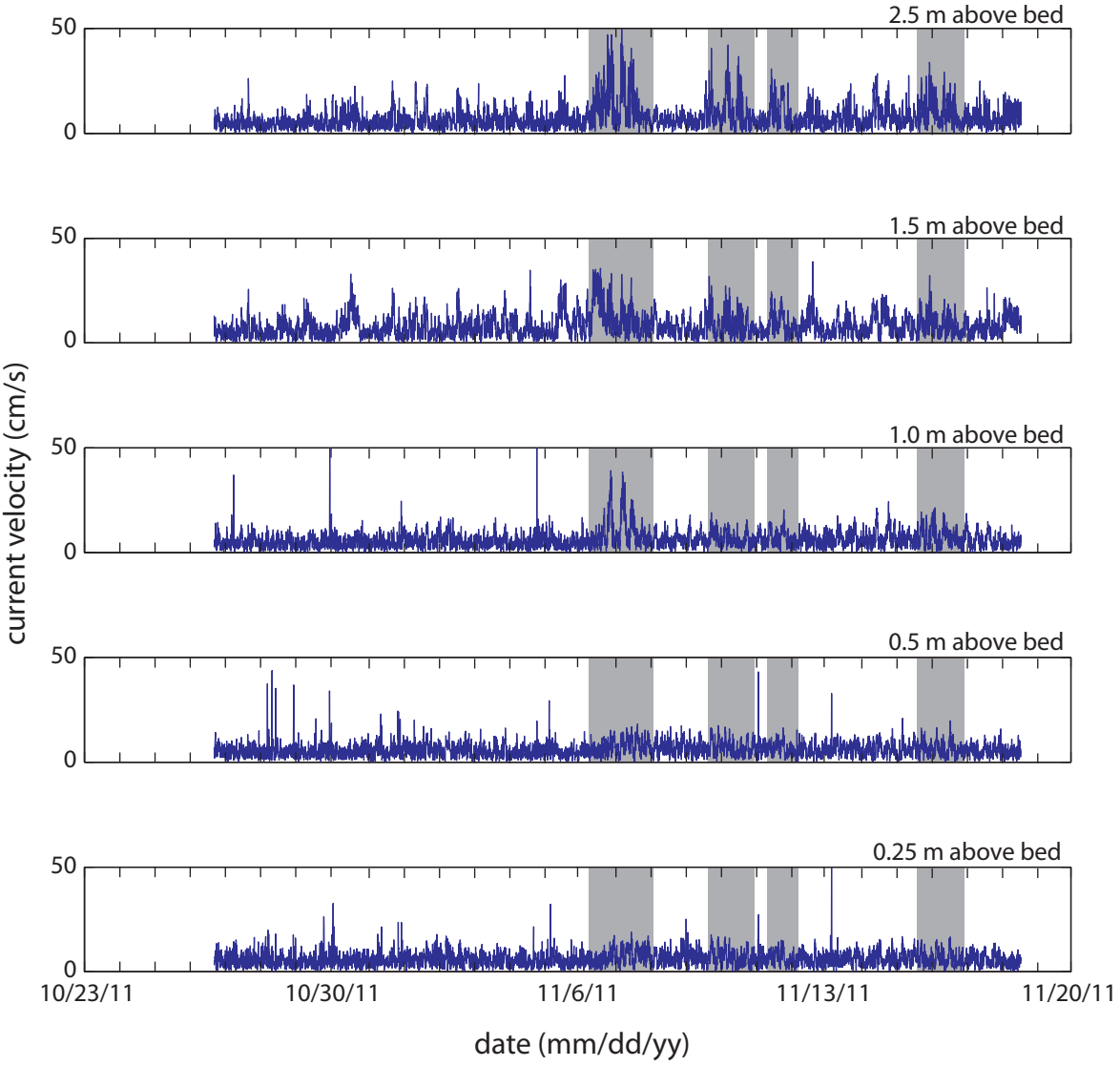
c-s3-06ac



Data from instrument UCVelocity - 1
see Figure 6 for location

Figure 21

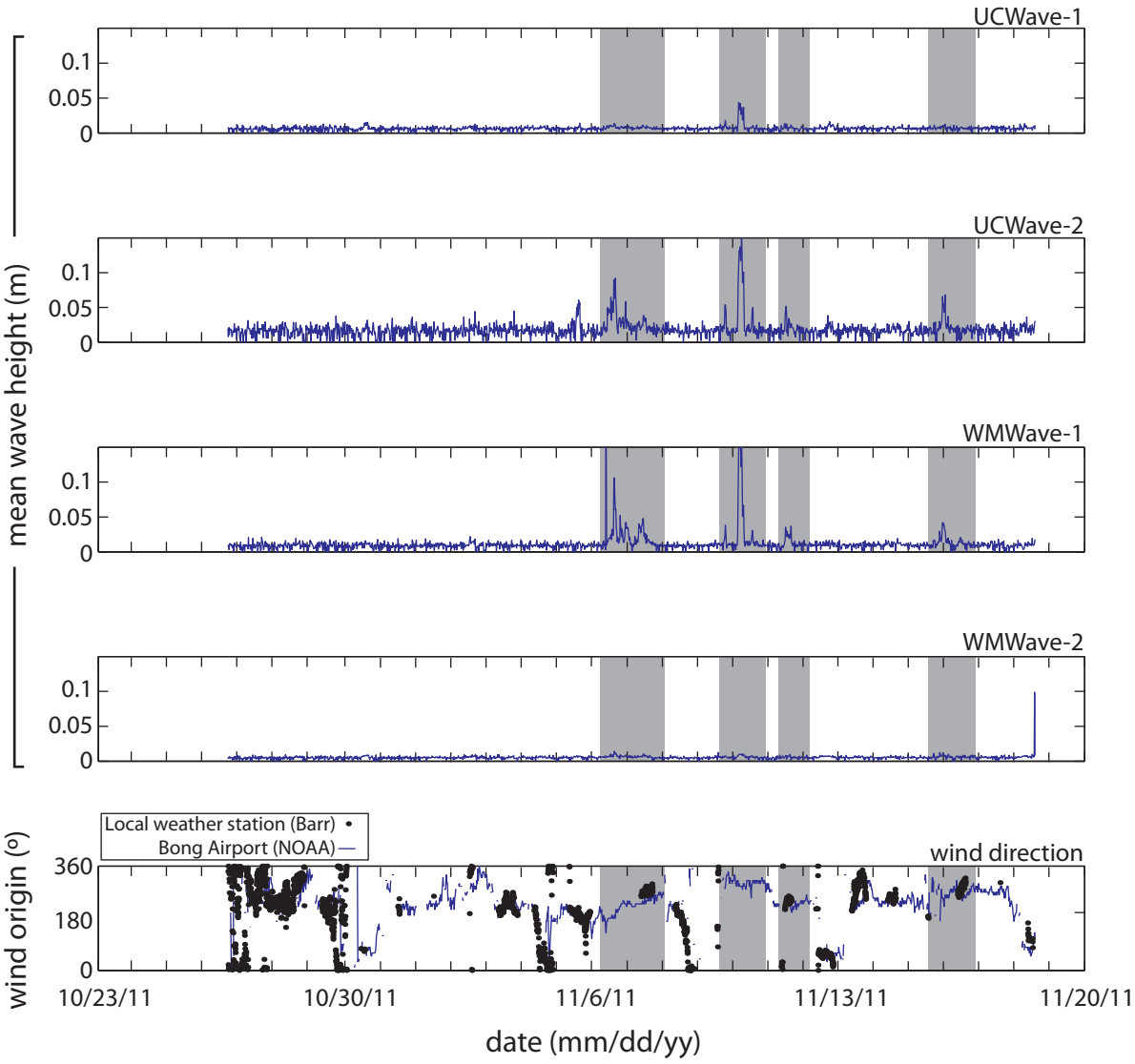
Fall 2011
Unnamed Creek ADCP Data
Spirit Lake Sediment Site -
Former U. S. Steel Duluth Works
Saint Louis River
Duluth, Minnesota



Data from instrument WMVelocity - 1
see Figure 6 for location

Figure 22

Fall 2011
Wiremill Delta ADCP Data
Spirit Lake Sediment Site -
Former U. S. Steel Duluth Works
Saint Louis River
Duluth, Minnesota



major wind events

see Figure 6 for instrument locations

Figure 23

Fall 2011
Wave Height Data
Spirit Lake Sediment Site -
Former U. S. Steel Duluth Works
Saint Louis River
Duluth, Minnesota

Completed Sediment Sample Location

Sediment Samples from Previous Investigations

Meteorological Station

Surface Water Level Gauge

Piezometer Location

Approximate Outer Study Area Limit

Approximate Location of St. Louis River Channel, Based on Orthophoto Interpretation

Cross Section Locations

State Boundary

Approximate U. S. Steel Operations Area (URS, 2008)

N

0 800 1,600

Feet

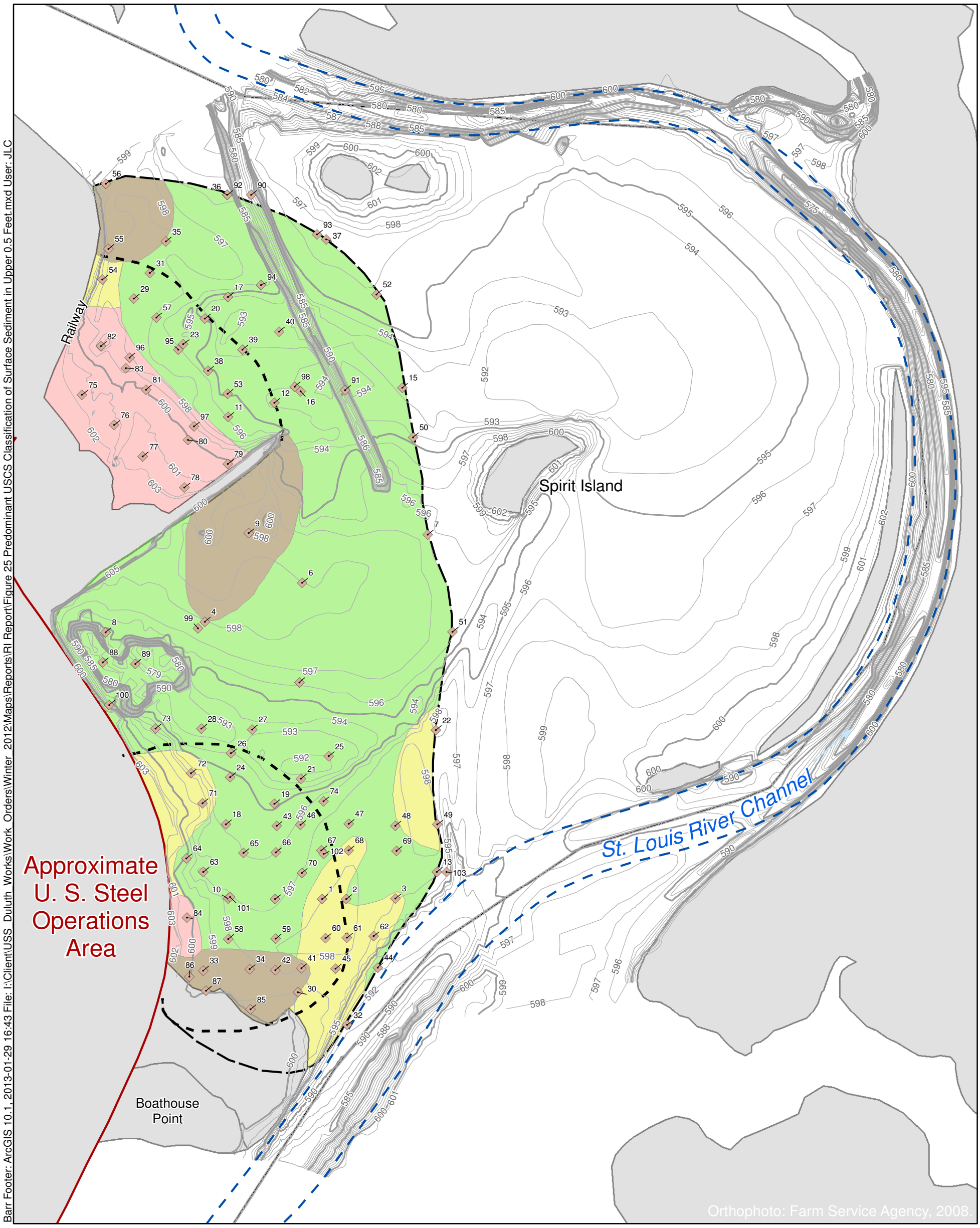
Figure 24

GEOLOGIC CROSS-SECTION LOCATIONS

Spirit Lake Sediment Site -
Former U. S. Steel Duluth Works
Saint Louis River
Duluth, Minnesota

c-s3-06ac

Barr Footer: ArcGIS 10.1, 2013-01-29 16:41 File: I:\Client\USS_Duluth_Works\Work_Orders\Winter_2012\Maps\Reports\RI Report\Figure 24 Geologic Cross-Section Locations.mxd User: JLC



Barr Footer: ArcGIS 10.1, 2013-01-29 16:43 File: I:\Client\USS_Duluth_Works\Work_Orders\Winter_2012\Maps\Reports\RI Report\Figure 25 Predominant USCS Classification of Surface Sediment in Upper 0.5 Feet.mxd User: JLC

- Predominantly Fill
- Predominantly Peat
- Predominantly Sand
- Predominantly Silt
- Samples Completed
- Bathymetry Contour (5-Foot)
- Bathymetry Contour (1-Foot)
- Approximate Outer Study Area Limit
- Approximate Limit of tPAH greater than Sediment Quality Target Concentrations for Sediments Near Surface - Based on Historic Data
- Approximate Location of St. Louis River Channel, Based on Orthophoto Interpretation
- State Boundary
- Approximate U. S. Steel Property (URS, 2008) *Approximate U. S. Steel Property (URS, 2008)*

Note: Determination of USCS Classification was based on boring log descriptions.

N

0 400 800 1,600

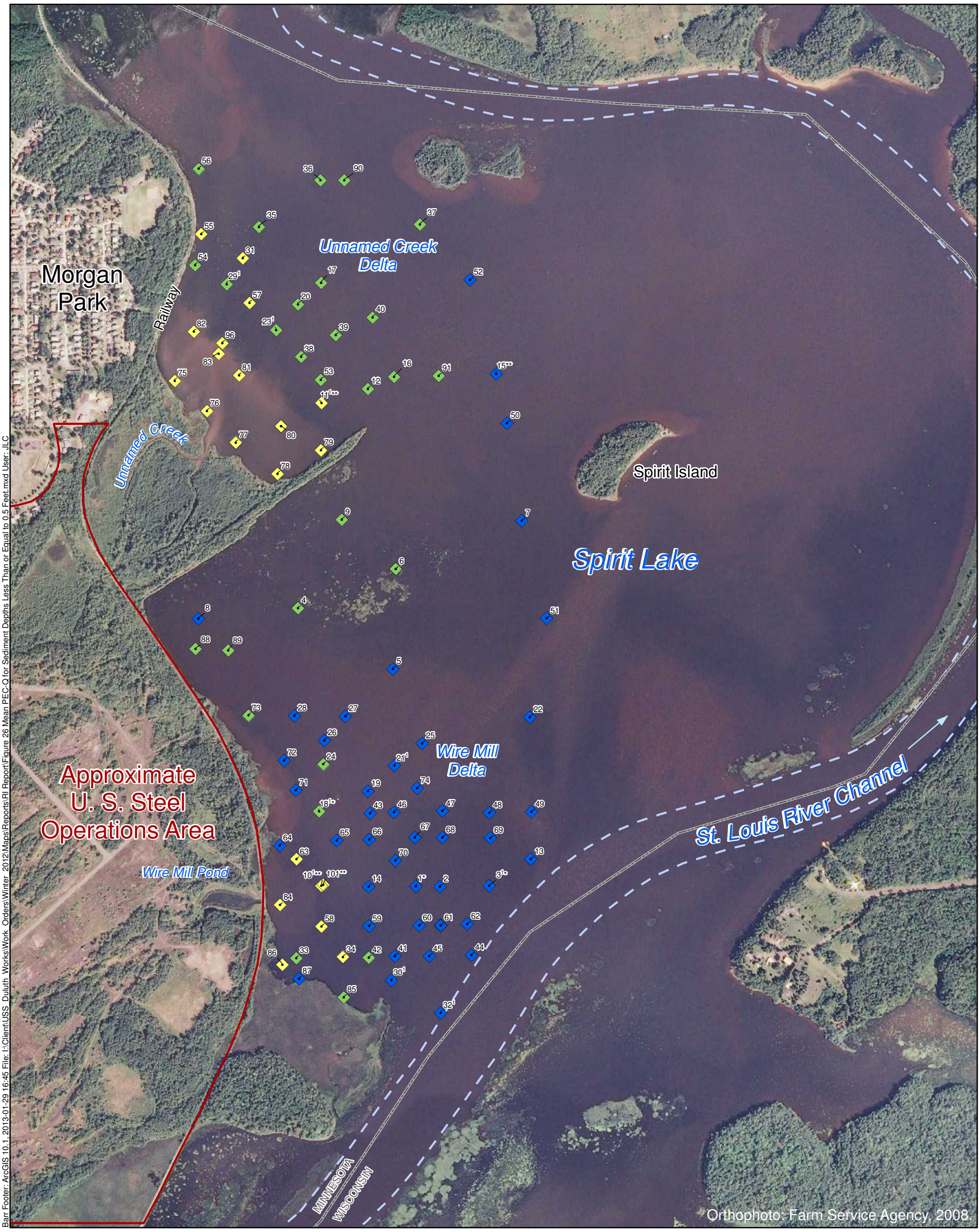
Feet

Figure 25

PREDOMINANT USCS CLASSIFICATION IN SURFACE SEDIMENT (0 - 0.5 FEET)

Spirit Lake Sediment Site -
Former U. S. Steel Duluth Works
Saint Louis River
Duluth, Minnesota

c-s3-06ac



Barr Footer: ArcGIS 10.1, 2013-01-29 16:45 File: I:\Client\USS_Duluth_Works\Work_Orders\Winter_2012\Maps\Reports\RI Report\Figure 26 Mean PEC-Q for Sediment Depths Less Than or Equal to 0.5 Feet.mxd User: JLC

- Mean PEC-Q less than or equal to 0.1
- Mean PEC-Q greater than 0.1 and less than or equal to 0.6
- Mean PEC-Q greater than 0.6
- Approximate Location of St. Louis River Channel, Based on Orthophoto Interpretation
- Approximate U. S. Steel Operations Area (URS, 2008)
- State Boundary

Notes: Mean PEC-Q calculated in accordance with the *Guidance for the use and application of sediment quality targets for the protection of sediment-dwelling organisms in Minnesota* (MPCA, 2007) by dividing chemical concentrations by the respective Level II SQTs.

SQT = Sediment quality target for the protection of sediment-dwelling organisms (MPCA, 2007)
Mean PEC-Q = Mean probable effect concentration quotient (MPCA, 2007)
Results shown are the surficial sample for a given location.
Results shown are the maximum value for the given depth range.

* Indicates sample taken at 0'-0.7' depth range.
** Indicates sample taken at 0'-1' depth range.
[1] Indicates samples where PAHs, metals, and PCBs were used to calculate the mean PEC-Q. All other locations shown use PAH and metal concentrations to calculate the mean PEC-Q since PCBs were not analyzed at those locations.

N

0 800 1,600

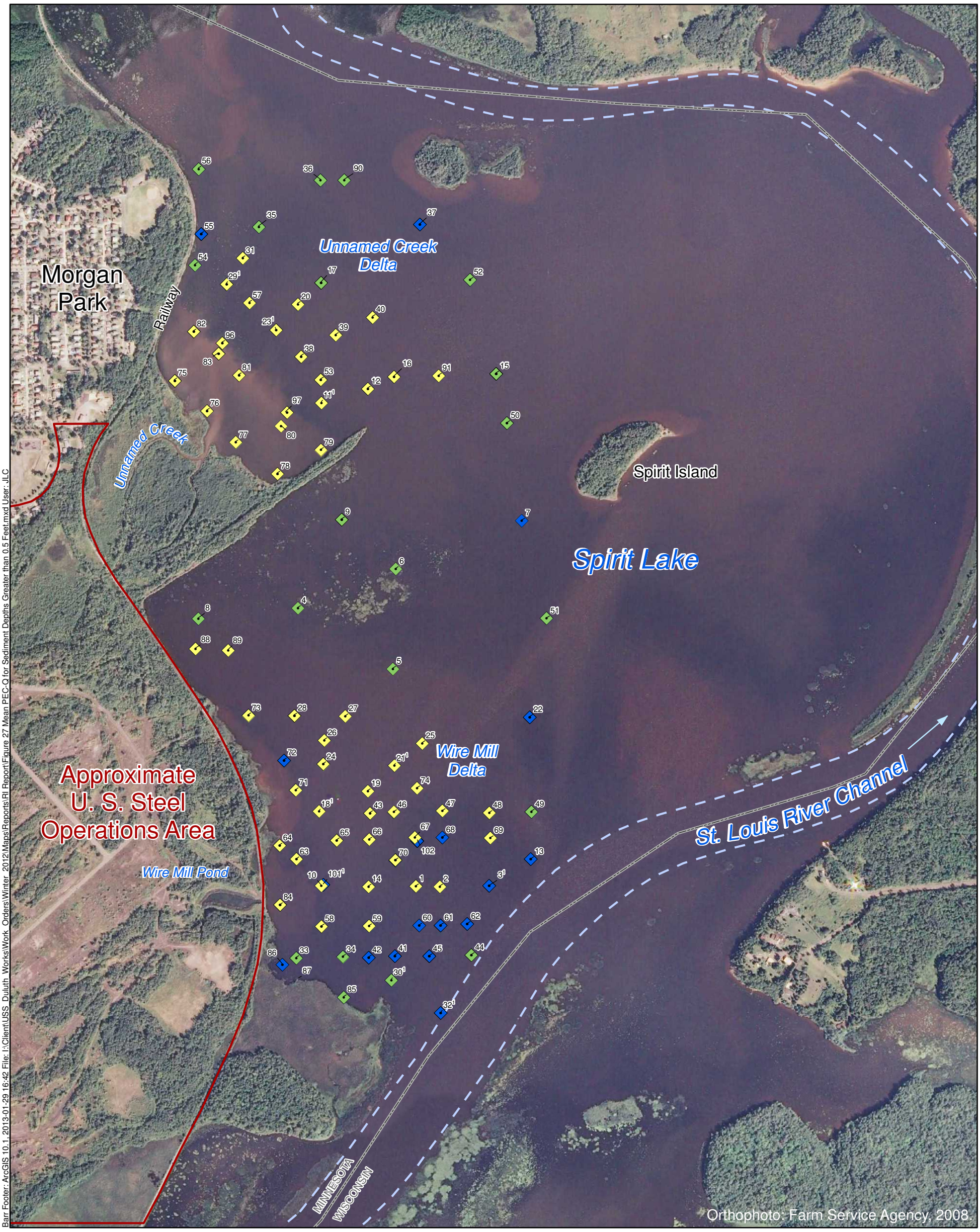
Feet

Figure 26

MEAN PEC-Q FOR SEDIMENT DEPTHS LESS THAN OR EQUAL TO 0.5 FEET

Spirit Lake Sediment Site -
Former U. S. Steel Duluth Works
Saint Louis River
Duluth, Minnesota

c-s3-06ac



Barr Footer: ArcGIS 10.1, 2013-01-29 16:42 File: I:\Client\USS_Duluth_Works\Work_Orders\Winter_2012\Maps\Reports\RI Report\Figure 27 Mean PEC-Q for Sediment Depths Greater than 0.5 Feet.mxd User: JLC

- Mean PEC-Q less than or equal to 0.1
- Mean PEC-Q greater than 0.1 and less than or equal to 0.6
- Mean PEC-Q greater than 0.6
- Approximate Location of St. Louis River Channel, Based on Orthophoto Interpretation
- Approximate U. S. Steel Operations Area (URS, 2008)
- State Boundary

Notes: Mean PEC-Q calculated in accordance with the *Guidance for the use and application of sediment quality targets for the protection of sediment-dwelling organisms in Minnesota* (MPCA, 2007) by dividing chemical concentrations by the respective Level II SQTs.

SQT = Sediment quality target for the protection of sediment-dwelling organisms (MPCA, 2007)
Mean PEC-Q = Mean probable effect concentration quotient (MPCA, 2007)
Results shown are the maximum value for the given depth range.

[1] Indicates samples where PAHs, metals, and PCBs were used to calculate the mean PEC-Q. All other locations shown use PAH and metal concentrations to calculate the mean PEC-Q since PCBs were not analyzed at those locations.

N

0 800 1,600

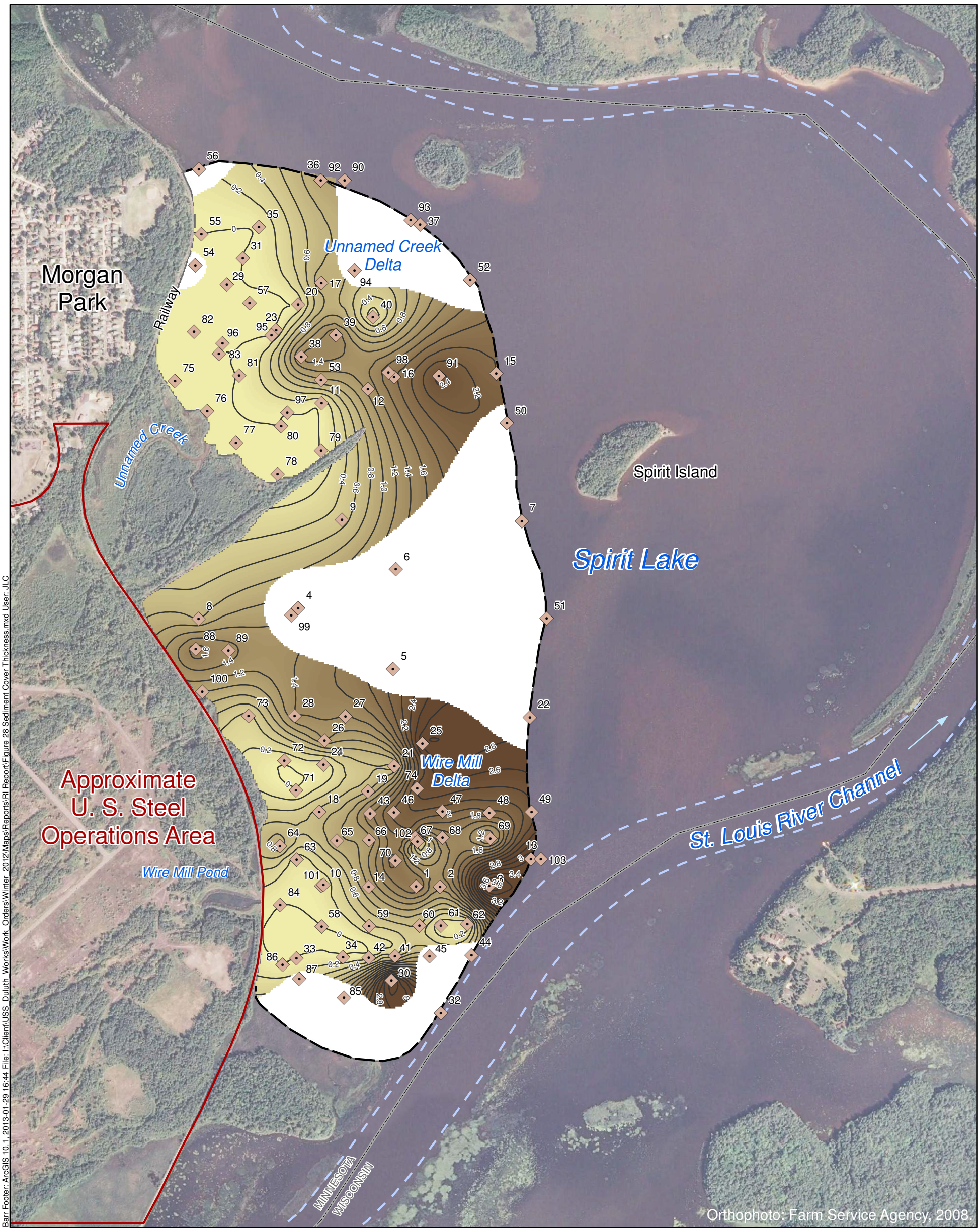
Feet

Figure 27

MEAN PEC-Q FOR SEDIMENT DEPTHS GREATER THAN 0.5 FEET

Spirit Lake Sediment Site -
Former U. S. Steel Duluth Works
Saint Louis River
Duluth, Minnesota

c-s3-06ac



Completed Sediment Sample Location

Approximate Outer Study Area Limit

Approximate Location of St. Louis River Channel, Based on Orthophoto Interpretation

Sediment Cover Thickness (Contour Interval = 0.2 feet) *Based on boring log observations and Total PAH PEC-Q analytical results*

Approximate U. S. Steel Operations Area (URS, 2008)

State Boundary

Sediment Cover Thickness

3.85 Feet

0 Feet

No Impact Evident

N

0 800 1,600

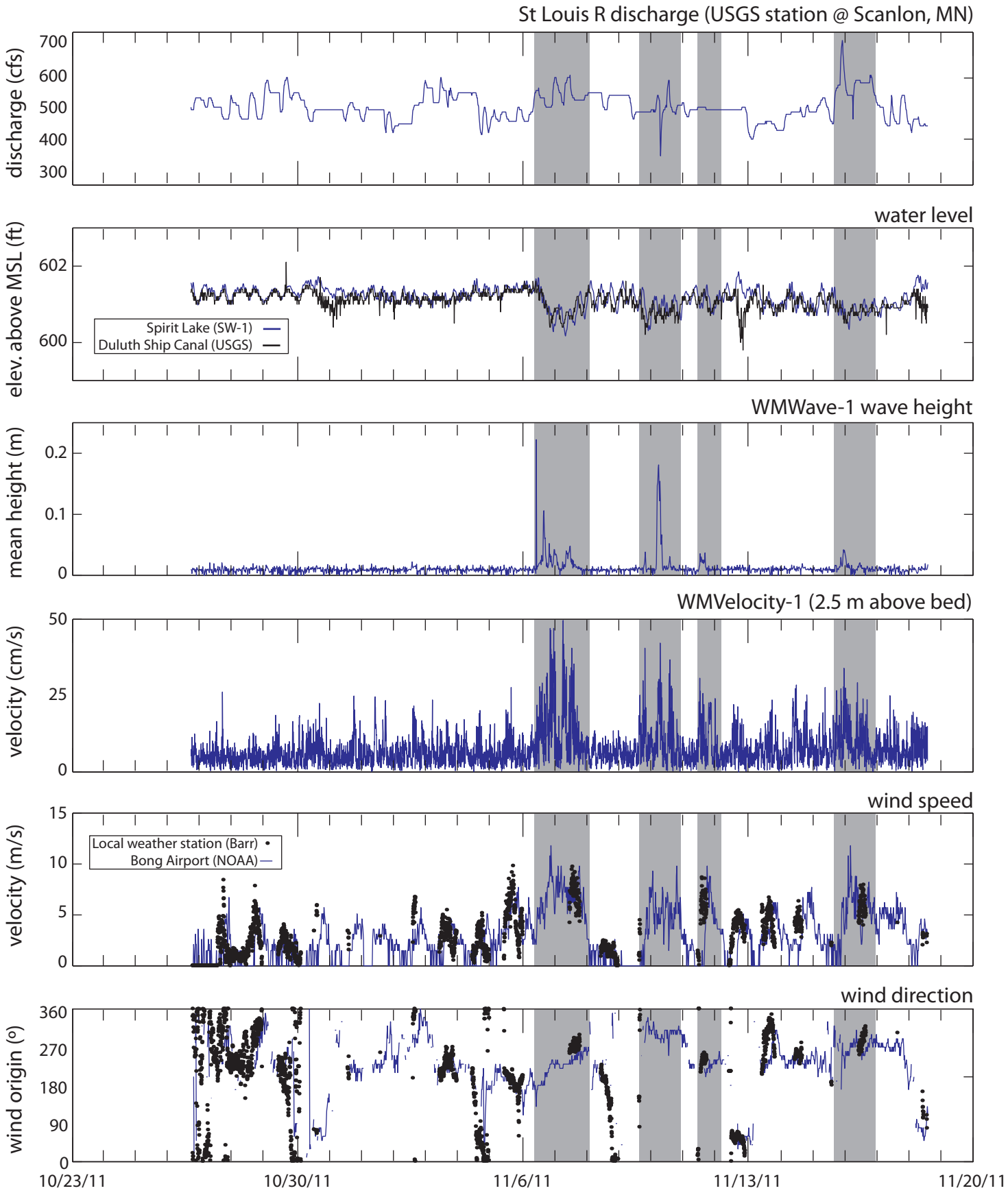
Feet

Figure 28

SEDIMENT COVER THICKNESS
Spirit Lake Sediment Site -
Former U. S. Steel Duluth Works
Saint Louis River
Duluth, Minnesota

c-s3-06ac

Barr Footer: ArcGIS 10.1, 2013-01-29 16:44 File: h:\Client\USS_Duluth_Works\Work_Orders\Winter_2012\Maps\Reports\RI Report\Figure 28 Sediment Cover Thickness.mxd User: JLC

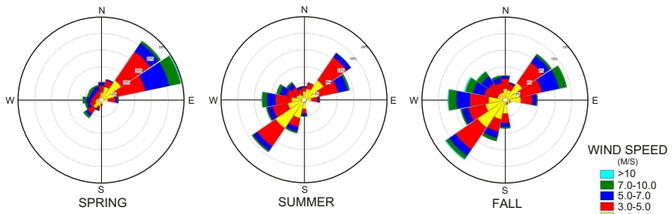


see Figure 6 for wave & velocity instrument locations
see Figure 4 for SW-1 (water level) instrument location

Figure 29
Fall 2011
Hydrodynamic Data Comparison
Spirit Lake Sediment Site -
Former U. S. Steel Duluth Works
Saint Louis River
Duluth, Minnesota

c-M3-06ac

Wind Direction Rose Diagrams
for Spring Through Fall (2006-2012)
Richard I. Bong Memorial Airport, Superior, Wisconsin



Longest Wave Fetch ~1 Mile Northeast

WEST ← → **EAST**

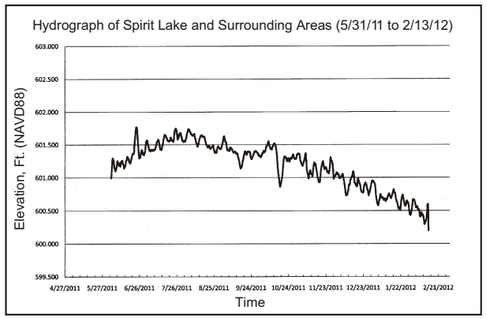
Foreshore Zone
Wave Washing Reworks Coarse Sediment, Fine Sediments Removed

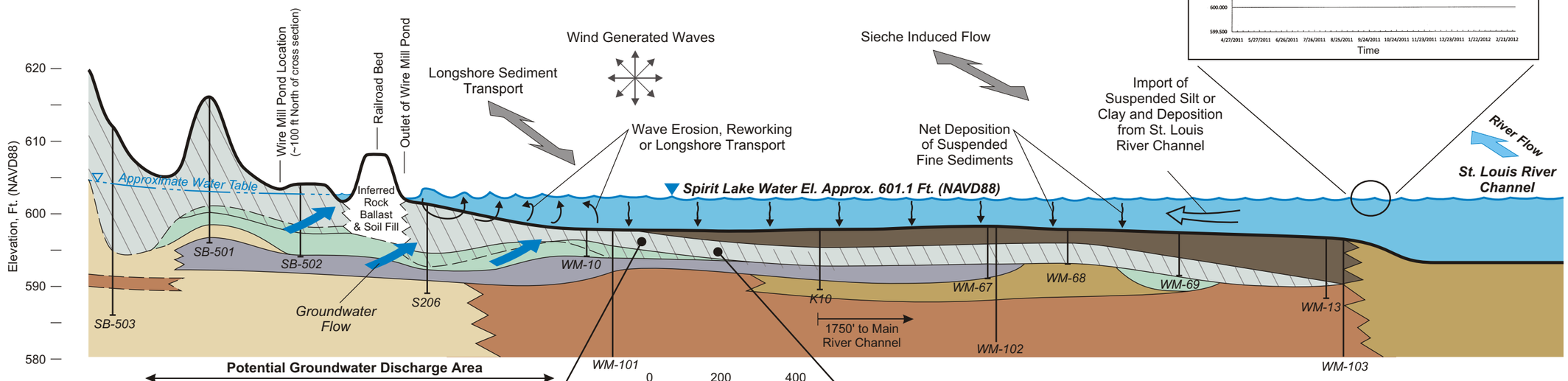
Nearshore Zone
Storm Wave Occasionally Reworks Sediments (some deposition)

Offshore Zone
Net Deposition of Suspended Fine Sediment and Organic Matter

Longshore Sediment
Transport Northward May Occur in this Zone

Site Water Levels are Affected by Seiche Cycles

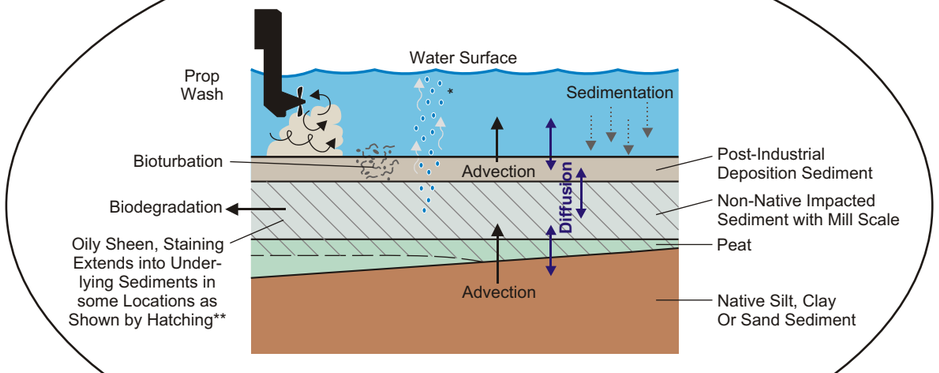




LEGEND

- Non-Native Material Containing Coarse to Fine Non-Native Sediment and Metallic Grains
- Organic Silt
- Silt
- Silty Sand
- Sand
- Clay
- Fiberous Peat
- Potentially Impacted Sediments

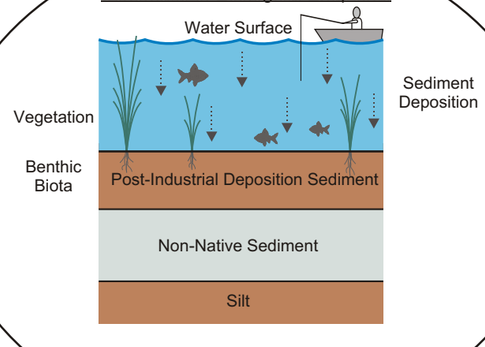
Schematic of Fate and Transport Processes



*Ebullition has not been observed.

**Mobile NAPL has not been observed.

Schematic of Ecological Endpoints**



**See Figure 33 for Additional Potential Exposure Pathways of Interest.

Figure 30

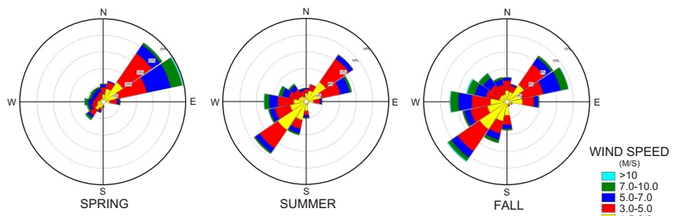
WIRE MILL CONCEPTUAL MODEL
Wire Mill Delta Area
Spirit Lake Sediment Site
Former U. S. Steel Duluth Works
Duluth, Minnesota
c-s3-06ac

P:\Mpls\23 MN\69236911125\WorkFiles\Wire Mill Conceptual Model 2013.CDR RLG 03-12-13

WEST

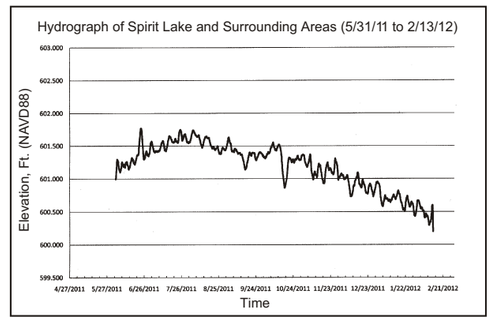
EAST

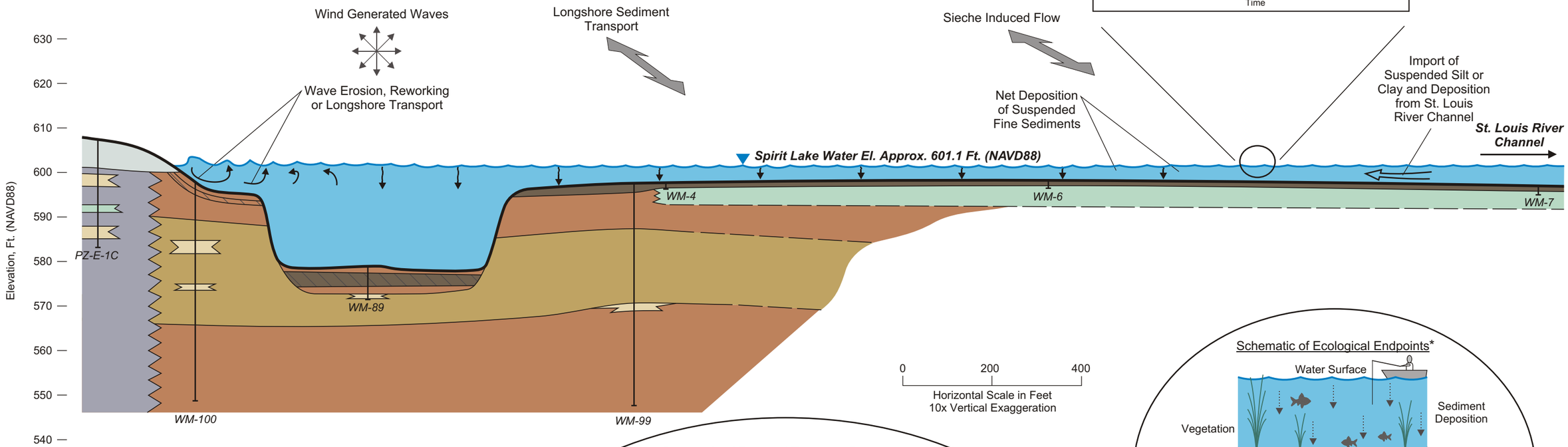
Wind Direction Rose Diagrams
for Spring Through Fall (2006-2012)
Richard I. Bong Memorial Airport, Superior, Wisconsin



Longest Wave Fetch ~1 Mile Northeast

Site Water Levels are Affected by Seiche Cycles



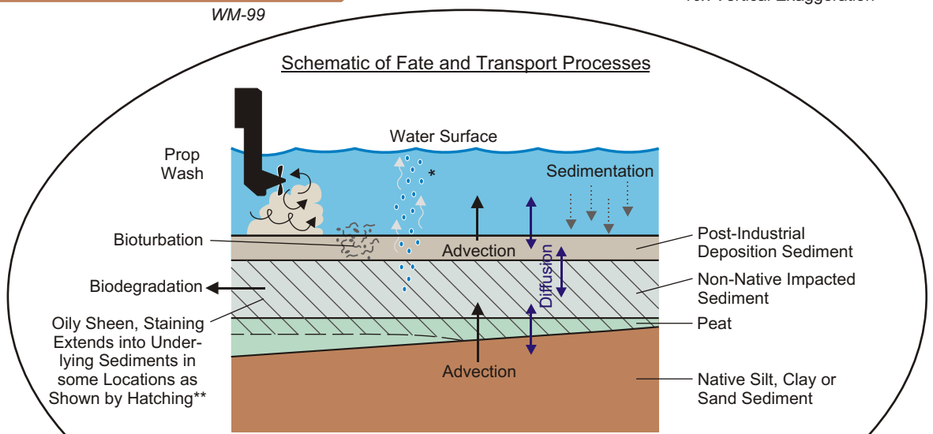


0 200 400
Horizontal Scale in Feet
10x Vertical Exaggeration

LEGEND

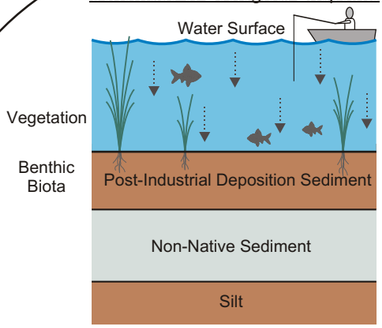
- Non-Native Sediments
- Organic Silt
- Silt
- Silty Sand
- Sand
- Clay
- Fiberous Peat
- Potentially Impacted Sediments

Schematic of Fate and Transport Processes



*Ebullition has not been observed.
**Mobile NAPL has not been observed.

Schematic of Ecological Endpoints*



*See Figure 33 for Additional Potential Exposure Pathways of Interest.

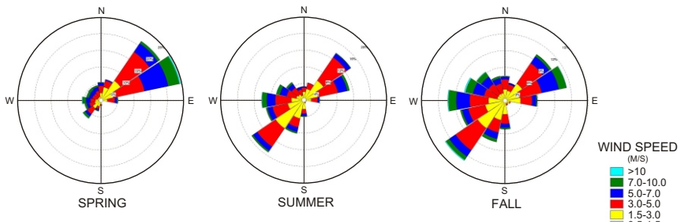
Figure 31

UPPER WIRE MILL CONCEPTUAL MODEL
Wire Mill Delta Area
Spirit Lake Sediment Site
Former U. S. Steel Duluth Works
Duluth, Minnesota
c-s3-06ac

P:\Mpls\23 MN\69\23691125\WorkFiles\Upper Wire Mill Conceptual Model Work Plan.CDR RLG 03-12-13

Wind Direction Rose Diagrams for Spring Through Fall (2006-2012)

Richard I. Bong Memorial Airport, Superior, Wisconsin



Longest Wave Fetch ~1 Mile Northeast

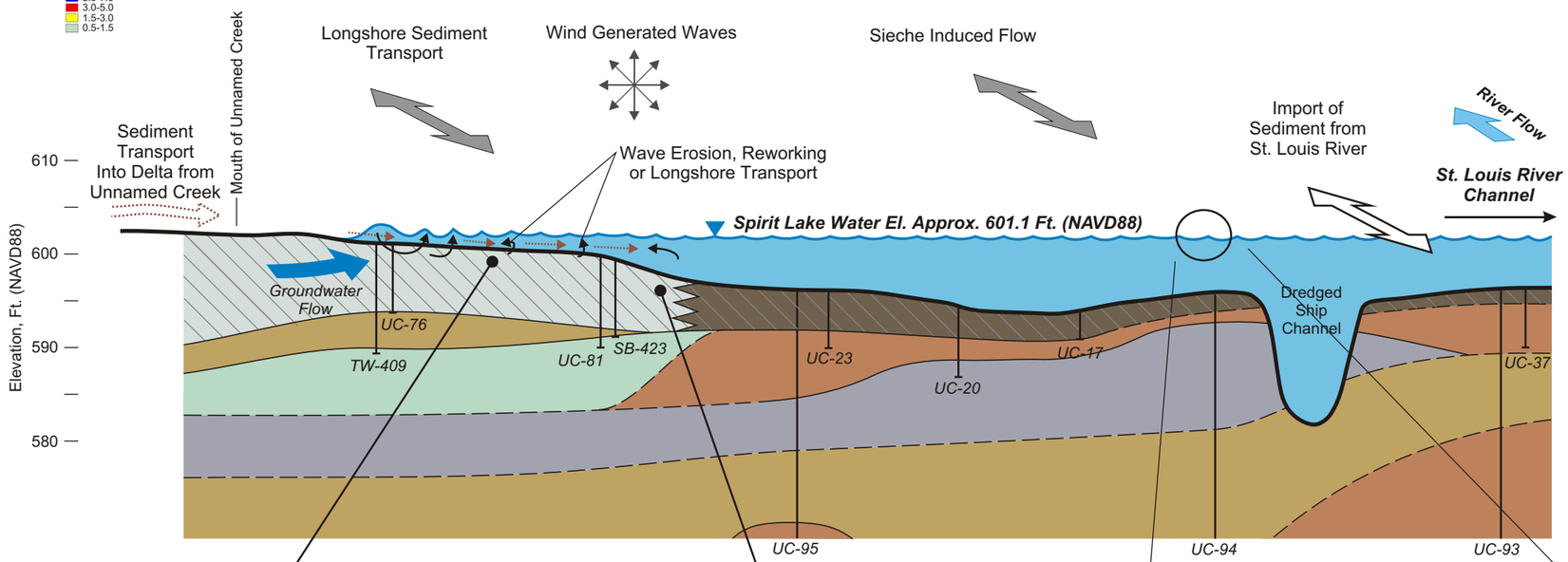
WEST ⟵ EAST

Foreshore Zone
Wave Washing Reworks Coarse Sediment, Fine Sediments Removed

Nearshore Zone
Storm Wave Occasionally Reworks Sediments (some deposition)

Offshore Zone
Net Deposition of Suspended Fine Sediment and Organic Matter

Longshore Sediment
Transport North or Southward May Occur in this Zone



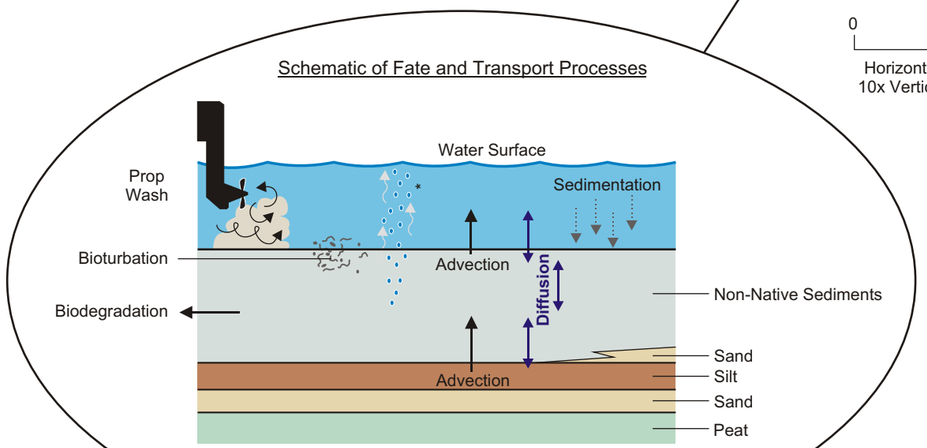
LEGEND

- Non-Native Sediments
- Organic Silt
- Silt
- Silty Sand
- Sand
- Clay
- Fiberous Peat
- Potentially Impacted Sediments

0 200 400

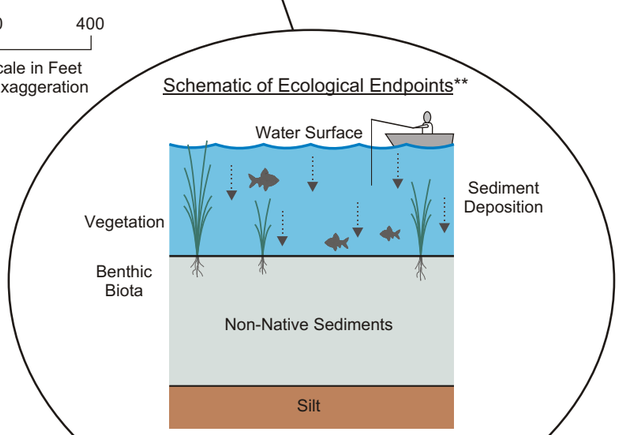
Horizontal Scale in Feet
10x Vertical Exaggeration

Schematic of Fate and Transport Processes



*Ebullition has not been observed.

Schematic of Ecological Endpoints**



**See Figure 33 for Additional Potential Exposure Pathways of Interest.

Site Water Levels are Affected by Seiche Cycles

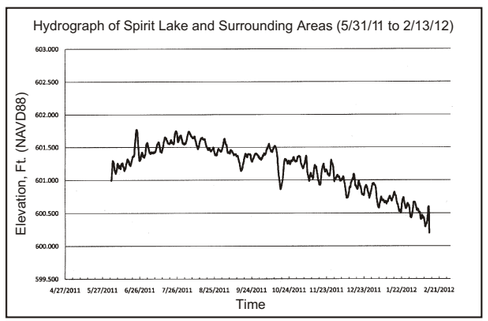
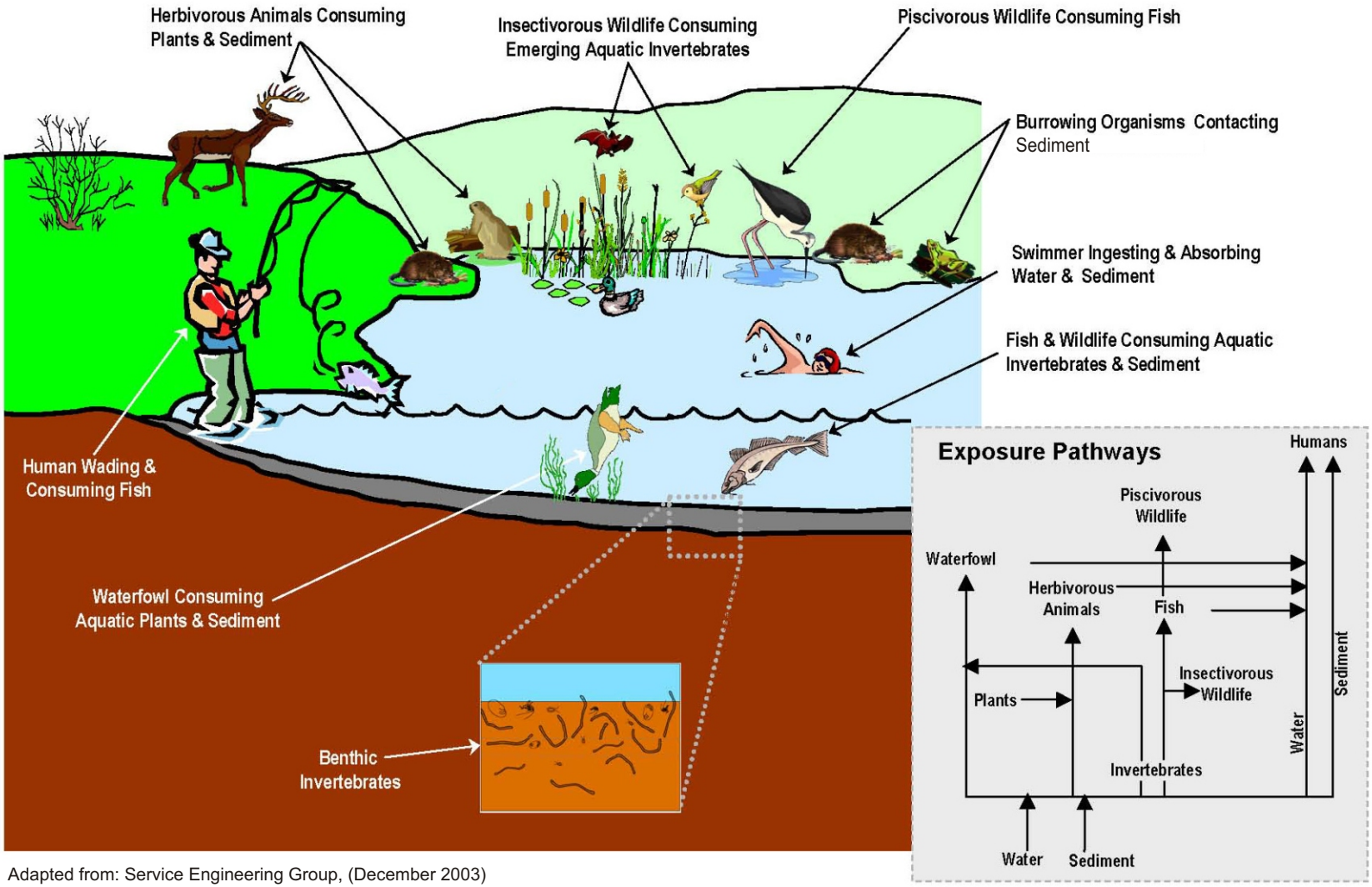


Figure 32

UNNAMED CREEK CONCEPTUAL MODEL
Unnamed Creek Delta Area
Spirit Lake Sediment Site
Former U. S. Steel Duluth Works
Duluth, Minnesota

c-s3-06ac

P:\Mpls\23 MN\69236911125\WorkFiles\Unnamed Creek Conceptual Model 2013.CDR RLG 03-12-13



Adapted from: Service Engineering Group, (December 2003)

Figure 33

POTENTIAL EXPOSURE PATHWAYS OF INTEREST
Spirit Lake Sediment Site
Former U. S. Steel Duluth Works
Duluth, Minnesota

c-s3-06ac

Appendices

Appendix A

Sediment Core/Boring Logs and Photographs
[On enclosed Compact Disc]

Appendix B

Site-Specific PAH Toxicity Unit Correlation Factors and Example Ecological Risk-Screening Calculations [Spreadsheet on enclosed Compact Disc]

Appendix C
Spirit Lake Hydrograph

Appendix D
Meteorological Data Graphs

Appendix E
Ice Evaluation

Appendix F
Geotechnical Evaluation

Appendix G

Analytical Laboratory Data Reports
[On enclosed Compact Disc]

Appendix H
Summaries of Selected Chemical Results

Appendix H (continued)

Summaries of Selected Chemical Results (continued)

Appendix I

Hydrodynamic/Bed Stability Data

Appendix J
Historical Maps and Photographs

Appendix K

Screening Level Human Health Risk Evaluation

Appendix L

Comparison of MPCA St. Louis River Estuary and Spirit Lake Sediment Site Data Sets

Technical Memorandum