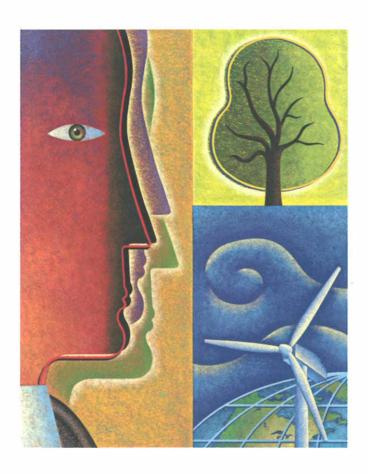


Hot Spot Investigation Documentation and Remedial Options Analysis Report

Kewaunee Marsh

May 2010





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Prepared For Wisconsin Department of Natural Resources Green Bay, Wisconsin

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RMT, Inc. | Wisconsin Department of Natural Resources Final

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Section 1 Introduction

1.1 Background

Approximately 15 acres of the Kewaunee Marsh Besadny Wildlife Area, in Kewaunee, Wisconsin, are contaminated with arsenic. The source of the arsenic is likely a spill of calcium/magnesium arsenate from the adjacent railroad that occurred in the late 1930s or early 1940s. An interim action was completed in 1996 to limit the threat of direct contact with the arsenic. Specifically, 4 acres of the marsh were capped, and all 15 acres were enclosed within a fence (Figure 1).

Between 2002 and 2005, STS Consultants (STS) completed site investigation activities to define the distribution of arsenic in the soil and groundwater at the site (STS, 2004 and STS, 2006). Based on the results of the STS investigation, WDNR established site specific cleanup standards of 19 mg/kg for soil and 148 μ g/L for groundwater/surface water.

Between 2005 and 2007, following the site investigation, RMT, Inc. (RMT), completed a treatability study and a remedial options analysis for the marsh to evaluate alternatives for achieving the site-specific cleanup standards (RMT, 2007). During the study, RMT noted that an area of elevated arsenic concentrations (2,200,000 μ g/L) was present in groundwater near the former railroad ballast at monitoring well MW04-10. RMT completed an additional groundwater investigation near MW04-10 to test the hypothesis that a hot spot of dissolved-phase arsenic was present within the railroad ballast near the location of a railroad spill. The results of the additional investigation confirmed that a hot spot of dissolved-phase arsenic is present below the railroad ballast and to the east of the ballast in the marsh, near MW 04-10, although the results did not define the depth and lateral extent of the high-level contamination into the marsh.

1.2 Purpose and Scope

Because the hot spot of dissolved-phase arsenic identified in 2007 can act as a source of arsenic to the groundwater in the marsh, remediation of the hot spot is the critical first step to achieving the remediation objectives that have been established for the site. In order to design a remedy for the hot spot material, the WDNR and RMT determined that the extent of the hot spot must be further defined, and a focused remedial alternatives analysis for the hot spot area should be completed.

RMT has completed additional site investigation activities and testing to define the extent of the hot spot material. RMT has also completed laboratory bench scale testing to evaluate potential treatment and disposal approaches for the material. Based on the results of the site investigation activities and bench scale studies, three remedial options were evaluated for the hot spot material: (1) *in situ* treatment; (2) *in situ* treatment with on-site containment; and (3) *in situ* treatment with off-site disposal.

The purpose of this report is to document the results of the additional investigations and laboratory testing, and to present the remedial options analysis for the hot spot material. The scope of this report includes the following:

- Summary of the previous data related to the hot spot area
- Summary of the focused 2009-2010 hot spot investigation
- Delineation of the hot spot
- Determination of hot spot remedial action objectives
- Summary of the bench scale evaluations of the prospective remedial options
- Remedial options analysis

Section 2 Previous Understanding of the Site

The following describes the site conditions that were documented by RMT and STS prior to the most recent hot spot investigation. It is critical to review the previous understanding of the site in order to put the current data and evaluations into context.

2.1 Cap Description

In 1996, STS completed an Interim Action at the site (STS, 1996). Specifically, STS constructed a permeable cap over areas with distressed vegetation in the marsh (Figure 2). The cap covered approximately 4 acres, was approximately 1.5-2.5 feet thick, and was constructed from the ground up as follows:

- Granular Lime: 30 cubic yards of granular lime were applied across the surface in an effort to remove soluble arsenic as an insoluble precipitate.
- Polystyrene sheets: 5-inch-thick polystyrene sheets were placed over areas devoid of vegetation to provide a supportive base for the cap
- Geotextile Fabric: 155,000 sf of woven geotextile was placed over visibly impacted areas to provide a high-strength permeable support for the wood chips
- Wood Chips: 2 to 2.5 feet of a yard mulch and wood chip mix was applied across the cap area
- Vegetation: Capped area was seeded to establish a vegetative mat.

2.2 Historical Soil Sampling - Capped Area 1994/2004/2006

In 1994, STS collected soil samples from the area to be capped prior to construction of the cap. The arsenic concentrations down the center of the capped area ranged between 2,660 and 10,700 mg/kg. The concentrations were generally highest near the railroad ballast and decreased moving east from the ballast, and generally decreased moving north and south from the areas previously devoid of vegetation.

In 2002, during the site investigation, STS collected soil samples from approximately 20 borings throughout the marsh; however, no samples were collected from the capped area. The results from the soil samples collected outside the capped area indicated that arsenic impacts that exceeded the cleanup criteria of 19 mg/kg were limited to the upper 2 feet of soil in the marsh, and samples outside the capped area were generally below 1,000 mg/kg, with a few exceptions. One exception was SB02-18, which was constructed within the ballast material near the

presumed location of the historical railroad spill. The concentrations of arsenic in SB 02-18 were between 1,800 and 6,520 mg/kg, at depths between 9 and 15 feet below ground surface (STS, 2004).

In 2005, during collection of samples for the treatability work, RMT collected a soil sample from beneath the cap near the railroad ballast near the location of the historical spill. The concentration of arsenic in this sample was 2,500 mg/kg, which was significantly lower than the 10,700 mg/kg that was detected in this area in 1994. Therefore, in June 2006, in order to confirm whether this decreasing trend was observable throughout the capped area, RMT collected soil samples from approximately the same locations under the cap that had previously been sampled in 1994 by STS. The results of the sampling found that the arsenic concentrations had decreased by a factor of 2 or 4 between 1994 and 2006; specifically, the concentrations in 2006 ranged from 340 to 6,100 mg/kg, as compared to the range of 2,660 and 10,700 mg/kg documented in 1994. It should be noted, that there is a high degree in variability in the concentrations of arsenic within relatively small areas across the marsh, and this variability may also be contributing to the decreasing concentration trend.

2.3 Leach Testing 2006

The soil samples collected by RMT in 2005 were subjected to screening Toxicity Characteristic Leaching Procedure (TCLP) and screening Synthetic Precipitation Leaching Procedure (SPLP). The screening tests follow the standard USEPA protocols (TCLP-SW 846 Method 1311 and SPLP-SW 846 Method 1312), with the exceptions that the leaching solution is analyzed directly after acidification, and smaller quantities of solid and leaching solution are used, while still maintaining the 1:20 solid to solution ratio. Previous tests have shown that the screening tests correlate well with standard leaching test results.

Each of the samples used in this testing, with the exception of one, were collected from locations outside the capped area and contained concentrations of arsenic below 1,000 mg/kg. For samples with compositional arsenic less than 1,000 mg/kg, none of the material was determined to be hazardous (TCLP >5 mg/L), and no correlation between leachable and compositional arsenic concentration was observed (RMT, 2007).

2.4 2007 RMT Hot Spot Groundwater Sampling

Groundwater collected from monitoring well MW 04-10 throughout 2004 and 2005 had arsenic concentrations between 1,000,000 μ g/L and 2,200,000 μ g/L, suggesting that the well is located within the area of the historical railroad spill. The elevated concentrations of arsenic detected in this well, along with the elevated concentrations of arsenic detected in ballast in SB 02-18 in

2002, indicated that a hot spot, or source area, of dissolved phase arsenic has persisted in this area since the original spill.

In order to evaluate the presence and delineate the extent of the presumed dissolved phase source area (the "hot spot"), RMT collected groundwater samples from 22 Geoprobe borings constructed in the ballast and the marsh near MW 04-10 in April 2007. The results of the sampling found that groundwater with concentrations of arsenic greater than 100,000 μ g/L is present along approximately 70 feet of the ballast area. The results suggested that the hot spot impacts extended eastward into the marsh. However, the results of the investigation did not specifically delineate the extent of the impacts into the marsh or the depth of the impacts (RMT, 2007).

2.5 Original Concepts for Remediation of the Hot Spot

As of 2007, it appeared that the cap continued to provide a direct contact barrier in the marsh, that the concentrations of arsenic were decreasing within the capped area, and that a hot spot source area persisted in the groundwater in the granular ballast material, and extended slightly eastward into the marsh. Based on this understanding, several remedial options were evaluated for the hot spot (RMT, 2007). These remedies included the following:

- Groundwater extraction and on-site treatment
- Groundwater extraction and off-site disposal
- *In situ* treatment of the hot spot

In February 2010, following the initial screening of alternatives, the options for remediation of the hot spot were refined by RMT and the WDNR. The WDNR selected the following options, which will be described in further detail within this report:

- Groundwater extraction and off-site disposal (using an extraction trench)
- *In situ* treatment
- *In situ* treatment and on site containment in the unsaturated zone
- *In situ* treatment and off-site disposal at a solid waste landfill.

Section 3 Hot Spot Investigation

In order to confirm the extent and depth of the hot spot impacts along the ballast and eastward into the marsh, a subsurface Geoprobe® investigation and geophysical conductivity survey were completed at the site.

3.1 Geoprobe Investigation

3.1.1 December 2009 Soil Sampling

On December 9, 2009, RMT, and its Geoprobe® subcontractor On-Site Environmental Services (OES), mobilized to the site to initiate the hot spot soil investigation. Fourteen, or approximately half of the proposed Geoprobe® borings, were completed between December 9 and 10, 2009. However, the fieldwork was forced to stop on December 10, 2009 because of severe winter weather.

A total of 10 borings were completed in the ballast area (B1D-B1E, B2A-B2E, and B3D-B3E), and 4 boring were completed in the marsh (M2D-M5D). The locations of the borings are shown on Figure 2. The borings were logged in the field and the soil boring logs are included in Attachment A. The borings extended between 20 and 30 feet below ground surface (bgs) in the ballast area, and 10 ft bgs in the marsh.

3.1.2 March 2010 Soil Sampling

Because a second mobilization was required to complete the investigation, RMT delayed completion of the investigation until the results of the December 2009 sampling event could be evaluated and the locations selected for the remaining Geoprobe® borings could be optimized. The results from the December 2009 sampling indicated the extent and depth of the impacts had been delineated in the ballast, but that the extent of the hot spot impacts required further delineation in the marsh. Therefore, no additional samples were completed in the ballast and the remainder of the sampling was focused on the marsh area.

RMT and OES mobilized to the site on March 17, 2010 to further investigate the extent of the hot spot in the marsh area. Sixteen borings were completed in the marsh area. Two transects (M2A-M2F) and (M5A-M5F) were completed parallel to the ballast. Transect M2 was approximately 10 feet from the ballast and transect M5 was approximately 60 feet from the ballast. A transect was also completed approximately 600 feet eastward

into the marsh (M6E-M12F) within the area that previously contained distressed vegetation prior to placement of the cap. The locations of the borings are shown on Figure 2. Each of the borings extended 8 to 12 feet bgs. The borings were logged in the field and the soil boring logs are included in Attachment A.

3.1.3 Soil Stratigraphy

Five cross-sections were developed from the hot spot investigation results. The locations of each cross-section are shown on Figure 3 and the cross-sections are included as Figures 4 through 8.

The marsh contains approximately 8 feet of peat, which overlays a 7 to 12 foot layer of organic silt. A coarse-grained gravel layer was observed beneath the organic silt in the deeper borings. Evidence of the cap (Styrofoam) was observed at 2 to 3 feet bgs in 5 of the marsh borings.

The ballast contains 6 to 14 feet of granular fill sand that overlays a compressed layer of peat and the organic silt. The coarse-gravel layer is present approximately 20 feet bgs in the ballast area. The upper 4 to 5 feet of the ballast are unsaturated.

3.1.4 Sampling Results

Soil samples were collected from 2-foot to 4-foot intervals, or from distinct soil types within each interval. The soil samples were submitted to Pace Analytical (Pace) for arsenic analysis. The laboratory reports are included in Attachment B, and the results are summarized in Table 1.

3.2 Geophysical Survey

A geophysical electrical conductivity survey was completed concurrent with the March 2010 Geoprobe® sampling event. The intent of the geophysical survey was to capture the electrical conductivity of a broad area surrounding the hot spot and then to correlate the conductivity to the arsenic concentrations detected at the discrete borings. The goal was to define the limits of the hot spot within the marsh based on this correlation

The Wisconsin Geological and Natural History Survey (WGNHS) completed the electrical conductivity survey on March 9, 2010. The WGNHS summarized the methods and results of the survey, which are included in Appendix A.

RMT analyzed the geophysical data and results of the compositional arsenic analyses with the goal of developing a correlation between conductivity and arsenic concentration in the marsh

(Figures A.1 and A.2). No correlation was observed between the two datasets, as shown on Figure A.3. It is likely that other factors, such as limestone used in the construction of the cap, may have interfered with the electrical conductivity response.

Based on the additional analysis of the geophysical survey, we have concluded that the limits of the hot spot cannot be defined from the electrical conductivity data. Although a specific correlation was not observed, the geophysical survey does provide a good relative picture of the arsenic distribution. The geophysical survey showed that the higher concentrations of arsenic are limited to the area under the cap, and to the east of the ballast area. This information supports that the established monitoring network is sufficient and appropriately distributed throughout the marsh.

Section 4 Hot Spot Definition

4.1 Hot Spot Definition

The results of the March 17, 2010 Geoprobe® investigation confirmed that elevated arsenic concentrations extend into the marsh; however, specific criteria were needed in order to define the limits of hot spot. RMT and the WDNR determined that the leaching characteristic, or potential impact the material has to groundwater, would be used to define the hot spot material.

4.1.1 Laboratory Analysis - Leach Testing

One criterion that could be used for delineating the hot spot material is the potential to leach arsenic above 5 mg/L in a TCLP test, which would mean the excavated material would be classified as a hazardous waste under the RCRA regulations. However, the sediment analysis to date has primarily been for compositional arsenic, and to use leachable arsenic as a criterion, the correlation between compositional and leachable arsenic needs to be determined.

RMT evaluated leaching characteristics of material collected during the December 2009/March 2010 sampling events. A memo describing the laboratory methods and results is included in Appendix B. The results of the study found a strong correlation between compositional arsenic concentration and leaching arsenic concentrations for samples with arsenic concentrations above 600 mg/kg. Specifically, the study found that material with compositional arsenic concentrations greater than 1,000 mg/kg would result in a TCLP concentration greater than 5 mg/L, and thus would be considered hazardous. Based on these results, the 1,000 mg/kg criterion was selected as the threshold to define the limits of the hot spot.

It is important to note that the previous leaching studies, discussed in Section 2.3, found no correlation between compositional arsenic concentration and TCLP. However, the previous work was focused on the moderately contaminated material that is present in the broad area of the marsh and not the high concentrations present near the former location of the railroad spill. The current and previous leaching studies both found that below approximately 600 mg/kg the arsenic is not very leachable, and there is no correlation between compositional concentrations and leaching concentrations.

4.1.2 Arsenic Distribution

The arsenic results are summarized in Table 1 and are also shown on each of the cross-sections (Figures 4 through 8). The approximate extent of the current hot spot (i.e., concentrations greater than 1,000 mg/kg) is shown on Figure 2.

The depth and extent of the hot spot arsenic impacts have been defined within the ballast. Arsenic concentrations greater than 1,000 mg/kg are present along a 70 foot length of the ballast, which is consistent with the results of the results from 2007, and coincide with the location of elevated impacts detected by STS in the ballast in 2004. The elevated arsenic impacts begin approximately 5 feet bgs (at the approximate) location of the groundwater table), and extend to a depth of approximately 15 feet bgs. The organic silt layer appears to be impeding the downward migration of the arsenic impacts.

The lateral extent of the hot spot impacts within the marsh has been generally defined, but additional investigation may be required to define the specific limits for the eastern edge (Figure 2). The material with arsenic concentrations greater than 1,000 mg/kg extends approximately 200 feet eastward from the ballast into the marsh. The width of hot spot impacts are present over approximately 80 feet near the ballast, but expand to at least 160 feet in width as you move eastward. The width of the impacts on the eastern edge is still approximate and further delineation is recommended. It was anticipated that the geophysical survey could have been useful to define the lateral extent of the hot spot impacts within the marsh. However, because a direct correlation between conductivity and arsenic concentration was not seen at the site (see Section 3.2), additional soil sampling is recommended.

The depth of the arsenic impacts has been defined within the marsh. Arsenic concentrations greater than 1,000 mg/kg are present within the upper 2 feet of the marsh material, and extend 8 to 10 feet bgs. Similar to the ballast area, the organic silt layer appears to be impeding further downward migration of the arsenic impacts. The elevated arsenic concentrations detected in the upper 2 feet suggest that the once "clean" cap material has now been impacted with arsenic. The specific mechanism that has caused these impacts is unknown; however, potential causes for arsenic impacts to the cap include evapotranspiration causing contaminated groundwater to rise into the vadose zone, groundwater fluctuations, settlement of the cap, or migration due to conversion of arsenic to arsine gas.

Based on the area and depth of impacts described above, the hot spot area with arsenic concentrations greater than 1000 mg/kg currently includes approximately 11,000 cy of material (Appendix D).

4.2 Concentration Trends Over Time

As discussed in Section 2.2, decreasing trends were observed in the arsenic concentrations under the cap between 1994 and 2006. In order to determine if the decreasing trend has continued, RMT compared the most recent sampling results (December 2009/March 2010) to the samples collected by RMT in 2006, and to the samples collected by STS in 1994. Again, it should be noted that while there is a high degree in variability in the concentrations of arsenic within relatively small areas across the marsh, there does appear to be a significant decrease in concentration for the 12 years which were used to predict future decreases. The details of this analysis are included in Appendix C.

The arsenic concentrations from similar locations were compared and a trendline was fit to the data from each distinct area. A decreasing trend with a strong correlation was observed in each of the areas under the cap. The mechanism causing the arsenic concentrations to naturally attenuate is uncertain, but is most likely either surface water transport or conversion of the arsenic to arsine gas. Further evaluation is recommended to identify this mechanism(s) to ensure that the mechanism is not causing unanticipated problems elsewhere, and to ensure that the conditions facilitating natural attenuation can be maintained.

Although the mechanism for the decreasing trend is unknown, we can assume that further reductions in concentration will likely occur over time in the capped area. Therefore, the area currently delineated as the hot spot within the capped area of the marsh (arsenic > 1,000 mg/kg), will likely reduce in size over time. This is important because reducing the quantity of material containing hazardous levels of arsenic significantly reduces the remediation cost, with minimal risk to human health and the environment.

To evaluate the impact that natural attenuation of arsenic will have on the extent of the hot spot area, RMT assumed the average rate of decrease observed over the last 16 years to estimate what the extent of the hot spot might be 4 to 5 years from now, when performance monitoring for a hot spot remedy will likely begin. This calculation is summarized in Appendix C. The results of the calculation suggest that areas that currently have arsenic concentrations greater than 2,000 mg/kg, would likely still be considered hot spot material 4 to 5 years from now, and all areas that currently have arsenic concentrations less than 2,000 mg/kg would likely be less than 1,000 mg/kg in 4 to 5 years, and thus will no longer be considered hot spot. The approximate extent of the area that will be considered hot spot in 4 to 5 years is shown on Figure 2. This area extends approximately 7 to 8 feet bgs in the marsh, and includes approximately 3,000 cy of material (Appendix D).

However, this evaluation and observation of decreasing concentrations applies to the marsh material, and not to the ballast area. Because detailed historical data is not available from the

ballast, and the material in the ballast is different than the marsh (granular vs. organic), we assume that natural attenuation of arsenic is not occurring in the ballast, and that the material currently above 1,000 mg/kg within the ballast will remain at those levels in the future.

4.3 Remedial Objectives

The hot spot material that will be targeted by the selected remedy is that material which would be considered hazardous if excavated from the site (TCLP > 5mg/L). The remedial action objectives for this hot spot material depend upon the remedial option selected.

- For any option that leaves the material on-site, the treatment must reduce the compositional arsenic concentrations to leach less than the site specific clean up criteria of 148 μg/L.
- For any option that removes the material from the site, the material must be treated to the level that renders it non-hazardous for arsenic (TCLP < 5 mg/L) so it can be disposed of at a WDNR-licensed solid waste (Subtitle D) landfill.

Section 5 Remedial Options – Laboratory Evaluations

Bench-scale laboratory tests were completed to evaluate the feasibility and develop design criteria for groundwater extraction and *in situ* treatment.

5.1 Groundwater Extraction Evaluation

5.1.1 Leach Testing

In order to evaluate the feasibility of the groundwater extraction trench, it is critical to determine the length of time, or number of pore volumes of water requiring removal, to achieve the remedial objectives for the hot spot. Bench-scale leach testing was completed on four materials composited from samples collected in December 2009/March 2010. The materials included Ballast Sand, Peat from the Ballast, Peat from the Marsh, and Organic Silt from the Marsh. A memo describing the laboratory methods and results for this leach testing is included in Appendix B.

5.1.2 Results

The results of the leach testing found that at least 1,000 pore volumes (500 to 600 million gallons) must be flushed through the hot spot material to achieve the remedial objectives for the on-site remedy (leachable concentration < 148 μ g/L). The large number of pore volumes required for the groundwater extraction makes this option unfeasible from the standpoint of time frame, groundwater management, and cost. Therefore, this option was eliminated from further evaluation in the detailed remedial options analysis presented in Section 6.

5.2 *In Situ* Treatment Evaluation

5.2.1 Effectiveness

During the 2007 treatability work, a groundwater treatment chemical process was developed that would achieve the groundwater cleanup criterion. The treatment consisted of the following:

- 25 mL/kg hydrogen peroxide (3%)
- 8.4% ferric sulfate
- 6% calcium carbonate

Additional bench scale testing was needed in order to evaluate the effectiveness of using this chemistry for *in situ* mixing of the saturated hot spot material (solids and liquid). A memo describing the laboratory methods and results for this testing are included in Appendix D.

The results from the 2010 bench scale work show that the treatment chemistry developed during the 2007 treatability study for the groundwater can also be used to effectively treat the saturated ballast and marsh material *in situ*. It should be noted that treatment of soil or sediment to render it nonhazardous for arsenic using this chemistry is covered under U.S. Patent 6,254,312 B1 (treatment of groundwater itself is not covered by the patent). Licensing to use this technology can be made available to the WDNR for the hot spot remediation either through RMT or purchasing the chemicals through Premier Chemicals, LLC.

5.2.2 Long-term Stability

The bench scale study described above was also set up to make a preliminary assessment of the long-term stability of the *in situ* treatment. The concern being that because the treated material will be left below the groundwater table, the treatment process may reverse if the treated material becomes anoxic over time through biodegradation, and some arsenic may leach from the treated material in the future.

The bench scale study evaluated the stability of the treated material over a 3 month time period. Within this time, no arsenic leached from the treated material, even when left in saturated conditions. However, these results cannot be extrapolated to conclude that the treated material will be stable over the long-term, but the results do support pursuing *in situ* treatment as an effective remedial option.

5.2.3 Refinement of Chemical Dosages

The bench scale-studies described above confirmed the effectiveness of the *in situ* treatment approach; however, since the chemistry had been developed for purposes of groundwater treatment of the most highly contaminated groundwater on the site, it was presumed that the chemical doses could be reduced for the *in situ* process and still be effective.

In order to refine the chemical dose for *in situ* treatment, additional bench-scale tests were completed. A memo describing the laboratory methods and results for this testing are included in Appendix B.

The results of the testing show that the doses for the *in situ* mixing could be reduced by 75 percent and still achieve the remedial objectives (leachable arsenic less than 148 μ g/L). The recommended dose for *in situ* mixing are:

- 6.25 mL/kg 3% hydrogen peroxide
- _ 2.1% ferric sulfate
- 1.5% calcium carbonate

In the case where the treated material would be excavated and disposed of at a WDNR-licensed solid waste (Subtitle D) landfill, the remedial objectives are less stringent (leachable arsenic < 5 mg/L). In this case, the doses of ferric sulfate and calcium carbonate can be reduced by 90 percent and the hydrogen peroxide application can be eliminated. The recommended doses for treatment and off-site disposal are:

- --- 1% ferric sulfate
- 0.75% calcium carbonate

Section 6 Remedial Options Analysis

Based on the initial screening of alternatives, and the results of the laboratory evaluations, three options were included in the remedial options analysis for the hot spot material.

- 1. *In situ* treatment
 - a. 11,000 cy (based on the current extent of the hot spot)
 - b. 3,000 cy (based on the extent of the hot spot estimated to remain in 4 to 5 years if natural attenuation continues)
- 2. *In situ* treatment, with on-site containment in the unsaturated zone (11,000 cy)
- 3. *In situ* treatment, with off-site disposal at a WDNR-licensed solid waste (Subtitle D) landfill (11,000 cy)

Groundwater extraction was eliminated from the detailed remedial options analysis because WDNR and RMT determined it to be unfeasible from the standpoint of cost and time frame for restoration (see Section 5.1).

The remedial options are summarized in Table 2 and Table 3, and the detailed quantity and cost estimating sheets for each option are included in Appendix D. Each remedial option is discussed below.

6.1 *In Situ* Treatment – 11,000 cy

6.1.1 Remedy Description – Basis of Cost

The 11,000 cy of hot spot material will be treated *in situ* to achieve the site specific clean up criteria (leachable arsenic concentration < 148 µg/L). Approximately 300 tons ferric sulfate, 200 tons limestone, and 1,000 gallons hydrogen peroxide (50%), will be incorporated into the hot spot material using excavators, end loaders, and similar equipment. Within the marsh, swamp mats would likely be used to provide a stable surface for the heavy equipment. The treatment zone will be gridded off into accessible areas, and the *in situ* mixing will occur sequentially in each subdivided area in 3 to 5 foot lifts. Following the application of the treatment chemicals, approximately 600 tons of bentonite powder will be blended into the treated area in order to reduce the permeability of the material, and improve the long-term performance of the treatment (restrict the flow of groundwater in the area). The addition of the treatment chemicals

and bentonite will cause some bulking and will raise the elevation of the treatment area approximately 1.5 to 2.5 feet.

Following the mixing process, a 6-inch layer of top soil or similar organic material will be placed over the treated marsh material and seeded to restore vegetation so as to reduce erosion and provide a vegetative barrier. The fence and ballast/bike path will be reconstructed in the treatment area, and the bike path will be restored where damaged by truck traffic during construction.

6.1.2 Performance Monitoring – Basis of Cost

Performance monitoring will be required to evaluate the effectiveness and long-term chemical stability of the *in situ* treatment. For the purposes of the remedial options analysis, it was assumed that 3 wells will be constructed in the treatment area, and one well will be constructed downgradient from the treated material. The wells will be monitored twice in the first year following treatment, and annually thereafter for 20 years. The wells will be monitored during each event for arsenic, iron, sulfate, calcium, and pH.

6.1.3 Effectiveness

The laboratory evaluations have indicated that the *in situ* treatment will achieve the remedial action objectives in the short term for the hot spot. However, because the material will be left in place below the groundwater table, there is the potential for anoxic conditions to appear following treatment (years to decades later) as a result of biodegradation. The anoxic conditions could allow some of the arsenic to leach into the groundwater, and thus the long-term effectiveness is less predictable.

The impact on the marsh of any future leached arsenic can be reduced by lowering the permeability of the treated material. A simple way to do this would be to add bentonite. Laboratory experiments have been conducted to evaluate the effectiveness of bentonite addition. These results are presented in Appendix B.

The application of bentonite into the hot spot is intended to reduce the permeability of the material, such that even if leaching occurs, less groundwater will flow through the treatment area and come in contact with the leachable arsenic. In addition, even if the material does leach in the long-term, it is likely that it will leach at lower concentrations than are currently seen in the untreated hot spot. Thus, although the long-term effectiveness cannot be guaranteed, the amount of arsenic leaching into the groundwater and moving into the marsh will be significantly reduced through *in situ* treatment.

6.1.4 Implementability

The *in situ* mixing process and site restoration can be accomplished using standard construction equipment. However, the marsh setting and target depth of 10 feet of saturated marsh material will require special consideration to the construction methods and phasing. Swamp mats or similar equipment would likely be required, and additional steps, such as a field trial are recommended in order to refine the specific means and methods that will be used by the contractor to complete the work. In addition, effort will likely be required to improve the bike path prior to construction and restore the bike path following construction, since it will be used as a haul road for the treatment chemicals and equipment during active remediation.

6.1.5 Time Frame for Restoration

The *in situ* treatment including site preparation and site restoration will take 6 to 8 weeks to complete. The bike path will need to be closed during this time to allow a safe work zone in the treatment area, and access for the construction equipment.

6.1.6 Cost

The estimated present worth cost for the *in situ* remedy for 11,000 cy of material is \$1,430,000. At this feasibility level of costing, a range -30% to +50% is typical, which equates to a potential cost range of \$1,000,000 to \$2,150,000.

6.2 In Situ Treatment - 3,000 cy

6.2.1 Remedy Description – Basis of Cost

The 3,000 cy of hot spot material would be treated *in situ* to achieve the site specific clean up criteria (leachable arsenic concentration < 148 μ g/L). The mixing and restoration process will be consistent with that presented in Section 6.1 where only the size of the treatment area will be reduced. This reduced area assumes that the natural attenuation that has been observed in the arsenic in the capped area will continue at the site, and that within 4 to 5 years only 3,000 cy of material will constitute the hot spot and require treatment. Based on this reduced area, approximately 70 tons ferric sulfate, 50 tons limestone, and 300 gallons hydrogen peroxide (50%), will be incorporated into the hot spot material.

As discussed in Section 4.2, although natural attenuation has been observed under the cap, RMT assumes that natural attenuation is not occurring readily within the ballast.

Therefore, active remediation to address the most highly impacted material near and in the ballast is warranted.

6.2.2 Performance Monitoring – Basis of Cost

Performance monitoring will be required to evaluate the effectiveness and long-term stability of the *in situ* treatment. For the purposes of the remedial options analysis, it was assumed that 2 wells will be constructed in the treatment area, and one well will be constructed downgradient from the treated material. The wells will be monitored twice in the first year following treatment, and annually thereafter for 20 years. The wells will be monitored during each event for arsenic, iron, sulfate, calcium, and pH.

6.2.3 Effectiveness

Same as 6.1.3.

6.2.4 Implementability

Same as 6.1.4.

6.2.5 Time Frame for Restoration

The *in situ* treatment including site preparation and site restoration will take 4 to 5 weeks to complete. The bike path will need to be closed during this time to allow a safe work zone in the treatment area, and access for the construction equipment.

6.2.6 Cost

The estimated present worth cost for the *in situ* remedy of 3,000 cy of material is \$780,000. At this feasibility level of costing, a range -30% to +50% is typical, which equates to a potential cost range of \$550,000 to \$1,170,000.

6.3 In Situ Treatment with On-Site Containment

6.3.1 Remedy Description - Basis of Cost

The 11,000 cy of hot spot material will be treated *in situ* to achieve the site specific clean up criteria (leachable arsenic concentration < 148 μ g/L). Approximately 300 tons ferric sulfate, 200 tons limestone, and 1,000 gallons hydrogen peroxide (50%), will be incorporated into the hot spot material using excavators, end loaders, and similar equipment. Swamp mats would likely be used to provide a stable surface for the heavy

equipment. The treatment zone will be gridded off into accessible areas, and the *in situ* mixing will occur sequentially in each subdivided area in 3 to 5 foot lifts.

Following the application of the treatment chemicals, the treated material will be excavated and placed on the surface of the marsh. For the purposes of this cost estimate, we assumed the material will be placed over a 500 by 180 foot section of the untreated capped area, and will be graded into a uniform mound 3 to 4 feet in height. No additional barriers or liners will be used, and the material will be allowed to dewater in place. Swamp mats would likely be used to provide stable access to the eastern portions of the marsh where the material will be placed.

Clean organic backfill will be transported to the site, and placed in the open excavation. A 6-inch layer of organic soil will be placed over the mound of treated marsh material. The newly placed organic soil will be seeded to restore vegetation so as to reduce erosion and provide a vegetative barrier. The fence and ballast/bike path will be reconstructed in the treatment area, and the bike path will be restored where damaged by truck traffic during construction. A larger effort will be required for restoration of the bike path, as compared to *in situ* treatment, due to the increased amount of truck traffic (approximately 800 trucks) that will occur due to importing of backfill.

6.3.2 Performance Monitoring - Basis of Cost

Performance monitoring will be required to evaluate the effectiveness of the hot spot treatment, and long-term monitoring will be required to evaluate the chemical and structural stability of the mound of treated material that will be left on site.

To document the effectiveness of the remediation, it was assumed that 3 wells will be constructed in the excavated and backfilled area. The wells will be monitored twice in the first year following treatment, and annually thereafter for 5 years. The wells will be monitored during each event for arsenic and pH.

To document the long-term chemical and structural stability of the mound of treated material, it was assumed that 2 wells will be constructed near or through this material. These wells will be monitored twice in the first year, and annually thereafter for 20 years. The wells will be monitored during each event for arsenic, iron, sulfate, calcium, and pH. In addition, an evaluation of the structural integrity of the mound of treated material will be made during each annual monitoring event. For the purposes of this cost estimate it was assumed that the mound will need to be regraded and restored once in the 20 years of monitoring.

6.3.3 Effectiveness

The laboratory evaluations have shown that the *in situ* treatment will achieve the remedial action objectives in the short term for the hot spot. The placement of the treated material above the groundwater table increases the confidence in the long-term effectiveness of the treatment. However, long-term monitoring is still recommended for this option, because settlement of the material or fluctuations in the water table may occur, whereby the treated material becomes submerged below the groundwater table and the long-term stability is no longer predictable.

It is also important to note that it is possible that movement of the treated material to an area outside the hot spot could have unintended consequences and a negative impact on the effectiveness of the natural attenuation of arsenic that appears to be occurring within the marsh.

6.3.4 Implementability

The *in situ* mixing and on-site containment of the treated material can be accomplished using standard construction equipment. However, the marsh setting and target depth of 10 feet of saturated marsh material will require special consideration to the construction methods. Swamp mats or similar equipment would likely be required, and additional steps such as a field trial are recommended in order to refine the specific means and methods that will be used by the contractor to complete the work. In addition, additional effort would be required to improve the bike path as a haul road or restore damage to the bike path following construction, because of the significant amount of truck traffic (likely over 800 trucks) that will occur importing of backfill.

6.3.5 Time Frame for Restoration

The *in situ* treatment with on site containment, including site preparation and site restoration will take 18 to 20 weeks to complete. The bike path will need to be closed during this time to allow a safe work zone in the treatment area, and access for the construction equipment.

6.3.6 Cost

The estimated present worth cost for the *in situ* remedy of 11,000 cy of material is \$2,650,000. At this feasibility level of costing, a range -30% to +50% is typical, which equates to a potential cost range of \$1,860,000 to \$3,980,000.

6.4 *In Situ* Treatment with Off-Site Disposal

6.4.1 Remedy Description – Basis of Cost

The 11,000 cy of hot spot material will be treated *in situ* to meet the less stringent objective of being non-hazardous (leachable arsenic < 5 mg/L) upon excavation. Approximately 200 tons ferric sulfate and 100 tons limestone will be incorporated into the hot spot material using a backhoe, loader, and similar equipment. Swamp mats will be used to provide a stable surface for the heavy equipment. The treatment zone will be gridded off into accessible areas, and the *in situ* mixing will occur sequentially in each subdivided area in 3 to 5 foot lifts.

Following the application of the treatment chemicals, the treated material will be excavated and dewatered. For purposes of this estimate, it was assumed 1,200 tons of magnesium sulfate (Mg SO₄) will be incorporated into the excavated material to remove any free liquids. The treated and dewatered material will then be transported off-site to a Subtitle D landfill. For purposes of this estimate it was assumed that the material will be disposed at Hickory Meadows landfill, under the State's contract with Veolia.

Clean organic backfill will be transported to the marsh site, and placed in the open excavation. The backfilled area will be seeded to restore vegetation so as to reduce erosion and provide a vegetative barrier. The fence and ballast/bike path will be reconstructed in the treatment area, and the bike path will be restored where damaged by truck traffic during the construction. A larger effort will be required for restoration of the bike path, as compared to *in situ* treatment and *in situ* treatment with on-site containment, due to the larger amount of truck traffic that will occur while transporting the treated material off-site and the importing backfill.

6.4.2 Performance Monitoring – Basis of Cost

Performance monitoring will be required to evaluate the effectiveness of the hot spot treatment. For purposes of this cost estimate, it was assumed that 3 wells will be constructed in the excavated and backfilled area. The wells will be monitored twice in the first year following treatment and excavation, and annually thereafter for 5 years. The wells will be monitored during each event for arsenic and pH.

6.4.3 Effectiveness

This option provides the strongest assurance of effectiveness in both the short-term and long-term. The laboratory evaluations have shown that the *in situ* treatment will achieve the remedial action objectives for the hot spot material in the short term (make it non-

hazardous). The removal of the treated material from the site provides the highest level of confidence as to long-term effectiveness, i.e. the material will no longer serve as a source of arsenic impacts to the Kewaunee Marsh in the future.

6.4.4 Implementability

The *in situ* mixing, excavation, and off-site disposal of the treated material can be accomplished using standard construction equipment. However, the marsh setting and target depth of 10 feet of saturated marsh material will require special consideration to the construction methods. Swamp mats or similar equipment may be required, and additional steps such as a field trial are recommended in order to refine the specific means and methods that will be used by the contractor to complete the work. In addition, additional effort would be required to improve the bike path as a haul road or restore damage to the bike path following construction, because of the significant amount of truck traffic (likely over 1,000 trucks) that will occur transporting treated material off-site and importing clean backfill.

6.4.5 Time Frame for Restoration

The *in situ* treatment with on site containment, including site preparation and site restoration will take 13-15 weeks to complete. The bike path will need to be closed during this time to allow a safe work zone in the treatment area, and access for the construction equipment.

6.4.6 Cost

The estimated present worth cost for the *in situ* remedy of 11,000 cy of material is \$2,900,000. At this feasibility level of costing, a range -30% to +50% is typical, which equates to a potential cost range of \$2,030,000 to \$4,350,000.

Section 7 Conclusions and Recommendations

7.1 Conclusions

The results of the hot spot investigation and laboratory evaluations of the hot spot material show the following:

- Material with compositional arsenic concentrations greater than 1,000 mg/kg would be considered hazardous if removed from the site (i.e., leach arsenic over 5 mg/L). Any material with arsenic concentrations greater than 1,000 mg/kg has thus been categorized as "hot spot" material.
 - The hot spot material is present under a 70 foot length of the ballast and extends approximately 200 feet into the marsh. The extent of the eastern edge of the impacts in the marsh are still approximate.
 - The hot spot material is present 5 to 15 feet below grade in the ballast and 0 to 10 feet below grade in the marsh. An organic silt/clay layer is impeding further downward migration of the arsenic.
 - The hot spot currently contains an estimated 11,000 cy of material.
- Natural attenuation appears to be occurring within the capped area of the marsh, but the process controlling the decreasing arsenic concentrations are not understood at this time.
 - If the rate of decrease in the arsenic concentrations (observed since 1994) continues, a smaller area would be considered hot spot material within the next 4 to 5 years ("future hot spot"). Specifically, marsh material that currently has arsenic concentrations of 2,000 mg/kg or less, would have arsenic concentrations less than 1,000 mg/kg in the next 4 to 5 years.
 - The future hot spot will still be present in the ballast (no natural attenuation presumed to be occurring here), and would only extend 80 feet into the marsh.
 - The future hot spot will contain an estimated 3,000 cy of material.

The results of the laboratory evaluations and detailed remedial options analysis have indicated the following:

Groundwater extraction is not a feasible option for the site because it would require approximately 500 to 600 million gallons of groundwater to be flushed through the hot spot to achieve the remedial objectives. Given the low permeability of the marsh material, removing this large volume of water would time prohibitive, and give the remote location of the site, management of this large volume of water would be cost prohibitive.

- The chemistry developed for treatment of groundwater at the site in the treatability study (RMT, 2007) will achieve the remedial objectives when applied to the hot spot material through *in situ* mixing.
 - The treated material can either be: (1) left in place, (2) excavated and contained in a dry area of the marsh, or (3) excavated and disposed off-site at a landfill.
 - Leaving the material in place is the lowest cost alternative, but there is less predictability with the long-term effectiveness of leaving the treated material below the groundwater table.
 - The on-site containment and off-site disposal options are similar in cost; however, off-site disposal provides the most reliability regarding long-term effectiveness.
- Natural attenuation could be relied upon to remediate a portion of the hot spot, and a smaller volume of material (3,000 cy) could be targeted for active remediation.

7.2 Recommendations

Based on the results of the investigations and remediation options analysis, we recommend the following:

- Select an active remedy from the list of options defined in Section 6 for the hot spot material.
- Collect additional samples in the eastern edge of the impacts of the marsh prior to the implementation of the hot spot remediation to confirm the extent of the hot spot.
- Complete additional studies to define the processes controlling natural attenuation of arsenic in the marsh, and evaluate if natural attenuation will continue.

Section 8 References

- RMT, Inc. 2007. WDNR Kewaunee marsh treatability study. Prepared for Wisconsin Department of Natural Resources, Kewaunee, Wisconsin. August 2007.
- STS. 1996. Construction documentation report for interim action at the Kewaunee marsh arsenic site. Prepared for Wisconsin Department of Natural Resources, Kewaunee, Wisconsin. June 11, 1996
- STS. 2004. Site assessment and remedial action alternatives report. Prepared for Wisconsin Department of Natural Resources, Kewaunee, Wisconsin. March 2004.
- STS. 2006. Site assessment and remedial action alternatives report addendum. Prepared for Wisconsin Department of Natural Resources, Kewaunee, Wisconsin. September 2006.

Table 1
December 2009/March 2010 Hotspot Geoprobe Investigation
Compositional Arsenic Results - Soil Sampling
Kewaunee Marsh, Kewaunee, Wisconsin

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Table 1 (continued) December 2009/March 2010 Hotspot Geoprobe Investigation Compositional Arsenic Results- Soil Sampling Kewaunee Marsh, Kewaunee, Wisconsin

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Notes

1. Sample data presented in the grid orientation shown on Figure 2.

J = Estimated concentrations above the detection limit and below the reportine limit

B = Analyte was detected in the associated method blank

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

BOLD =Arsenic concentration greater than 1,000 mg/kg, which corresponds to the material that has been classified as "hot spot" based on its potential to be hazardous (TCLP > 5 mg/L).

Prepared By: A. Goergen 12/29/09, A. Sellwood 4/5/10 Checked By: A. Sellwood 12/30/09, T. O'Connell 5/12/10

Table 2
Remedial Options Analysis
WDNR – Kewaunee Marsh Hot Spot Remediation – Kewaunee, Wisconsin

REMEDIAL OPTION	ESTIMATED COST	TIMEFRAME	ADVANTAGES	DISADVANTAGES	DESCRIPTION AND ASSUMPTIONS
1a. In Situ Treatment (11,000 cy)	\$1,430,000	6 to 8 weeks	Low cost and short remediation time Least amount of disturbance to surface of bike path (i.e. least amount of truck traffic) Perception of not "relocating" the problem	 Treated material left below water table Uncertainty with long-term stability in saturated reducing environment Long-term performance monitoring required to evaluate and confirm stability over time Public perception of leaving material on site 	Remedy Description: The "hot spot" material will be treated <i>in situ</i> to render the material non-hazardous for arsenic and achieve the site specific clean up criteria. The treatment chemicals will be mechanically mixed into the saturated hot spot material with a backhoe and loader. The treated material will be left in place, and covered with either vegetation or ballast material. Following remediation, the bike path and fence will be restored to existing conditions. • The treatment cost is based on applying 300 tons (21 g/kg _{soll}) ferric sulfate, 200 tons (15g/ kg _{soll}) limestone, and 1,800 gallons (6.25 mL/kg _{soll}) hydrogen peroxide (30%) to the hot spot material. The chemical doses for treating the material are on the basis that the material must be treated to achieve the site specific cleanup criteria. (Additional testing could be used to refine these doses.) • Following treatment 600 tons (50g/kg _{soll}) of bentonite (5%) will be mixed into the treated material, to reduce the permeability. • The <i>in situ</i> work will be targeted for the late fall and winter months to provide a more stable work surface on the marsh, and swamp mats will be used to provide a stable work surface. • The mixing will be accomplished with an excavator, dozer, and loader. The treatment area will be divided into smaller accessible areas, and mixing would occur sequentially in each subdivided area in 3 to 5 ft lifts. Treated material will be removed and temporarily stockpiled to allow access to the deeper material. All treated material will be replaced into the area from which is was removed. • A 6-inch layer of top soil or similar organic soil will be placed over the treated marsh material and seeded to restore vegetation so as to reduce erosion and provide a vegetative barrier. • The unsaturated ballast material (upper 4 to 5 feet) will be segregated from the treated material and stockpiled on-site. Following treatment of the saturated material, the untreated, unsaturated ballast soils will be used as backfill to restore the
1b. In Situ Treatment (3,000 cy)	\$780,000	4 to 5 weeks	 Lowest cost and least time Takes advantage of the natural attenuation of arsenic Others same as above 	 Same as above Assumes that natural attenuation will continue 	Remedy Description: Same as above, only with smaller quantities: 70 tons (21 g/kg _{soil}) ferric sulfate, 60 tons (15g/ kg _{soil}) limestone, and 480 gallons (6.25 mL/kg _{soil}) hydrogen peroxide (30%), and 160 tons bentonite. Performance Monitoring – 20 years Same as above only with 2 wells in smaller treatment area and 1 well downgradient from the treated material.

Notes

- 1. The "hot spot" area is defined at material with compositional arsenic concentrations greater than 1,000 mg/kg. This concentration correlates to levels that have the potential to be hazardous for arsenic.

 The hot spot area is shown on Figure 2, and includes approximately 11,000 cy or 11,900 tons of material. In the case of treatment option 1b, the "hot spot" is defined at material with compositional arsenic concentrations greater than 2,000mg/kg. This concentration correlates to levels that will still have the potential to be hazardous for arsenic in 4 to 5 years, assuming natural attenuation reduces the concentration to be below 1,000 mg/kg in that time.

 The future hot spot area is shown on Figure 2, and includes approximately 3,000 cy or 3,200 tons of material
- 2. All monitoring costs are strictly for evaluating the performance of the hot spot remediation, and do not include monitoring and evaluations for the entire marsh area, or bringing the site to closure.
- 3. All costs based on preliminary concepts. They are intended for remedial option comparison and not for budgetary purposes. The detailed cost estimating spreadsheets that provide a basis for the opinion of probable cost are included in Appendix F of this report.
- 4. A field trial is recommended to determine the specific means and methods for construction/implementation in this unique setting.
- 5. The best judgment value is presented in the table. However, at this level of cost estimating, the range in cost may vary from -30 percent to +50 percent of the best judgment value. This approach is consistent with USEPA guidance on feasibility study level estimating of remediation costs.
- 6. Costs are rounded to two significant digits. Total costs include direct and indirect capital costs, and present worth costs of the monitoring.

Table 2 (continued) Remedial Options Analysis

WDNR - Kewaunee Marsh Hot Spot Remediation - Kewaunee, Wisconsin

REMEDIAL OPTION	ESTIMATED COST	TIME FRAME	ADVANTAGES	DISADVANTAGES	DESCRIPTION AND ASSUMPTIONS
2. In Situ Treatment with On-site Containment in Unsaturated Zone	\$2,650,000	18 to 20 weeks	 Treated material set above the groundwater table Higher confidence in chemical stability of treated material when kept unsaturated Perception of not "relocating" the problem Less costly than transporting and disposing off site at a solid waste landfill 	 Cannot guarantee the material will remain unsaturated over the long-term (material may settle below water table or water table may rise) Requires long-term maintenance and inspection of contained material Long-term monitoring still required May alter the natural attenuation process that is on-going in the capped area Alters the existing topography, and may be more noticeable to the public Public perception of leaving material on site Significant closure time to bike path Significant amount of truck traffic and disturbance to the bike path 	Remedy Description: The "hot spot" material will be treated using the same approach described for <i>in situ</i> treatment. However, for this option, the treated material will be excavated and placed on the unsaturated capped area of the marsh. The marsh excavation will be backfilled with organic soil from an off-site source, and the ballast excavation will backfilled with granular material. Following remediation, the bike path and fence will be restored to existing conditions. Same chemistry, treatment/construction process, and basis for the chemical doses as described for <i>in situ</i> treatment. The treated material will be excavated and placed on top of the "capped" area that is outside the hot spot area, and above the current water table. The treated soil would be graded across an area approximately 180° x 500° and would extend approximately 3 to 4 feet above the existing grade. The material will dewater in place on the unsaturated capped area. The water that drains off the material will not require additional treatment. The treated material would be covered with a 6-inch layer of top soil and seeded to restore vegetation so as to reduce erosion and provide a vegetative barrier. The marsh excavation would be backfilled with approximately 10,500 cy of organic material, and seeded to restore vegetative cover. The ballast area would be backfilled with approximately 10,500 cy of granular material. Approximately 450 cy of backfill will come from an off-site source. The other 350 cy will come from unsaturated ballast material (upper 4 to 5 feet) that is segregate and stockpiled on site as was described for the <i>in situ</i> treatment process. The bike path will be restored and the fence replaced to existing conditions. This cost assumes that the stabilization, on-site containment, and site restoration can be completed in 18 to 20 weeks. Performance Monitoring – 5 and 20 years A total of 5 years of performance monitoring are assumed for the hot spot area, and a total of 20 years of monitoring are assumed to confirm

Notes

- 1. The "hot spot" area is defined at material with compositional arsenic concentrations greater than 1,000 mg/kg. This concentration correlates to levels that have the potential to be hazardous for arsenic.

 The hot spot area is shown on Figure 2, and includes approximately 11,000 cy or 11,900 tons of material. In the case of treatment option 1b, the "hot spot" is defined at material with compositional arsenic concentrations greater than 2,000mg/kg. This concentration correlates to levels that will still have the potential to be hazardous for arsenic in 4 to 5 years, assuming natural attenuation reduces the concentration to be below 1,000 mg/kg in that time.

 The future hot spot area is shown on Figure 2, and includes approximately 3,000 cy or 3,200 tons of material
- 2. All monitoring costs are strictly for evaluating the performance of the hot spot remediation, and do not include monitoring and evaluations for the entire marsh area, or bringing the site to closure.
- 3. All costs based on preliminary concepts. They are intended for remedial option comparison and not for budgetary purposes. The detailed cost estimating spreadsheets that provide a basis for the opinion of probable cost are included in Appendix F of this report.
- 4. A field trial is recommended to determine the specific means and methods for construction/implementation in this unique setting.
- 5. The best judgment value is presented in the table. However, at this level of cost estimating, the range in cost may vary from -30 percent to +50 percent of the best judgment value. This approach is consistent with USEPA guidance on feasibility study level estimating of remediation costs.
- 6. Costs are rounded to two significant digits. Total costs include direct and indirect capital costs, and present worth costs of the monitoring.

Table 2 (continued) Remedial Options Analysis

WDNR - Kewaunee Marsh Hot Spot Remediation - Kewaunee, Wisconsin

REMEDIAL OPTION	ESTIMATED COST	TIME FRAME	ADVANTAGES	DISADVANTAGES	DESCRIPTION AND ASSUMPTIONS
3. In Situ Treatment, with Off-Site Disposal	\$2,900,000	13 to 15 weeks	Treated material will be kept in a controlled and monitored location (solid waste landfill) Removes bulk of source material Highest confidence in long-term effectiveness. (i.e. eliminates long-term stability concern for saturated reducing conditions at the marsh) Public perception may be improved for removing the hot spot material from the site Least amount of performance monitoring	 Highest cost Some uncertainty with dewatering Perception of "relocating" the problem Significant closure time to bike path Significant amount of truck traffic and disturbance to the bike path 	Remedy Description: The "hot spot" material will be treated using the same approach described for <i>in situ</i> treatment. However, for this option, the treated material will be excavated, dewatered, and transported off site for disposal at a solid waste landfill. The marsh excavation will be backfilled with organic soil from an off-site source, and the ballast excavation will backfilled with imported granular material. Following remediation, the bike path and fence will be restored to existing conditions. The treatment cost is based on applying 200 tons (10.5 g/kgsoil) ferric sulfate, 100 tons (7.5g/kgsoil) limestone, and no hydrogen peroxide to the hot spot material. The chemical doses selected for treating the material are on the basis that the material must be treated to render it non-hazardous for disposal purposes. The treatment process will be the same as described for <i>in situ</i> treatment. The treated material will be excavated and stockpiled on-site. The material will be dewatered by adding magnesium sulfate to the material to absorb any residual free liquids. The material must be dewatered to contain no free liquids for landfill acceptance. Cost assume that the excavated material will be transported to Hickory Meadow landfill in Hilbert, Wisconsin (55 miles from the site), and will be disposed under the State's waste disposal contract with Veolia. The marsh excavation would be backfilled with approximately 10,500 cy of organic material, and seeded to restore vegetative cover. The ballast area would be backfilled with approximately 800 cy of granular material. Approximately 450 cy of backfill will come from an off-site source. The other 350 cy will come from unsaturated ballast material (upper 4 to 5 feet) that is segregate and stockpiled on site as was described for the <i>in situ</i> treatment process. The bike path will be restored and the fence replaced to existing conditions. Performance Monitoring – 5 years A total of 5 years of performance monitoring are assumed for the hot spot area. Construct

Notes:

- 1. The "hot spot" area is defined at material with compositional arsenic concentrations greater than 1,000 mg/kg. This concentration correlates to levels that have the potential to be hazardous for arsenic. The hot spot area is shown on Figure 2, and includes approximately 11,000 cy or 11,900 tons of material. In the case of treatment option 1b, the "hot spot" is defined at material with compositional arsenic concentrations greater than 2,000mg/kg. This concentration correlates to levels that will still have the potential to be hazardous for arsenic in 4 to 5 years, assuming natural attenuation reduces the concentration to be below 1,000 mg/kg in that time. The future hot spot area is shown on Figure 2, and includes approximately 3,000 cy or 3,200 tons of material
- 2. All monitoring costs are strictly for evaluating the performance of the hot spot remediation, and do not include monitoring and evaluations for the entire marsh area, or bringing the site to closure.
- 3. All costs based on preliminary concepts. They are intended for remedial option comparison and not for budgetary purposes. The detailed cost estimating spreadsheets that provide a basis for the opinion of probable cost are included in Appendix F of this report.
- A field trial is recommended to determine the specific means and methods for construction/implementation in this unique setting.
 The best judgment value is presented in the table. However, at this level of cost estimating, the range in cost may vary from -30 percent to +50 percent of the best judgment value. This approach is consistent with USEPA quidance on feasibility study level estimating of remediation costs.
- 6. Costs are rounded to two significant digits. Total costs include direct and indirect capital costs, and present worth costs of the monitoring.

Table 3
Comparative Summary of Remedial Options Estimated Costs⁽¹⁾
WDNR – Kewaunee Marsh Hot Spot Remediation

SCENARIO		BEST JUDGMENT REMEDIATION CONCEPTUAL COST ESTIMATES							
		TOTAL COST		PRESEN	IT WORTH OF ANNUAL	COSTS ⁽⁴⁾			
	REMEDIAL OPTION	PRESENT WORTH(2)	YEAR 1 COSTS ⁽³⁾	O&M	MONITORING	DURATION			
1a	In Situ Treatment (11,000 cy)	\$1,430,000	\$1,250,000	\$0	\$180,000	20 years			
1b	In Situ Treatment (3,000 cy)	\$780,000	\$600,000	\$0	\$180,000	20 years			
2	In Situ Treatment with On-site Containment	\$2,650,000	\$2,400,000	\$40,000 (once – yr 10)	\$210,000	20 years			
3	In Situ Treatment with Off-site Disposal	\$2,900,000	\$2,850,000	\$0	\$50,000	5 years			

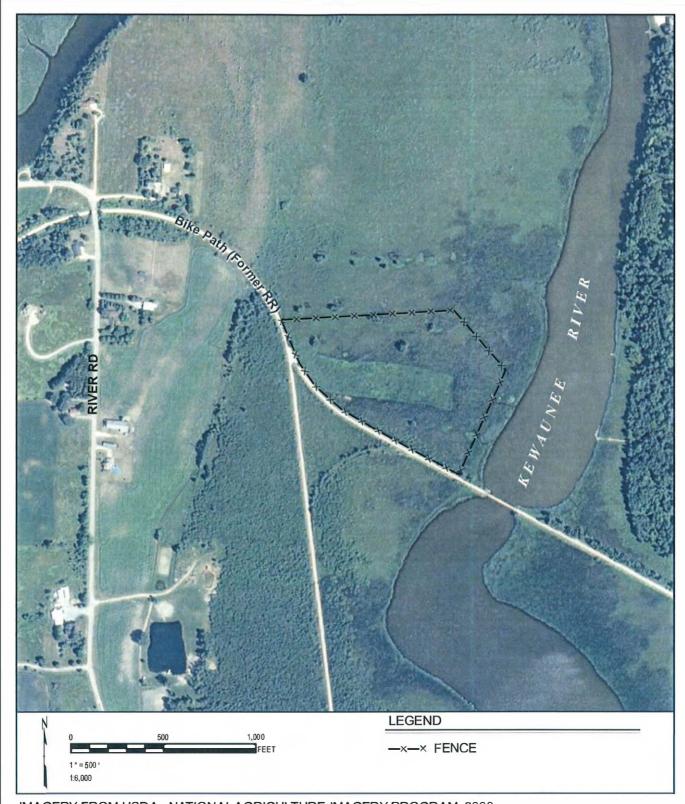
Footnotes:

(1) This table is a summary of information presented in Table 2, and is not intended to be used as a stand alone document. This summary is compiled for comparative purposes only. Important descriptions, assumptions and uncertainties are discussed in Table 2.

(3) Year 1 costs include direct and indirect capital costs, as well as the first year O&M and monitoring costs.

(4) Costs do not include total site monitoring and evaluation to bring the site to closure.

The best judgment value is presented in the table. However, at this level of cost estimating, the range in cost may vary from -30 percent to +50 percent of the best judgment value. This approach is consistent with USEPA guidance on feasibility study level estimating of remediation costs.



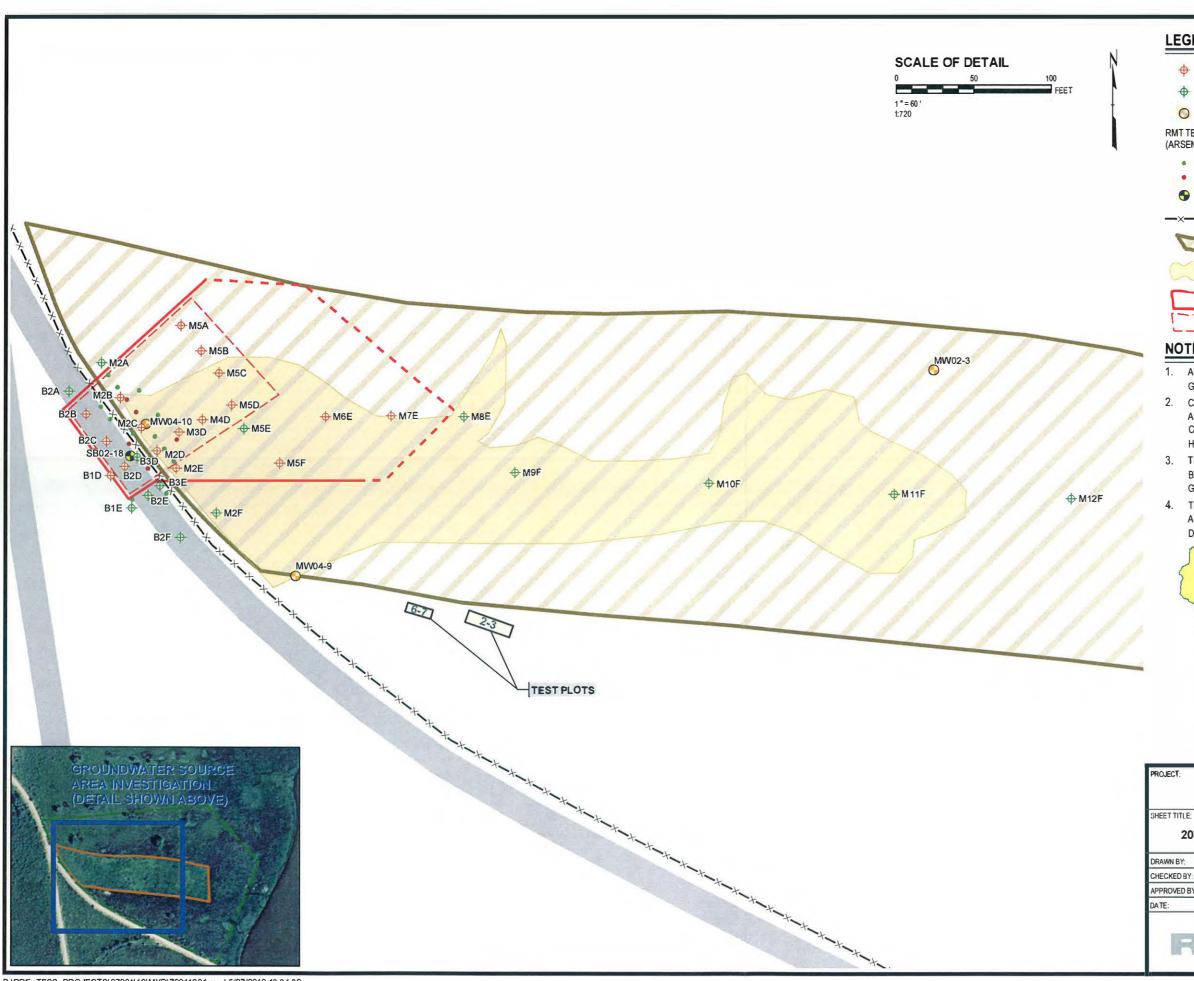
IMAGERY FROM USDA - NATIONALAGRICULTURE IMAGERY PROGRAM, 2008.



744 Hearlland Trail Madison, W153717-1934 P.O. Box 8923 53708-8923 Phone: 608-831-4444 Fax: 608-831-3334 WISCONSIN DEPARTMENT OF NATURAL RESOURCES KEWAUNEE MARSH

SITE AREA MAP

DRAWN BY:	PAPEZJ
APPROVED BY:	FISHD
PROJECT NO:	00-007201.19
FILE NO.	72011903.mxd
DATE:	MAY 2010



LEGEND

ARSENIC > 1,000 mg/kg \ M-SERIES = MARSH (8-12 FT) B-SERIES = BALLAST (15-30 FT)

ARSENIC < 1,000 mg/kg

MONITORING WELL LOCATION

RMT TEMPORARY WELL LOCATION (APRIL 2007) (ARSENIC CONCENTRATION COLOR CODE)

- < 100,000 µg/L
- > 100,000 µg/L
- SOIL BORING (STS HISTORICAL SAMPLE LOCATION)



CAPPEDAREA

APPROXIMATE AREA OF PREVIOUSLY DISTRESSED VEGETATION



APPROXIMATE EXTENT OF CURRENT HOT SPOT AREA (>1,000 mg/kg) (DASHED WHERE INFERRED)

APPROXIMATE EXTENT OF FUTURE HOT SPOT (>2,000 mg/kg)

NOTES:

- ALL GEOPROBE BORINGS WERE LOCATED USING A TRIMBLE GEOXH GPSUNIT.
- CURRENT HOT SPOT IS DEFINED AS CONTAINING COMPOSITIONAL ARSENIC CONCENTRATIONS GREATER THAN 1,000 mg/kg. THIS COMPOSITIONAL CONCENTRATION CORRELATES TO POTENTIALLY HAZARDOUS MATERIAL (TCLP > 5 mg/kg).
- 3. THE CURRENT HOTSPOT IMPACTS EXTEND APPROXIMATELY 10 FT BELOW GRADE IN THE MARSH AND ARE PRESENT5-12 FT BELOW GRADE IN BALLAST.
- THE FUTURE HOT SPOT REPRESENTS THE AREA THAT WILL HAVE ARSENIC > 1,000 mg/kg IN 4 YEARS BASED ON THE OBSERVED RATE OF DECREASE N CONCENTRATION OVER THE LAST 15 YEARS.



WISCONSIN DEPARTMENT OF NATURAL RESOURCES KEWAUNEE MARSH

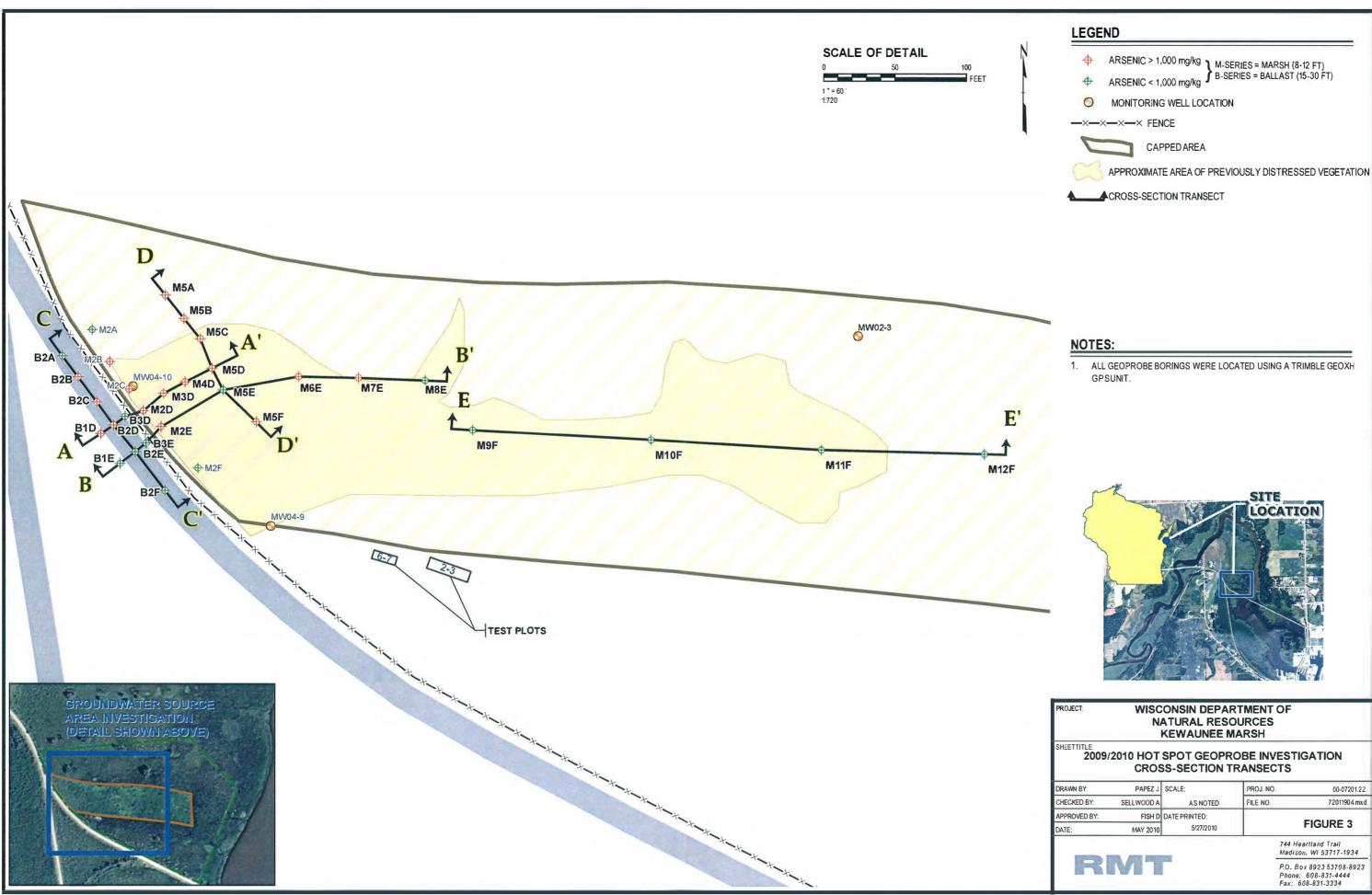
2009/2010 HOT SPOT GEOPROBE INVESTIGATION

DRAWN BY:	MCKEEFRY J	SCALE:	PROJ. NO.	00-07201.15
CHECKED BY:	SELLWOOD A	AS NOTED	FILE NO.	72011901.mx
APPROVED BY:	FISH D	DATE PRINTED:		FIGURE A
DATE:	MA V 2010	5/27/2010		FIGURE 2



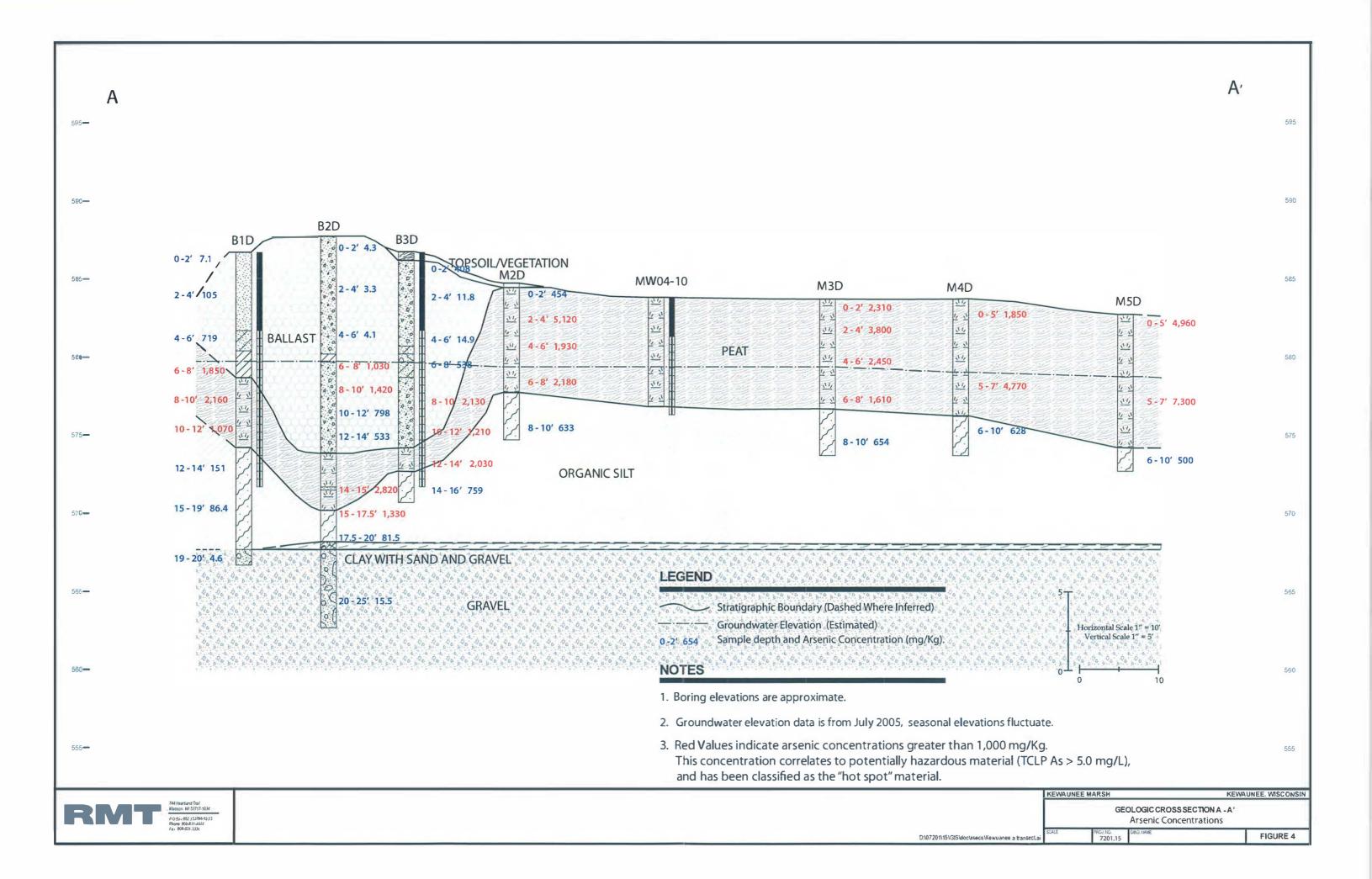
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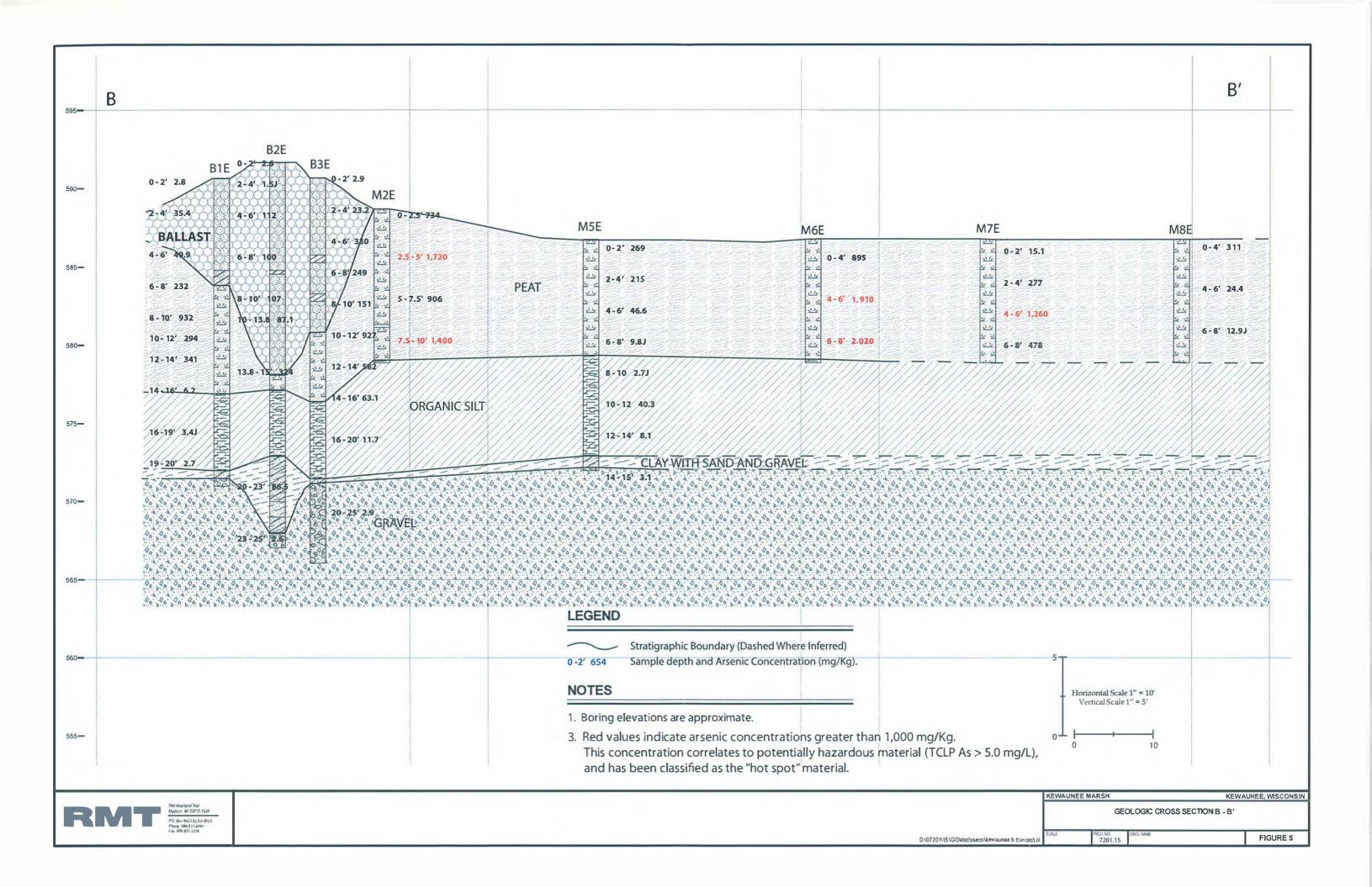
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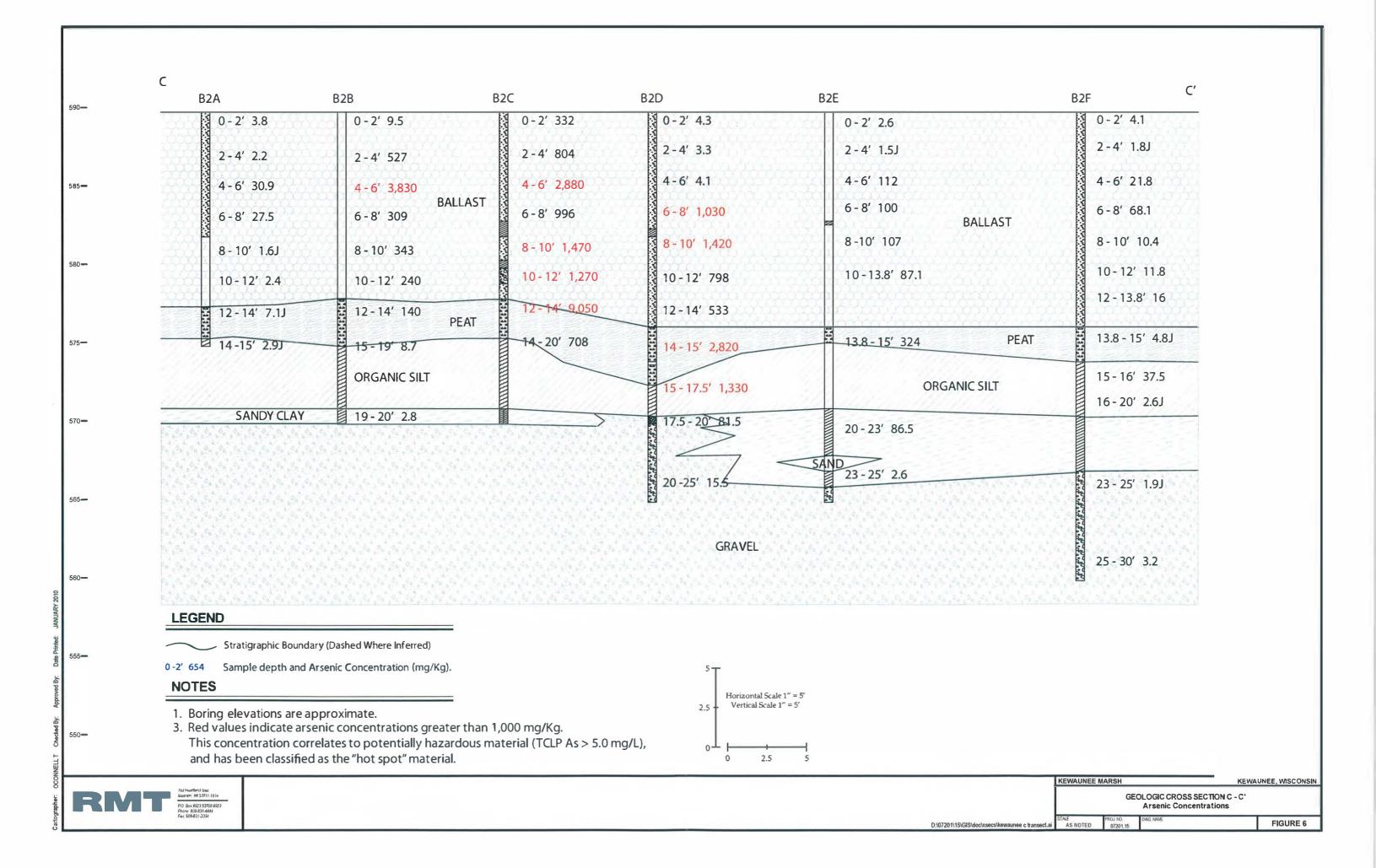


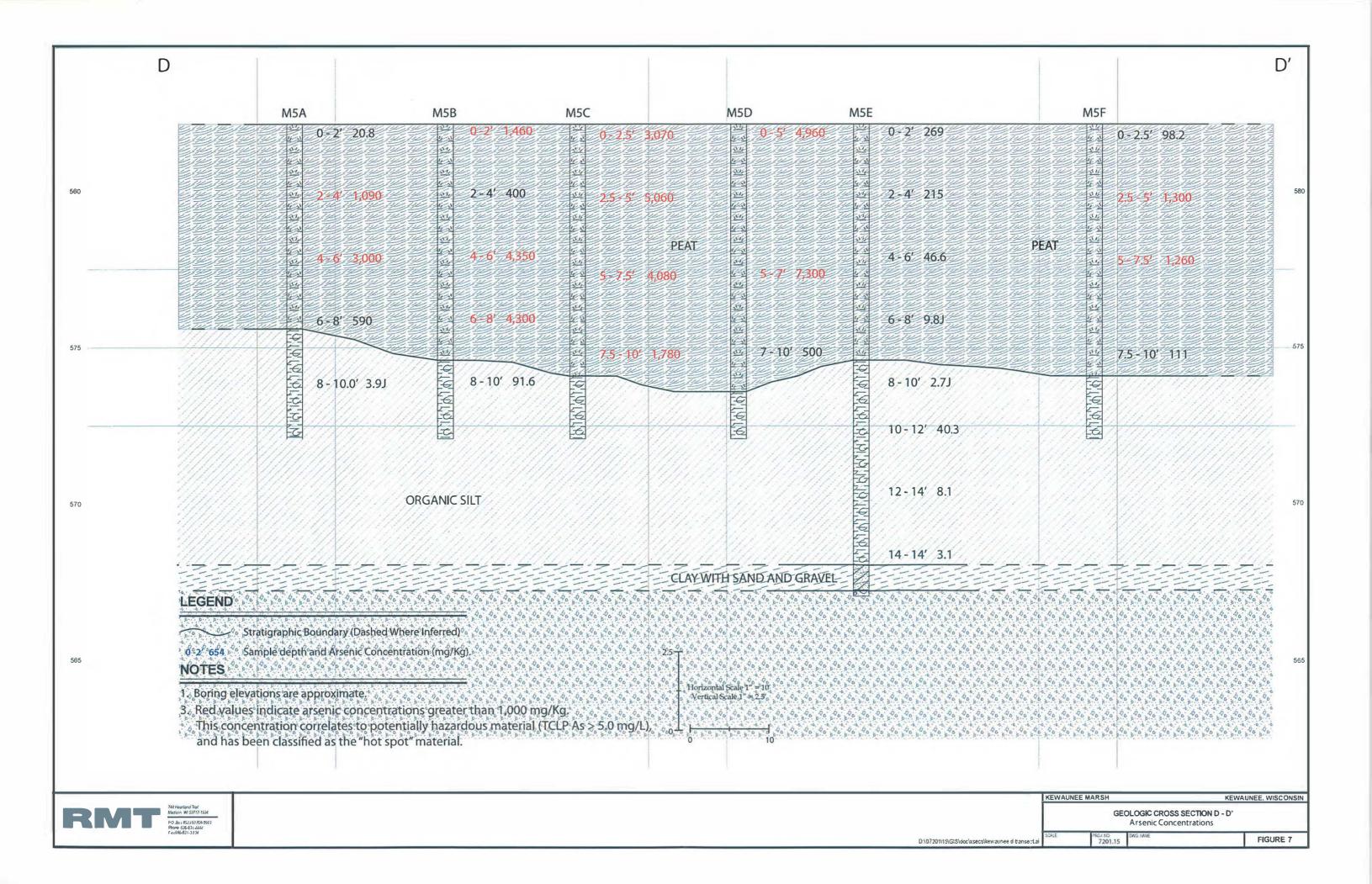
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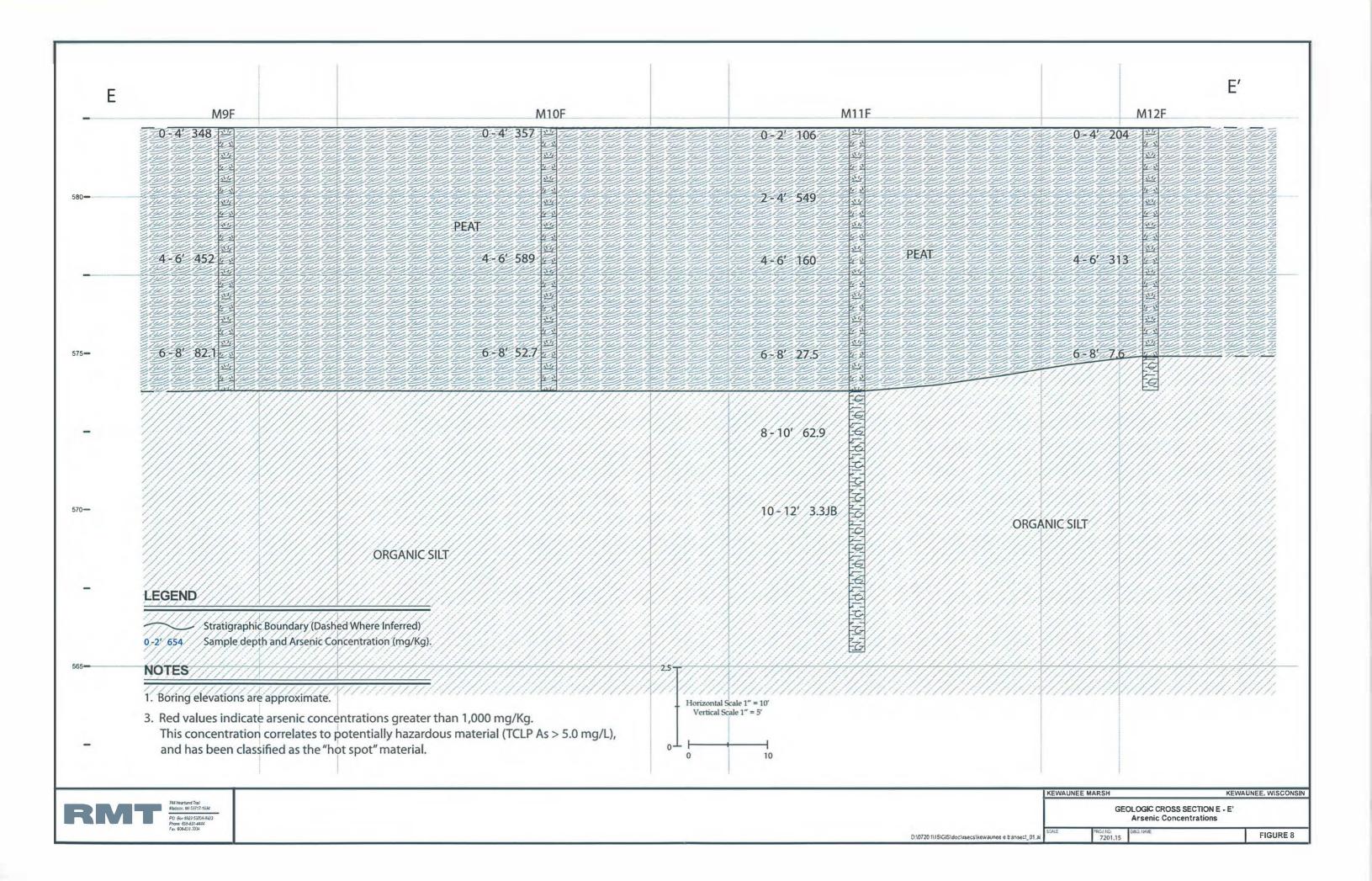
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Appendix A Geophysical Conductivity Survey

April 7, 2010

Annette Weissbach, Hydrogeologist Wisconsin Department of Natural Resources 2984 Shawano Ave. Green Bay, WI 54313-6727

Re: Geophysical Survey of an Arsenic Contaminated Site in the Kewaunee Marsh

Dear Ms. Weissbach,

This memorandum describes efforts by scientists from the Wisconsin Geological and Natural History Survey to characterize an arsenic plume in the Kewaunee Marsh Besadny Wildlife Area near Kewaunee, WI using electrical conductivity measurements. The site of the arsenic contamination is a wetlands located near the Kewaunee River. The site is underlain by approximately 7 feet of peat over around 10 feet of organic silt over clays, sands and gravels. The source of the arsenic is thought to be a spill from a nearby railroad, currently a recreational bike trail. The spill is thought to have occurred in the 1940s (Stanforth and others, 2007).

We chose to use electrical conductivity measurements to map the arsenic plume because the concentrations of arsenic are very high in the soils (>1000 mg/Kg) and also in ground water samples (>1,000,000 $\mu g/L$), creating a measurable contrast to uncontaminated areas. The high concentrations of arsenic ions, arsenate or arsenite, in the groundwater cause large increases in the conductivity of the subsurface. These high conductivities allowed us to quickly map the extent of the arsenic plume.

Methods

The electrical conductivity of the subsurface varies with the conductivity of the pore fluid and the sediment. Pore fluids with higher ionic strengths are more conductive and result in higher conductivities measured with the instrument. In this survey, we expect that the higher concentrations of arsenic ions caused measurably higher conductivities. Also, different lithologies have different electrical conductivities. Most common minerals such as quartz or feldspar have very low conductivities so that pore fluids dominate the overall conductivities in these sediments. However, clays are highly conductive with the result that a sediment with a high clay content and with pore fluid of low conductivity will give overall conductivities similar to a clean sand sediment with a high conductivity pore fluid. For this reason, if bulk measurements of conductivity are used to map the extent of a plume of conductive pore fluid, the clay content and porosity of the subsurface must be assumed to not vary significantly. We made that assumption in this survey.

We used an EM-31 ground conductivity meter to measure the bulk electrical conductivity of the subsurface. This instrument is easy to use and can collect large

amounts of data quickly. It measures electrical conductivity by inducing current in the subsurface with a coil located at the end of one of its arms. Another coil at the end of the other arm records the induced earth current. That current is proportional to the conductivity of the subsurface (McNeill, 1980).

The orientation of the instrument coils affects the depths at which the instrument is most sensitive (McNeill, 1980). If the coils are aligned vertically, the instrument will sense greater depths. When the coils are aligned horizontally, more shallow depths have greater weight. For example, Figure 1 shows the instrument response with depth for when the coils are vertical, Rv(z) and horizontal, Rh(z). When the coils are vertical, the about half of the instrument response is due to the subsurface above 12.1 feet. The figure also shows that about 25% of the instrument response when the coils are vertical is from below 24.3 feet. In contrast, when the coils are aligned horizontally, half of the instrument response is due to the subsurface above only 5 feet. This difference allowed us to measure the difference between the shallow (around 5 feet depth) and deep (around 12 feet depth) conductivities at the site.

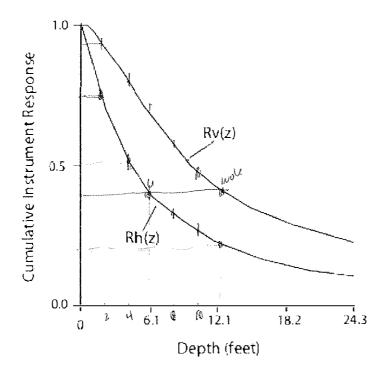


Figure 1. EM-31 instrument response (after McNeill, 1980)

We collected data at approximately even intervals across the site. At each location, we collected vertical and horizontal coil conductivity readings. Each location was recorded with a Garmin Oregon GPS unit. The data was collected in approximately 2 hours.

Results

In general, the conductivity results confirm earlier interpretations of the extent of the impacted area. Figure 2 shows the site, the shallow and deep conductivity measurements, and conductivity contours based on the deep measurements. Red corresponds to higher conductivity and blue to low. The deep measurements are shown as the larger circles beneath the smaller circles of the shallow measurements. The regions of highest conductivity correspond to the two zones of dead vegetation where the arsenic spill and runoff was thought to have accumulated. There do not appear to be any high values of deep conductivities outside the capped area either to the west or north. Some moderately high conductivities are present to the southwest, between the tracks, shown in orange but their origin may be due to sediment changes or moderate concentrations of arsenic. The conductivities suggest that the arsenic plume is slowly migrating to the east and diminishes in strength towards the river, around 100 feet past the capped zone.

Other factors, in addition to variation in pore fluid and lithologic variation, may affect the conductivities. A cap, indicated in the 2005 air photo in Figure 2 by the more green vegetation beneath the central plumes, had been placed over the highly contaminated areas. While that cap may have altered the conductivity of the upper 3-4 feet at the site and might affect the shallow conductivity values, it would have much less effect on the deep conductivity values. This is justified by observing that the orange value deep conductivities shown on the east end of the capped area are not significantly different than the deep conductivities just outside of the capped area. Another factor, one that also affected the shallow readings, was there was around 6 inches of water over ice in the area outside the capped zone. Within the capped zone, there was little standing water and no ice. There was standing water to the west of the tracks but no ice. In general, where the vegetation seen in the air photo is green, the ice had melted. Where the vegetation was brown, the ice was still present. The presence of ice would tend to lower the resistivity of the shallow measurements since nearly 30% of the weighted measurement would be from the upper two feet. In contrast, the deep measurements would be relatively unaffected since only 5% of the deep measurement depends on the upper two feet (Figure 1). For these reasons the deep measurements are relatively unaffected by the ice, standing water, or the cap.

Conclusions

A survey of the electrical conductivity of the subsurface was conducted using an EM-31 ground conductivity meter in an area contaminated with arsenic. The measured conductivities are highest where the arsenic was known to have been spilled and to have killed vegetation. The conductivities are lower in areas not thought to be contaminated. Although the conductivities between the railroad tracks may suggest an area of additional moderate contamination, the survey confirmed that the current interpretation of the arsenic migration towards the river is likely correct.

Please contact me (608-262-2307; <u>djhart@wisc.edu</u>) if you have any questions regarding this report.

Sincerely,

David Hart Hydrogeologist/Geophysicist

Cc: Alyssa Sellwood, RMT

References

McNeil, J.D., 1980, Electromagnetic Terrain Conductivity Measurement at Low Induction Numbers. Technical Note TN-6. Geonics Limited, Ontario, Canada.

Stanforth, R., R. Fish, A. Sellwood, and P. Turpin., 2007, WDNR-Kewaunee Marsh Treatability Project-Final Report to WDNR, RMT, Madison, WI.

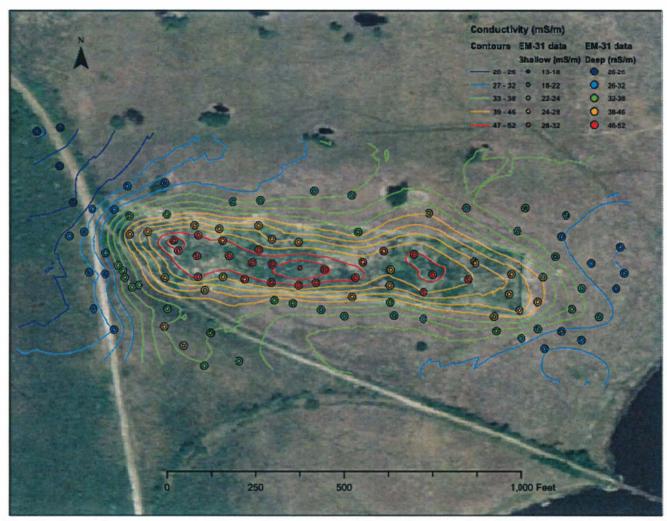
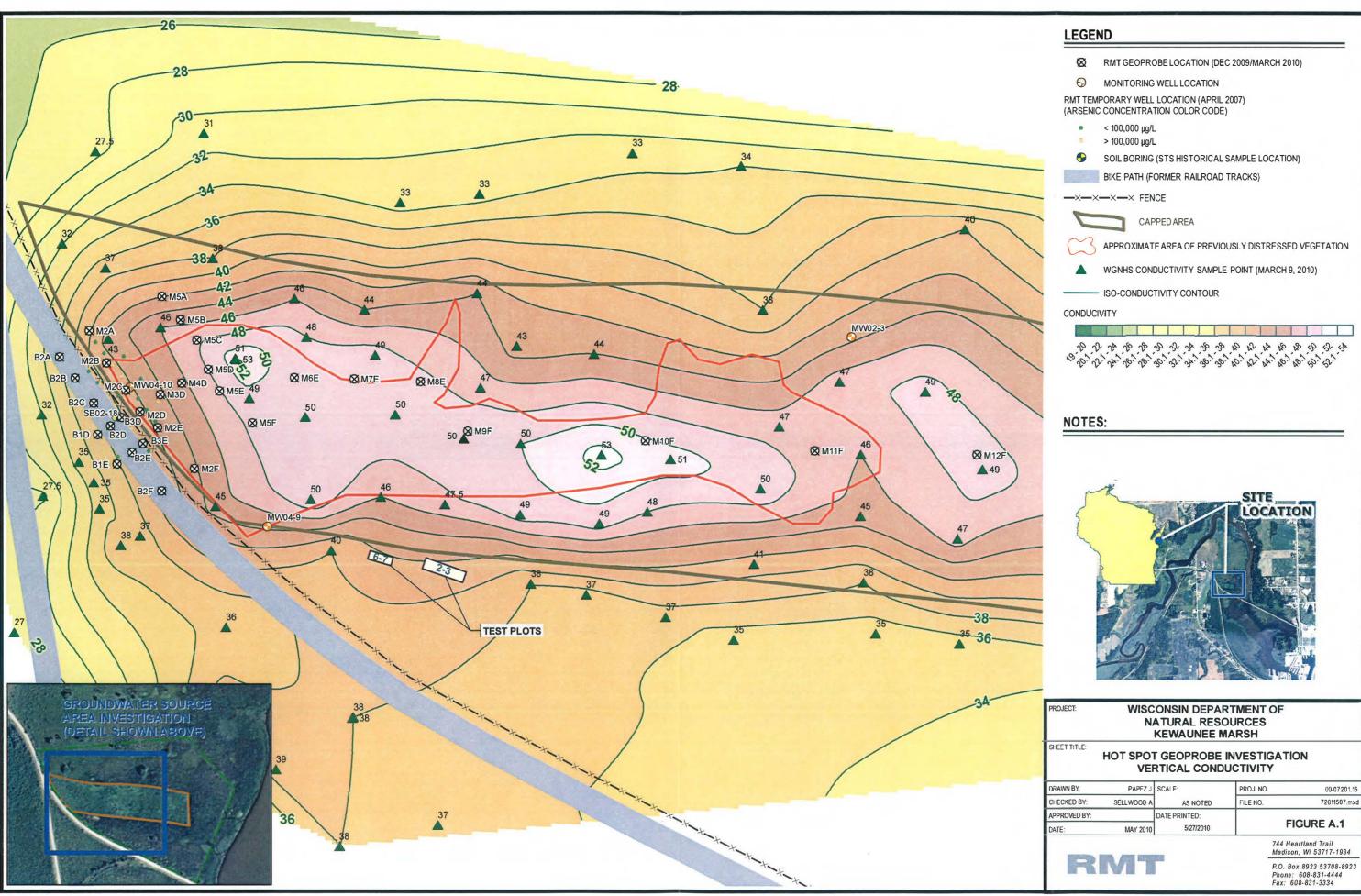


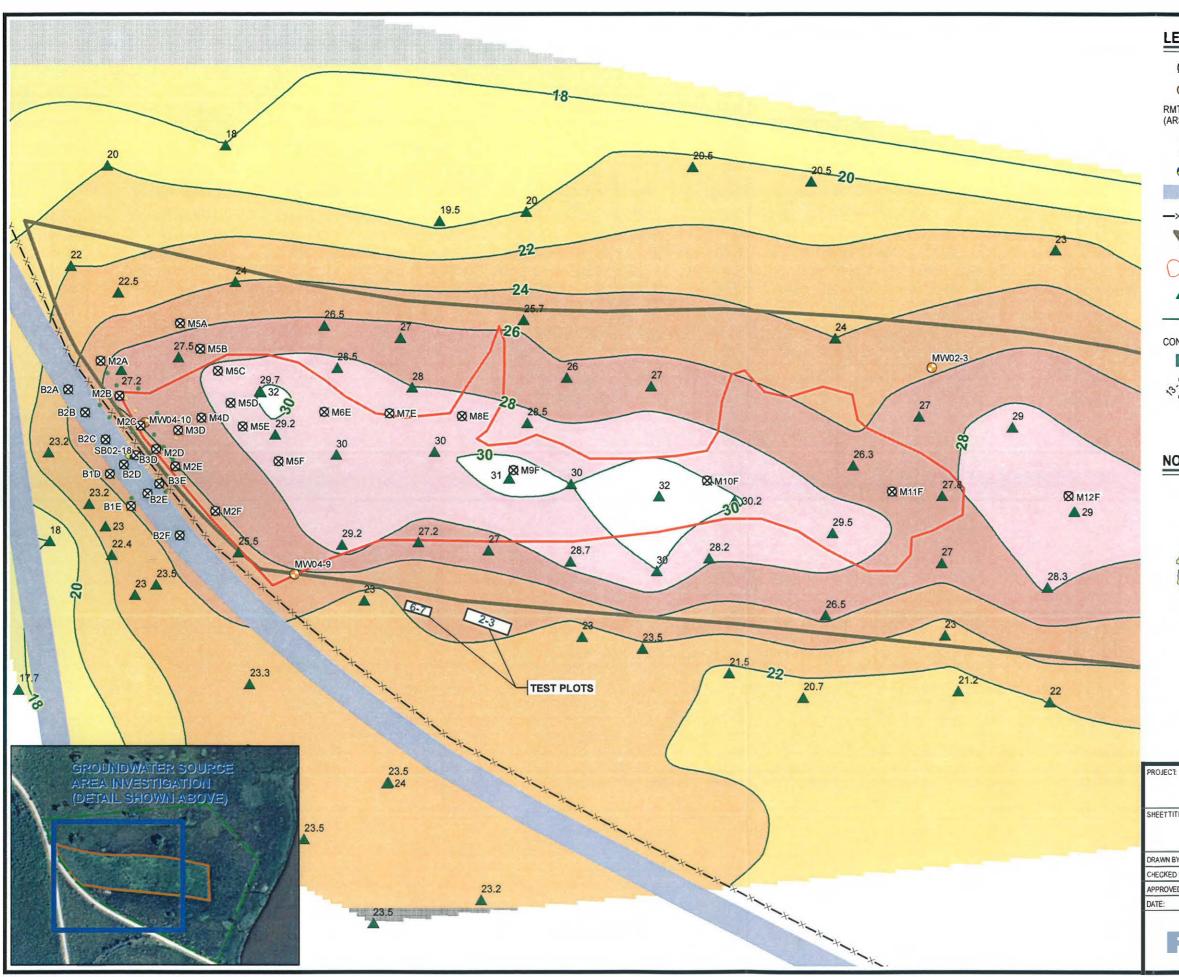
Figure 2. Air photo showing conductivity measurements. The highest conductivities are shown in red; the lowest are shown in blue. The small circles are for the shallow horizontal coil measurements; the large circles are for the deep vertical coil measurements.



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72011507.mxd

FIGURE A.1



LEGEND

- RMT GEOPROBE LOCATION (DEC 2009/MARCH 2010)
- MONITORING WELL LOCATION

RMT TEMPORARY WELL LOCATION (APRIL 2007) (ARSENIC CONCENTRATION COLOR CODE)

- < 100,000 µg/L
 - > 100,000 µg/L
- SOIL BORING (STS HISTORICAL SAMPLE LOCATION)
- BIKE PATH (FORMER RAILROAD TRACKS)

—x—x—x—x FENCE

CAPPED AREA

APPROXIMATE AREA OF PREVIOUSLY DISTRESSED VEGETATION

WGNHS CONDUCTIVITY SAMPLE POINT (MARCH 9, 2010

ISO-CONDUCT!VITY CONTOUR

CONDUCTIVITY



NOTES:



WISCONSIN DEPARTMENT OF **NATURAL RESOURCES KEWAUNEE MARSH**

SHEETTITLE:

HOT SPOT GEOPROBE INVESTIGATION HORIZONTAL CONDUCTIVITY

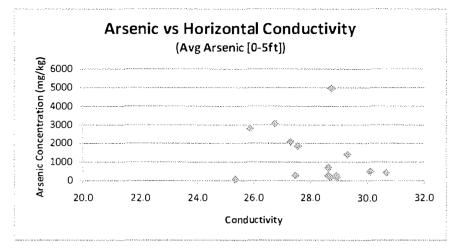
DRAWN BY:	PAPEZ J	SCALE:
CHECKED BY:	SELLWOOD A	AS NOTED
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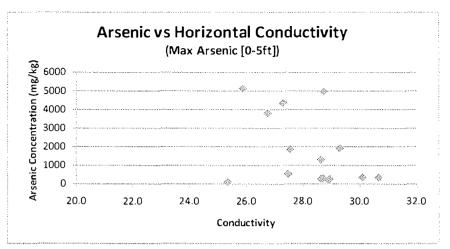
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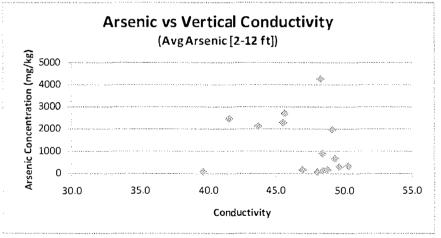


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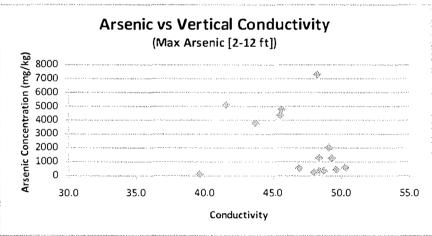


FIGURE A.3

Appendix B Remediation Laboratory Summary Memos

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Comparison of DI Water and TCLP Leach Test Results



Date: May 5, 2010

To: Technical File

From: **Bob Stanforth**

Project No.: 02085.23.009

Comparison of DI Water and Screening TCLP Leaching Test Results for Subject:

Kewaunee Sediments

Introduction

The focus of leaching studies for the Kewaunee soils has been predominantly using distilled water leaching tests (using the SPLP procedure but with DI water), or modifications thereof with different solids concentrations. Less work has been done using screening TCLP tests¹, since the focus has not been on whether the sediments are hazardous, but rather on the potential for contributing dissolved arsenic to the marsh. However, one approach to delineating the "hot-spot" area requiring treatment would be to determine the areas of the marsh that leach arsenic at over 5 mg/L in a TCLP test, and would be considered hazardous were they to be removed.

Compositional analysis and screening TCLP and DI Water tests have been run on a number of composite sediments from the two recent Geoprobe investigations on the site (in December 2009, and Marsh 2010). These results can be used for two purposes: first to compare DI Water and TCLP results and see if the DI Water test (at 2 g/40 mL) can be used as a surrogate for the TCLP test, and second, to compare leaching test concentrations (TCLP or DI Water) with the compositional values.

Results

Compositional and leaching test results for the different composites are given in Table 1.

Table 1

	ARSENIC CONCENTRATION						
SAMPLE	COMPOSITIONAL, mg/kg	SCREENING TCLP, mg/L	DI WATER, mg/L ^(f)				
December 2009 Composites							
Ballast	1,400	8.4	13				
Peat Under ballast	1,500	11	11				
Peat in Marsh	2,600	24	18				
Organic Silt in marsh	550	3.1	2.5				

¹ The screening tests follow the standard USEPA protocols (TCLP-SW 846 Method 1311 and SPLP-SW 846 Method 1312), with the exceptions that the leaching solution is analyzed directly after acidification, and smaller quantities of solid and leaching solution are used, while still maintaining the 1:20 solid to solution ratio. Previous tests have shown that the screening tests correlate well with standard leaching test results. 3

Table 1

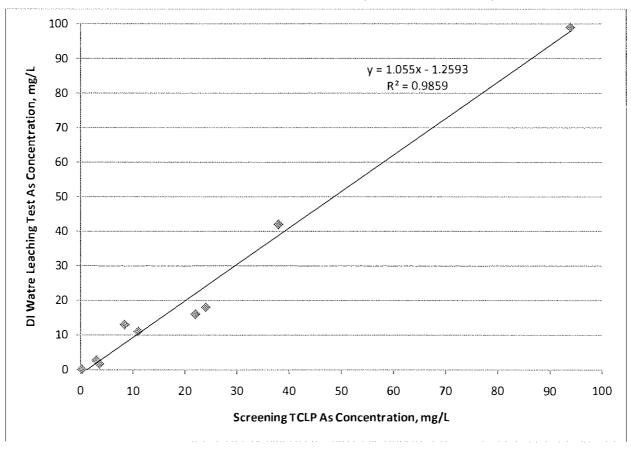
	ARSENIC CONCENTRATION						
SAMPLE	COMPOSITIONAL, mg/kg	DI WATER, mg/L ⁽¹⁾					
March 2010 Composites							
>10,000 mg/kg	8900	94	99				
~5,000 mg/kg	4550	38	42				
2,000 4,000 mg/kg	2950	22	16				
1,000 - 2,000 mg/kg	1200	3.0	2.8				
500 – 1,000 mg/kg	920	3.6	1.7				
250 – 500 mg/kg	440	0.26	0.18				

Note:

Comparison of TCLP and DI Water Leaching Test Results

A comparison of the two leaching test results, using the same solid/solution ratio (2 g/40 mL) is given in Figure 1.

Figure 1
Comparison of DI Water Leaching Test Arsenic Concentrations
With TCLP Arsenic Concentrations for Composite Kewaunee Samples



^{) 2} g/40 mL sample.

The two leaching tests give very similar arsenic concentrations, indicating that the DI water leaching test (at the correct solids concentration) gives a good indication of the expected TCLP test arsenic concentration.

A second comparison can be made between the compositional arsenic concentration and the leaching test concentration, as shown in Figure 2.

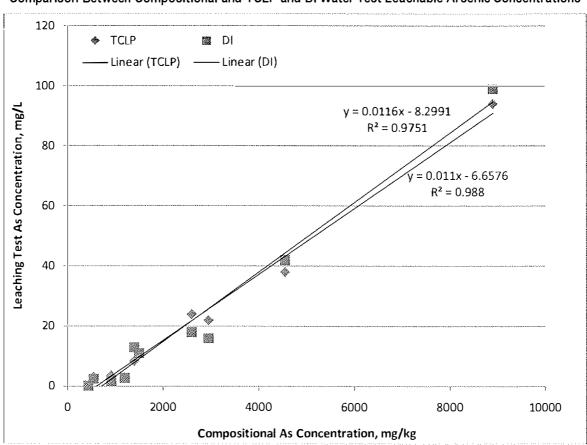


Figure 2
Comparison Between Compositional and TCLP and DI Water Test Leachable Arsenic Concentrations

There is a good correlation between the compositional levels of arsenic in the samples and the leachable concentrations, in either the TCLP or DI water tests. Increasing compositional levels of arsenic increase the amount leached in the TCLP or DI Water tests. However, for both tests, the lines do not go through the origin, but rather there is a compositional threshold below which arsenic is not very leachable, and above which leaching concentrations increases linearly with compositional arsenic. The threshold value for the TCLP test is 605 mg/kg, while for the DI Water test it is 715 mg/L. More importantly, a compositional value of around 1060 mg/kg is needed to give a TCLP test concentration of greater than 5 mg/L. In other words, sediments with compositional levels below 1060 are not likely to be hazardous due to arsenic leaching in the TCLP test.

Conclusion

Based on the compositional analysis and screening leaching test analysis of the Geoprobe samples from the Kewaunee Marsh, sediments with a compositional value of below 1000 mg/kg are not likely to be hazardous due to arsenic leaching in a TCLP test.

Leach Testing of Composite Samples



Date: May 5, 2010

To: Technical File

From: Bob Stanforth

Project No.: 02085.23.009

Subject: Leach Testing of Composite Kewaunee Hot Spot Samples

Introduction

Compositional analysis of the Geoprobe samples showed several things:

- 1. The boundaries of the highly contaminated soil under the railroad (RR) bed have been delineated.
- 2. The contamination extends past the ballast under the RR bed and into the underlying peat material. Contamination does not extend into the underlying silt or into the gravel layer beneath the RR bed.
- 3. The highly contaminated zone extends further into the marsh than was anticipated. The eastern edge has not been delineated.
- 4. The highly contaminated zone extends deeper into the marsh than was anticipated, going into the organic silt at 7-10 feet as well as through the peat layer going down to 7 feet.

One potential approach to remediating the highly contaminated groundwater in the ballast under the RR bed is to install a groundwater extraction trench parallel to the bike path and pump the groundwater. A question that needs to be addressed in evaluating this approach is how long it will take to remove the contamination from the area using a groundwater pumping system. Is the arsenic sufficiently soluble that the contamination can be removed by pumping a few pore volumes, or will multiple pore volumes need to be removed in order to reduce arsenic concentrations to acceptably low levels? This question can be addressed by running leaching tests on the contaminated material collected during the December 2009 Geoprobe sampling.

The original work called for doing leaching tests on the ballast to evaluate the leaching pattern of arsenic from the contaminated area. However, given the much more extensive nature of the contamination and the need to know whether the arsenic is dissolved or particulate for treatment purposes, leaching tests were run on composites of the different types of contaminated soils found, namely ballast, peat under the ballast, peat in the marsh, and organic silt in the marsh.

Procedure

Composite Preparation

Composites were made of the different types of material to be tested. The different soil samples divided into the four groups (Ballast, Peat under Ballast, Peat in Marsh, Organic Silt in Marsh) and composites made by mixing equal weights of each Ballast sample, each Peat-under-Ballast sample, each Peat-in-Marsh sample and each Organic-Silt-in-Marsh sample. Table 1 gives the

individual samples used for each composite, along with the arsenic concentrations and moisture content for each sample. The moisture content and arsenic concentration for each composite are also given in Table 1.

Leaching Tests

A series of leaching tests were run on each composite. Amounts of solid ranging from 0.5 g to 20 g were placed in 50 mL centrifuge tubes, and sufficient deionized (DI) water added to bring the volume to 40 mL. The samples were shaken overnight, then centrifuged to separate the solids and leachate. The leachate was removed and an aliquot filtered for arsenic and calcium analysis. The pH was measured on the remaining leachate. Meanwhile, fresh DI water was added to each sample, and the process repeated. The 0.5 g through 4 g samples were leached for a total of ten elutions, while the 10 and 20 g samples were leached for five elutions. The pore volume was estimated from the moisture content of the samples (since they were saturated when collected).

To illustrate what the leaching pattern looks like when there is no retention on the solids, sand spiked with an arsenate standard to give an arsenic concentration of 1000 mg/kg As was leached using solids concentrations of 0.5 g, 1.0 g, 2.0 g and 4.0 g per 40 mL.

Results

The results of the leaching tests are given in Tables 2 and 3 for arsenic concentration and mass of arsenic released, respectively.

Arsenic concentrations in the 4 g/40 mL samples vs. pore volume are shown in Figure 1. The leaching pattern for all the solids samples follows a similar curve, with a rapid decrease at low pore volumes and an extended tailing off to much higher pore volumes. Arsenic concentrations from the spiked sand samples drop much more quickly than the marsh samples, indicating that the tailing is due to something more than retained pore water. Note that concentrations do not drop to low levels even after several elutions (representing hundreds of pore volumes).

The focus of the pump-and-treat concept was for the ballast material. Arsenic concentrations versus pore volume for the different solids concentrations of Ballast samples are shown in Figure 2. All the solid concentrations fall on the same line. Arsenic concentrations are not reduced to low values until after many pore volumes. Figure 3 shows arsenic concentration vs. pore volume for the low arsenic concentration section of the graph. Arsenic concentrations are not reduced to below 0.17 mg/L (the target value) until after over 1000 pore volumes (approximately 500 to 600 million gallons) have been removed. Given the low permeability of the marsh material, removing this large volume of water would be time prohibitive, and given the remote location of the site, management of this large volume of water would be cost prohibitive.

Further, the mass balance on arsenic for the ballast material indicates that only about 500 mg/kg arsenic was removed from the ballast by the leaching, or about one third of the total arsenic present (Table 3). Not only would groundwater extraction involve removing large volumes of water, it would also not remove much of the arsenic present in the ballast. In contrast, almost all the arsenic was removed from the other three composites in the multiple elution leaching tests (Table 3).

Conclusions

It would require removal of more than 1000 pore volumes of water from the ballast area to reduce the leached concentration to below 0.17 mg/L. Removing and treating such a large volume is impractical, and the pump-and-treat approach is unlikely to be a cost-effective way to remediate the soil under the bike path.

Table 1
Kewaunee Geoprobe Investigation of Hot Spot Area, December 2009
Summary of Contaminated Samples in BD/MD Transect

SAN	IPLE		ARSENIC
BORING	DEPTH	MOISTURE, %	MEASURED, mg/kg
Ballast			
B1D	6-8	25.5	1,850
B2D	6-8	13.4	1,030
	8-10	12.8	1,420
	10-12	17.4	798
	12-14	13.9	533
B3D	6-8	11.8	538
	8-10	17.5	2,130
	10-12	18.4	1,210
Composite		17.7	1,400
Peat Under Bal	last		
B1D	8-10	75.9	2,150
	10-12	80.8	1,070
B2D	14-15	72.8	2,820
	15-17.5	44.9	1,330
B3D	12-14	77.3	2,030
	14-16	59.4	759
Composite		68.0	1,500
Peat in Marsh			
M2D	2-4	71.1	5,120
	4-6	78.6	1,930
	6-8	81.1	2,180
M3D	0-2	56.5	2,310
	2-4	82.3	3,800
	4-6	78.8	2,450
	6-8	75.7	1,610
M4D	0-5	53.5	1,850
	5-7	84.5	4,770
M5D	0-5	77.7	4,960
	5-7	87.9	7,300
Composite	Programme	74.9	2,600
Organic Silt in	Marsh		
M2D	8-10	67.4	633
M3D	8-10	67.1	654
M4D	7-10	67.9	628
M5D	7-10	68.8	500
Composite		6 7 .7	550

Table 2
Arsenic Concentrations – Kewaunee Geoprobe Composite Samples Multiple Extraction Test
Using DI Water Extractant

SAN	IPLE					EXTRA	CTION				
dl 💮	DRY WT	1 (1 (1 (1 (1 (1 (1 (1 (1 (1 (1 (1 (1 (1	2	3	4	5	6	7	8	9	10
As Conce	ntration, mg	/L (Concent	rations below	r target of 0.:	148 mg/L in	bold)					
Ballast	0.5	2.7	0.71	0.37	0.29	0.21	0.12	0.10	0.091	0.081	0.045
	1.0	5.9	1.7	0.91	0.65	0.46	0.24	0.24	0.20	0.15	0.091
	2.0	9.8	3.2	1.8	1.4	1.1	0.57	0.47	0.40	0.35	0.24
	4.0	16	6.1	3.8	3.4	2.1	1.2	0.85	0.77	0.64	0. 4 4
	10.0	34	15	11	7.9					-	
	20.0	54	28	22	17						
Peat	0.5	3.7	0.90	0.39	0.25	0.16	0.081	0.063	0.057	0.034	0.03
under	1.0	6.4	2.1	1.0	0.70	0.47	0.25	0.20	0.18	0.12	0.09
Ballast	2.0	12	3.7	1.9	1.4	1.0	0.63	0.49	0.41	0.31	0.24
	4.0	19	7.0	3.6	2.3	2.6	1.5	1.1	0.92	0.71	0.63
	10.0	40	19	14	11						
	20.0	71	31	27	23	3834344					
Peat in	0.5	6.4	1.0	0.32	0.19	0.12	0.062	0.049	0.038	0.026	0.02
Marsh	1.0	9.9	2.3	0.93	0.59	0.40	0.19	0.17	0.16	0.14	0.10
	2.0	16	4.3	2.1	1.5	1.2	0.72	0.59	0.52	0.44	0.39
	4.0	33	12	5.0	3.2	2.8	1.8	1.3	1.0	0.94	0.86
	10.0	85	30	23	14						
	20.0	160	49	19	40				Hag bearing	£1	
Organic	0.5	1.0	0.40	0.22	0.16	0.10	0.066	0.061	0.058	0.030	0.02
Silt in	1.0	1.6	0.64	0.37	0.29	0.20	0.13	0.10	0.11	0.078	0.04
Marsh	2.0	2.6	1.2	0.80	0.64	0.55	0.35	0.30	0.24	0.20	0.14
	4.0	4.1	2.1	1.3	1.2	1.1	0.68	0.63	0.55	0.43	0.38
	10.0	8.2	2.7	1.8	0.89	52503255	3:33:65/43/4	######################################		***************************************	
	20.0	12	4.1	2.6	1.2						
As	0.5	11	0.078	<0.013	<0.013	100914040	4,00,00				
Spiked	1.0	23	0.28	0.024	<0.013	747470					
Sand	2.0	45	1.1	0.045	<0.013						
	4.0	85	3.2	0.12	<0.013	327600					

Table 3
Cumulative Arsenic Extracted – Kewaunee Geoprobe Composite Samples Multiple Extraction Test
Using DI Water Extractant

	PLE	<u>(* 1974 – 1864) iš 1866 </u>		en Gregoria de la composição de Carlos. La composição de la compo	ngagaga arawaya da arawa ka		CTION		Paris de la prima de la proposició de la prima de Notaciones de la prima de l	100 may 1940 a program in La coma naca a nta and a ca	}600.6-(1000,000,000.600). •
ID	DRYWT	1	2	3	4	5	6	7	8	9	10
Cumulativ	Arsenic Ma	ass extracted	d, mg/kg								
Ballast	0.5	262	331	367	395	415	427	436	445	453	457
(1,400)	1.0	287	370	414	446	468	480	491	501	508	513
	2.0	237	314	358	392	419	433	444	454	462	468
	4.0	195	269	315	356	382	397	407	417	425	430
	10	165	238	291	329	857478744.02	477753	Bar paraki	8 J. L.		
	20	131	199	252	293	######################################	THE PROPERTY.	272-02172			
Peat	0.5	925	1150	1250	1310	1350	1370	1386	1400	1410	1420
under	1.0	750	1010	1135	1220	1279	1310	1335	1358	1373	1384
Ballast	2.0	750	981	1100	1190	1253	1292	1323	1349	1368	1383
(1,500)	4.0	595	814	927	999	1080	1127	1161	1190	1212	1232
	10	500	738	913	1050	ARGEVILLA PER LE		NACH BOOK	4.194.00		
	20	444	638	807	951		VERY COLUMN	99903337FA			
Peat in	0.5	2030	2350	2450	2510	2548	2568	2584	2596	2604	2610
Marsh	1.0	1570	1940	2090	2180	2244	2274	2301	2327	2344	2365
(2,600)	2.0	1280	1620	1790	1910	2006	2063	2110	2152	2187	2218
	4.0	1270	1730	1920	2040	2148	2217	2267	2306	2342	2375
	10	1351	1828	2286	2510	97.800000000			Selection of the select		
	20	1275	1666	1817	2136						
Organic	0.5	247	346	400	440	465	481	496	511	518	523
Silt in	1.0	198	277	323	359	384	400	413	426	436	441
Marsh	2.0	161	235	285	325	359	381	399	414	426	435
(550)	4.0	127	192	232	269	303	324	344	361	374	386
	10	102	135	157	168	58 F 57 F 4 C	XII.4804.480	inia karana			
İ	20	74.3	99.7	116	123		22732355	4 Nation 2017			
As	0.5	880	890	890	890	50/261/4747934	78-78-50-50	38138378			
Spiked	1.0	920	931	932	932	8888888					
Sand	2.0	900	922	923	923		A SAME STATE OF THE SAME STATE			1.0	



Figure 1
Arsenic Concentrations versus Elution Number for the 4g/40 mL Samples of Each Composite

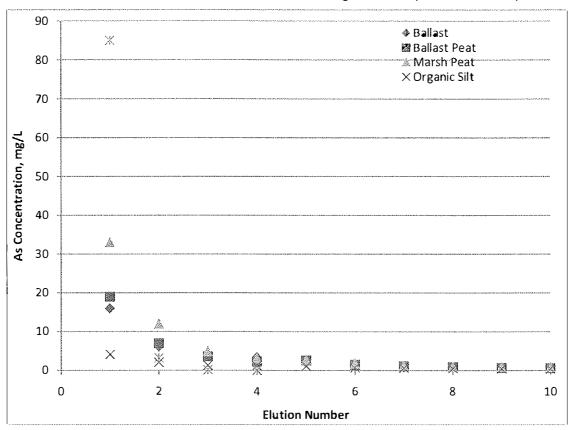
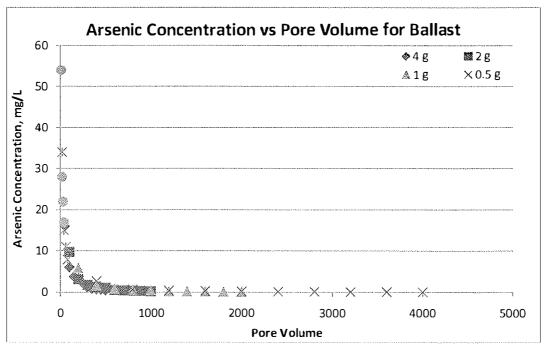
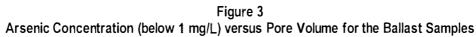
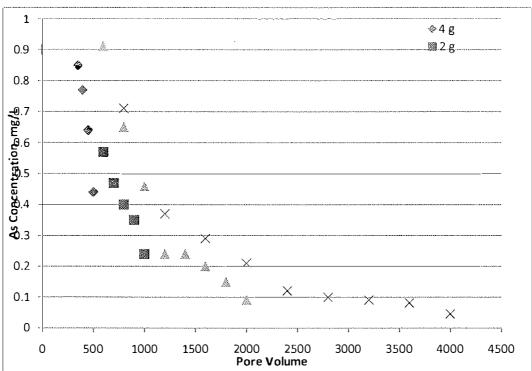


Figure 2
Arsenic Concentration versus Pore Volume for the Ballast Samples







Confirmation of Treatment Effectiveness for Sediments



Date: May 5, 2010

To: Technical File

From: Bob Stanforth

Project No.: 02085.23.009

Subject: Kewaunee Confirmation of Treatment Effectiveness for Sediments

Introduction

A treatment process was developed for treating contaminated groundwater at the Kewaunee site, using the groundwater from MW04-10 and from in the ballast under the bike path, as discussed in the 2007 Treatability Report. The objectives of the treatment were as follows:

- Reduce dissolved arsenic to <170 μg/L
- Generate solids that do not leach arsenic at greater than 5 mg/L in a TCLP test

It was assumed that the bulk of the arsenic in the ballast was dissolved, and that the ballast solids would be inert in the treatment testing. Since the ballast solids appear to be predominantly sand, this assumption is not unreasonable. However, the sediment in the marsh contains significant amounts of organic matter, lower concentrations of arsenic, and presumably more arsenic tied up in the solid phase. It is important, therefore, to test the treatment chemistry developed for the ballast groundwater on the sediment samples, both from under the tracks and in the marsh to ensure that the treatment process is still effective.

During the Geoprobe sampling in December, 2009 high arsenic levels were found in several different types of media in addition to the ballast groundwater. High levels of arsenic were found in the peat under the ballast, in the peat in marsh adjacent to the tracks, and at somewhat lower levels in the organic silt under the peat in the marsh. All the media need to be tested to confirm treatment effectiveness.

Composite samples of the four types of soil found during the December, 2009 Geoprobe investigation were mixed with the treatment reagents developed for the groundwater in the ballast area to evaluate whether the reagents effectively immobilized arsenic in the soils. The treatment consists of the following (per kilogram of soil):

- 25 mL 3% H₂●₂
- 84 g Fe₂(SO₄)₃-xH₂O
- 60 g CaCO₃

The soils were treated and then subjected to both screening TCLP and SPLP tests, and the leachates analyzed for arsenic.

The treatment process was developed for the contaminated groundwater in the ballast and hot spot area in the marsh (near MW04-10). Since the ballast contains very little organic matter, and the treatment process will render the solids oxic, there is little driving force to generate anaerobic conditions in the ballast. Anaerobic conditions could reverse a small portion of the treatment chemistry and release some arsenic. Hence, there is some concern that the treatment process could be reversed if the samples become anoxic following treatment due to the continued biodegradation of the organic material in the solids. To address this concern the samples were saturated with DI water after aliquots were removed for the leaching tests and allowed to sit in capped beakers. Samples were taken after 10 days, 1 month, and after 3 months to determine whether arsenic is released from the treated material over time.

Results

The untreated ballast and two peat samples leached arsenic over the hazardous waste criterion of 5 mg/L in the screening TCLP (Table 1). The organic peat sample was marginally nonhazardous (at 3.1 mg/L As). All four samples leached significant amounts of arsenic (>1 mg/L) in an SPLP test.

Treatment with the proposed reagents reduced arsenic leaching in both the TCLP and SPLP tests to below detection (<0.013 mg/L). Arsenic concentrations remained below detection for all samples tested under saturated conditions.

The results indicate that the treatment process developed for the groundwater in the ballast is also effective for both the ballast solids and marsh solids, and maintains a low arsenic leaching potential from the solids for all the times tested (up to three months) after treatment.

Table 1
Results of Screening TCLP and SPLP Leaching Tests on the Composite Geoprobe Samples With and Without Treatment

		SCREEN	IING TCLP	SCREE	NING SPLP
S	AMPLE	На	As, mg/L	рН	As, mg/L
Ballast					
Untreated	l	5.94	8.4	8.91	13
Treated	Immediate	5.98	<0.013	6.56	<0.013
	10 Day			7.46	<0.013
	1 month			7.63	<0.013
	3 month			7.74	<0.013
Peat Und	ler Ballast				
Untreated	I	6.27	11	8.36	11
Treated	Immediate	6.14	<0.013	6.71	<0.013
	10 Day			7.31	<0.013
	1 month			7.44	<0.013
	3 month			7.54	<0.013
Peat in N	larsh				
Untreated	ſ	5.44	24	8.33	18
Treated	Immediate	5.94	<0.013	5.70	<0.013
	10 Day			6.93	<0.013
	1 month			6.97	<0.013
	3 month			7.44	<0.013
Organic	Silt in Marsh				
Untreated	d	6.29	3,1	8.76	2.5
Treated	Immediate	6.28	<0.013	7.21	<0.013
	10 Day			7.46	<0.013
	1 month			7.56	< 0.013
	3 month			7.77	<0.013

Dose Response Testing



Date: May 5, 2010

To: Technical File

From: Bob Stanforth

Project No.: 02085.23.009

Subject: Kewaunee Dose Response Testing For Hot-Spot Sediments

Introduction

With an increased area of "hot-spot" sediment that may require treatment, and with much lower soluble arsenic concentrations than found in the ballast groundwater, lower doses of treatment additives were tested to see if the dose could be reduced and still have effective treatment. The initial "dose" was that determined for the ballast groundwater. However, since the objective was to lower the leachable arsenic to below the hazardous waste criterion of 5 mg/L rather than to meet a groundwater criterion, the arsenite oxidation using peroxide was not included. The selected chemistry consisted of the following:

- 8.4% Ferric Sulfate (Fe₂(SO₄)₃•xH₂•
- 6.0% high calcium limestone

Varying proportions (0.1, 0.25, and 0.5 times) of this dose were introduced to the composite sediments of differing arsenic concentrations made up form the March 2010 Geoprobe investigation samples. The treated samples were subjected to both screening TCLP and screening SPLP tests.

Results

The results are given below.

	SCREEN	ING TCLP	SCREEN	ING SPLP
DOSE	рН	As, mg/L	pH	As, mg/L
~10,000 mg/kg As	s Sediment			
Untreated	5.28	94	7.88	99
	5.39	99	8.10	88
0.10 Dose	5.45	38	7.60	27
0.25 Dose	5.49	2.4	7.05	0.96
0.50 Dose	5.73	<0.013	5.61	0.025
~5000 mg/kg As	Sediment			
Untreated	5.50	38	8.08	42
	5.40	47	8.14	35
0.10 Dose	5.60	3.8	7.44	2.6
0.25 Dose	5.52	0.099	6.52	0.062
0.50 Dose	5.61	<0.013	6 02	<0 013

	SCREEN	ING TCLP	SCREEN	NG SPLP
DOSE	На	As, mg/L	рН	As, mg/L
2000-4000 mg/kg A	s Sediment			
Untreated	5.57	22	8.42	16
	5.54	23	8.45	16
0.10 Dose	5.65	2.3	7.35	0.20
0.25 Dose	5.59	<0.013	6.68	0.023
0.50 Dose	5.67	<0.013	5.91	<0.013

The results indicate that a much lower dose of the treatment additive is required for reducing leaching from the sediments to below 5 mg/L, with a 0.25 X dose effective for the most contaminated sediments, and a 0.10 X dose effective for the sediments with lower arsenic levels (5000 mg/kg and below). A plot of the TCLP arsenic concentration versus dose (as the fraction of the groundwater treatment dose) is shown in Figure 1. Figure 2 shows the same results with the Y-axis expanded so that results under the hazardous waste criterion (HWC) for arsenic (5 mg/L)are more clearly seen. Since there is very little sediment with the very high arsenic levels (~10,000 mg/kg), an overall dose for the contaminated sediment of 1% ferric sulfate and 0.75% limestone (or 0.125 X dose) should be effective for the bulk of the material. For the higher arsenic concentrations (5000 mg/kg and above) a 0.25 X dose is effective.

Figure 1
TCLP As versus Dose for Kewaunee Sediments of Differing Arsenic Concentrations
(HWC – Hazardous Waste Criterion)

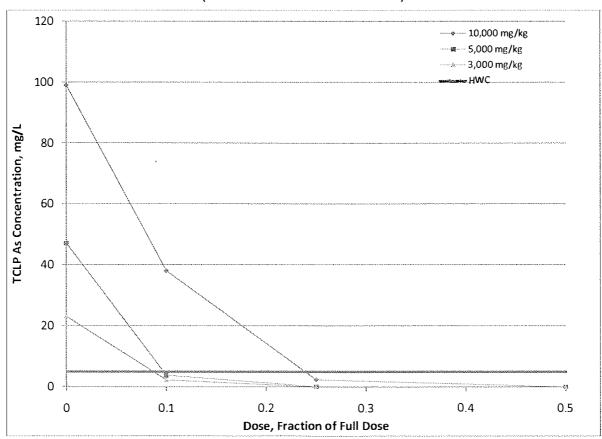
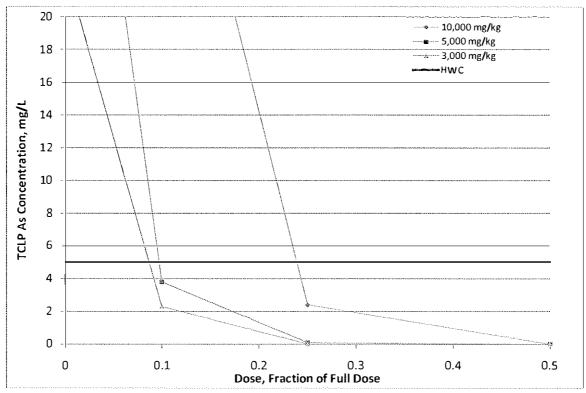


Figure 2

TCLP As versus Dose for Kewaunee Sediments of Differing Arsenic Concentrations,
with the Y-axis Expanded so that Concentrations Around the Hazardous Waste Criterion (HWC) are More Clearly Seen



Addition of Bentonite



Date: May 11, 2010

To: Technical File

From: Bob Stanforth

Project No.: 02085.23.009

Subject: Addition of Bentonite to Treated Kewaunee Peat Samples

Introduction

The treatment process for the Kewaunee sediment samples is designed to immobilize arsenic so that it is insoluble and immobile in the treated material. This process could be improved by reducing the permeability of the treated material, so that the potential for arsenic mobility back into the marsh is reduced still further. To test this concept, samples of treated peat material were further treated with different amounts of bentonite and the permeability of the samples measured.

Procedure

Samples of contaminated peat were mixed with the target treatment reagent (6.6 mL 3% peroxide, 21 g ferric sulfate and 15 g high calcium limestone per kilogram of sediment). The samples were allowed to react for several hours (to ensure all gas has been generated from the acid-limestone reaction), then different amounts of sodium bentonite powder were added, as shown in the Table 1 below. The bentonite was allowed to hydrate, then the samples were placed into permeameter cells, gently compacted by hand and the permeability measured in a flexible wall permeameter using a falling head permeameter test (ASTM D5084).

Results

The permeability results are presented in Table 1 below. Laboratory data sheets are attached.

SAMPLE	BENTONITE	PERMEABILITY, cm/sec
Untreated	0	4.6 x 10 ⁻⁷
Treated	0	2.9 x 10 ⁻⁷
	2%	3.1 x 10 ⁻⁷
	4%	1.8 x 10 ⁻⁷
	6%	1.3 x 10 ⁻⁷
	8%	1.1 x 10 ⁻⁷

Conclusions

Somewhat surprisingly, the untreated sediment has a relatively low permeability even without treatment or bentonite addition. Permeabilities in the peat layers in field range from 1.5×10^{-4} to 6.7×10^{-3} cm/sec, (STS, 2004). The laboratory measurements for the untreated material has a permeability three orders of magnitude lower than what is found in the field. The lower permeability in the lab sample may be due to the disruption of the sediment layering that enhances horizontal permeability in the field. Disruption of this layering, which occurs due to the annual deposition of the plant material, can lower the permeability significantly. Treatment of the sediment would disrupt the layering, and would be anticipated to lower the permeability even without addition of either treatment reagents or bentonite. Addition of the treatment reagents lowered the permeability slightly, since the reagents form very fine solids which plug the pores in the sediment, while addition of bentonite lowered the permeability still further. However, the difference in permeability between the sample with no bentonite (2.9 x 10^{-7} cm/sec) and the highest (8%) bentonite dose (1.1×10^{-7} cm/sec) is fairly small. The addition of bentonite provides some assurance that the permeability has been reduced. However, the disruption of the sediment structure during treatment is the major factor reducing permeability.

The laboratory test does not perfectly model what will happen in the field, but is indicative of a significant reduction in permeability just due to working the marsh material. The actual decrease in permeability due to the treatment will need to be determined in the field.

A previous estimate of groundwater flow rates at the site gave a groundwater velocity of 0.37 ft/yr using a permeability of 1.7×10^{-4} cm/sec (STS, 2004). A reduction in permeability of several orders of magnitude would lower the groundwater flow velocity to insignificant rates, such that the groundwater would be essentially static in the treated area.

								RMT, lr	nc.							2C: (X)	
					1	Falling I	Head Pern	neability :	Гest (AST	M D5084	1)					2A: 5 / α	
	Projec	t Nar	ne:	WDNR -	Kewaunce					(Cell #:						8
1	Pr∙jec	(#:	1	02085.03.0	001						USCS Desc	ription					N/A
!	Sampl	e Na	me:	AC 10040	12						USCS Clas	sification					N/A
,	Visual	Des	cript	Marsh Se	diment						Average K	(v =				41.6E-0	7 cm/sec
	Sampl	e Tyj	oe:	Remoidee	l		Initial	Füral									
							Values	Values									
	Sampl	le Dia	a. (in)				2.85	2.70			Permeant:				,	Vater	
	Sampl	le Ht.	(in)				2.20	1.97			Permeant S	Specific Gr	avity:		1	.00.	
	Tare 6	k We	t (g)				299.22	518.80			Sample Sp	ecific Grav	ity:		ì	.95	Est.
·	Tare 8	k Dry	(8)				144.00	108.10			Contining	Pressure (1	osi):		1	0.00	
	Tare (g)					0.00	26.1.10			Burette Dia		r.			0.250	
	Samp	le Wi	. (g)	×	<u></u>		299.22	25-1.70		***************************************	Burette Ze					100.0	
											Final Samp	ple Conditi	ion:		(Consolidate	d
	Maist	ure ('	'ó)				107.8	76.9			Maximum	Gradient:			1	3.7	
	Wet D)			81.2	86.0			Average G	radient:			1	10.9	
	Dry D	Densi	y (pcf)			39.1	48.6			Max. Effec	t. Stress (p	si):		:	3.2	
	Satur	ation	(%)				99.6	100.0			Min. Effec	t. Stress (p	si):		1	1.3	
			****								Ave. Effec	t. Stress (p:	si):		:	2.1	
	Date		7	ime	Run	Temp	Pressu	re (psi)		Cham.		Bot.		Top	Flow	Kv ***	Ave.*
Yr.	Mo.	Dav	Hr.	Min.	Time	C***	Bot	Тор	Cham	Díſ.	Bot	Dif.	Тор	Dif.	Dtf.%	cm/sec	0,1
2010	5	3	13	3.00		0.0	98	98	20.55		3.95		100.65				
2010	5	3	13	37.00	2040	20.0	98	98	25.35	4.80	6.40	2.45	94.60	6.05	-42.4	9.7E-0	7
2010	5	3	14	10.00	1980	20.0	98	98	27.50	2.15	8.95	2.55	91.25	3.35	-13.6	7.5E-0	7
2010)	5	3	14	46.00	2160	20.0	98	98	29.10	1.60	[1.75	2.80	88.20	3.05	-4.3	7.3E-0	7
2010	5	3	14	57.00	660	20.0	98	98	30.15	1.05	12,40	0.65	87.20	1.00	-21.2	7.1E-0	17
2010	5	4	5	53.00		0.0	98	98	54.()()		2,55		98.95				
2010	5	-4	7	4.00	4260	20.0	98	98	55.35	1.35	7.65	5.10	93.40	5.55	-4.2	5.9E-0	17
2010	5	-4	8	4.00	3600	20.0	98	98	56.80	1.45	11.40	3.75	89.70	3.70	0.7	5.4E-0	
2010	5	4	8	57.00	3180	20.0	98	98	57.90	1.10	[4.40]	3.00	86.50	3.20	-3.2	5.6E+0	
2010		4	9	38.00	3660	20.0	98	98	58.20	0.30	17.70	3.30	8,3,35	3.15	2.3	5.5E-0	
2010	5	-4	10)	59.00	3660	20.0	98	98	59.40	1.20	20.55	2.85	80.40	2.95	-1.7	5.4E-(
9		-1	12	4.00	3900	20.0	98	98	60.20	0.80				2.95		5.4E-(
2010											23.40	2.85	77,65		1.8		
2010	5 -	-4	13	5.00	3660	20.0	98	98	61.70	1.50	25.75	2.35	75.20	2.45	-2.1	5.4E-0	
2010		4	1.1	7.00	3720	20.0	98	98	62.40	0.70	28.00	2.25	73.15	2,05	4.7	5.2E-0	
2010		-4	16	16.00	77-10	20.0	98	98	6-1.60	2.20	31.85	3.85	69.30	3.85	0.0	5.2E-0)/
2010	5	3	5	40.00		0.0	98	98	15.15		4.20		99,30				
2010	5	5	6	40.00	3600	20.0	98	98	18.00	2.85	7.30	3.10	94.25	5.05	-23.9	5.3E-0	
2010	5	5	7	42.00	3720	20.0	98	98	18.90	0.90	10.55	3.25	90.75	3,50	-3.7	4.7E-0	
2010	5	5	8	42.00	3600	20.0	98	98	19.20	0.30	13.60	3.05	87.70	3.05	0.0	4.7E-0	
2010	5_	5	9	42.00	3600	20.0	98	98	20.60	1.40	16.25	2.65	84.60	3.10	-7.8	4.8E-0	07
2010	5	5	10	42.00	3600	19.0	98	98	20.90	0.30	18.80	2.55	82.05	2.55	0.0	4.7E-0	07 I
2010	5	5	11	42.00	3600	20.0	98	98	22.10	1.20	21.15	2.35	79,50	2.55	-1.1	4.8E-0	07 1
2010	5	5	12	42.00	3600	20.0	98	98	22.40	0.30	23.35	2.20	77.40	2,10	2.3	4.6E-0	07 1
2010	5	5	13	42.()()	3600	20.0	98	98	23.50	1.10	25.20	1.85	75.25	2.15	-7.5	4.6E-	07
2010	5	5	1-1	43.00	3660	20.0	98	98	2-1.00	0.50	27.15	1.95	73.40	1.85	2.6	4.6E-	07 ï
2010	5	ŝ	15	50.00	4020	20.0	98	98	24.40	0.40	28.90	1.75	71.40	2.00	-6.7	4.5E-	07 1
**A zer	o in t	his co	lumn	starts a so	eries of mea	suremer	nts.		*Average	Ky for th	ose rows w	vith a 1 in t	he Ave. co	olumn.		4.6E-	07 cm/sec
ti				وأميام بيوالان	le Kv and le	(las	4:77	,						***************************************	justed for		- management

Τ									RMT, I	nc.						lo	C: M	i
							Falling I	Flead Pern			M ID508-	1)				: -	2A: /ἐλ\	1
T		Projec	t Nai	ne:	WDNR -	Kewaunee			<u> </u>	, ,		 Cell #:						3
		'rojec	t #:		02085.01.	.001						USCS Desc	ription:					:N/A
	9	Samp	le Na	me:	AC10040	-13						USCS Class	•					N/A
		Visua	l Des	cript:	Treated S	Sediment						Average K	(v =			r	2.9E-07	cm/sec
Τ		Samp	le Ty	pe:	Remolde	d		Initial	Final			-						
								Values	Values									
		Samp	le Di	a. (in)				2.85	2.75			Permeant:				V	Vater	
		Samp	le I-It	(in)				2.13	1.80			Permeant S	Specific Gr	avity:		ı	.00	
		Tare 6	k We	t (g)				297.80	501.00			Sample Sp	ecific Grav	sity:		2	.08	Est.
		Tare &	k Dry	(g)				116.49	396.42			Contining	l'ressure (psi):		l.	0.00	İ
		Tare (g)					0.00	249.93			Burette Dia	ameter (in)		0	.250	ļ
L		Samp	le W	l. (g)				297.80	251.07			Burette Ze	ro (cm):			1	0.00	
												Final Samp	ole Condit	ion:		(Consolidated	
		Moist	urc (%)				103.3	71.4			Maximum	Gradient:			2	20.5	
		Wet D	Densi	ty (pcl)			83.7	89.5			Average C	radient:			ı	1.0	
1				ıy (pcf	-			41.2	52.2			Max. Effec		osi):		3	3.I	
		Satura	ntion	(%)				99.8	100.0			Min, Effec	t. Stress (p	si):		l	.4	
L												Ave, Effec	t. Stress (p	si):		2	.2	
		Date		7	ime	Run	Temp	Pressu	re (psi)		Cham.		Bot.		Тор	Flow	Kv ***	Ave.*
	Yr.	Mo.	Day	Hr.	Min.	Time	C***	Elot	Тор	Cham	Dif.	Bot	Dif.	Тор	Dif.	Dif.%	cm/sec	0,1
١	2010	-{	30	10	29.00		0.0	98	98	62.20		17.90		98.25				
2	2010	.1	30	12	39.00	7800	20.0	98	98	64.10	1.90	23.55	5.65	91.45	6.80	-9.2	4.1E-07	
3	2010	-1	30	13	40,00	3660	20.0	98	98	64.45	0.35	25.90	2.35	89.85	1.60	19.0	3.1E-07	
4	2010	4	30	I-1	11.00	1860	20.0	98	98	64.80	0.35	27.00	1.10	87.70	2.15	-32.3	5.3E-07	***************************************
s	2010	5	3	6	T1.00		0.0	98	98	22.80		1.70		100.70			— »	
6	2010	5	3	7	11.00	3600	20.0	98	98	23.85	1.05	4.35	2.65	97.05	3.65	-15.9	3.5E-07	
7	2010	5	3	8	12.00	3660	20.0	98	98	24.10	0.25	7.10	2.75	93.90	3.15	-6.8	3.4E-07	
H	2010	_	3	9	12.00	3600	20.0	98	98	2-1.60	0.50	9.65	2.55	91.15	2.75	-3.8		
8 <u> </u> .		5					21.0										3.3E-07	
9	2010		3	11	13.00	7260		98	98	25.80	1.20	14.30	4.65	86.20	4.95	-3.1	3.2E-07	····
۰	2010	5	3	12	44.00	5:160	20.0	98	98	25.00	-0.80	17.35	3.05	82.75	3.45	-6.2	3.3E-07	***************************************
1	2010	5	3	14	8.00	50.10	20.0	98	98	25.55	0.55	19.95	2.60	79.90	2.85	-4.6	3.3E-07	
2	2010	5	<u>l</u>	5	49.00	56-160	2(),()	98	98	29.80	4.25	37,15	17.20	60.95	18.95	-4.8	3.1E-07	
3	2010	5	4	5	58.00		0.0	98	98	30.30		37.25		100.50				····
4	2010	5	4	7	59.00	7260	20.0	98	98	31.20	0.90	40.50	3.25	96.30	-1.20	-12.8	3.3E-07	
5	2010	5	4	10	1.00	7356	20.0	98	98	31.60	0.40	43.50	3.00	93.10	3.20	-3.2	3.0E-07	
6	2010	5	-1	11	59.00	701-1	20.0	98	98	32.20	0.60	45.95	2,45	90.25	2.85	-7.5	3.0E-07	
7	2010	5	4	1-1	0.00	7260	20.0	98	98	32.70	0.50	48.25	2.30	87.70	2.55	-5.2	3.0E-07	
8	2010	5	1	16	8.00	7680	20.0	98	98	33.50	0.80	50.40	2.15	85.35	2.35	-1,4	3.0E-07	
9	2010	5	5	5	:31.00	-18180	20.0	98	98	37.15	3.65	58.75	8.35	75.70	9.65	-7.2	2,813-07	
0	2010	5	5	5	40.00		0.0	98	98	37.05		-L95		98.75				
21	2010	5	5	7	44.00	7-1-10	20.0	98	98	37.60	0.55	10.05	5.10	93.65	5.10	0.0	2.9E-07	, 1
22	2010	5	5	9	44.00	7200	20.0	98	98	37.60	0.00	1-1.30	4.25	89.15	4.50	-2.9	2.9E-07	
23	2010	5	5	11	45.00		20.()	98	98	37.75	0.15	18.15	3.85	85.20	3.95	-1.3	2.9E-07	
24	2010			13	44.00		20.0	98	98	38.00	0.25	21.50	3.35	81.60	3.60	-3.6	2.9E-07	
	2010		5	16	23.00		20.0	98	98	38.50	0.50	25.40	3.90	77.55	4.05	-1.9		
25	2010	<u></u>		7	37.00		19.0	98	אר 98		***************************************	39.30			······································		2.8E-07	
°			6 his co			eries of mea			98	·41.30	2.80 Kv: (or th	39.30 050 TOWS W	13.90	62.80	14.75	-3.0	2.8E-07	
						eries of mea ole Kv and lo			١	WikuRö	rv (ör th	ose faws w	am a t III l	me Ave. co		ineta. I for	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	cm/sec
L	i i eriiiii	101101	11111		a oy stab	HE VE WHEN TO	2 es 110 M	Carrerential.	,						Lv ad	justed for	temperature.	

Γ									RMT, I	nc.						k	2C: \$)	
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Ī	1	Projec	t Nan	ne: V	VDNR -	Kewaunee						Cell #:						1
	1	Projec	t #:	C	2085.01.0	001						USCS Desc	ription:					N/A
	9	Sampl	e Na	me: /	\C10040	.1.1						USCS Class	sification:					N/A
		Visual	Des	cript: T	freated S	ediment -						Average K	(_V =			I	3.1E-07	cm/sec
Γ	9	Samp	le Tyj	pe: I	Remolde	d		Initial	Final									
								Values	Values									
	9	Samp	le Dia	a. (in)				2.85	2.70			Permeant				١	Vater	1
	:	Samp	le Ht	(in)				2.17	2.00			Permeant S	Specific Gr	avity:		1	1.00	
		Tare 6	k We	l (g)				303.03	525.80		:	Sample Sp	ecific Grav	rity:		=	2.04	Est.
		Tare 8	k Dry	(g)				151.20	-112.30			Confining	Pressure (psi);		1	0.001	İ
		Tare (g)					0.00	261.10			Burette Di	ameter (in):		(0.250	
1		Samp	le W	. (g)				303.03	264.70			Burette Ze	ro (cm):			:	100.0	
												Final Samp	ole Condit	ion:		(Consolidated	
		Moist	ure ('	%)				1004	75.1			Maximum	Gradient:			1	18.9	
		Wei E	Densil	ly (pcí)				831	88.1			Average C	Gradient:				10,5	
		Dry E)ensit	y (pci)				41.6	50.3			Max. Effec	t. Stress (p	si):		:	3.2	
		Satur	ation	(*4)				99.5	100.0			Min. Effect	ı. Sıress (p	si):			1.2	
												Ave, Effec	ı.Stress (p	si):		:	2.3	
Ī		Date	T	T	ime	Run	Temp	Pressu	re (psi)		Cham,		Bot.		Тор	Flow	Kv ***	Ave.*
	Yr.	No.	Day	Hr.	Min.	Time	C***	Bot	Тор	Cham	Dif.	Bot	Dif.	Тор	Dif.	Dif.%	cm/sec	0,1
	2010	4	30	10	29,00		0.0	98	98	70.70		17.65		98.40				
2	2010	4	30	12	40.00	7860	20.0	98	98	72.85	2.15	23.15	5.30	89.25	9.15	-24.9	5.5E-07	
3	2010	4	30	13	41.00	3660	20.0	98	98	73.20	0.35	25.55	2.40	86.60	2.65	-5.●	-1.7E-07	
4	2010	4	30	14	12.00	1860	20.0	98	98	73.40	0.20	26.60	1.05	85.40	1.20	-6.7	1.4E-07	***************************************
s 🖟	2010	5	3	6	12.00		0.0	98	98	17.05		1.00		99.30				
6	2010	<u>-</u>	3	7	12.00	3600	20.0	98	98	18.70	1.65	3.35	2.35	95.30	4.00	-26.0	4.0E-07	
7	2010	5	3	8	12.00	3600	20.0	98	98	19.10	0.40	5.85	2.50	92.05	3.25	-13.0	3.9E-07	
8	2010		3	9	12.00	3600	20.0	98	98	19.95	0.85	8.20	2.35	89.20	2.85	-9.6		
ľ	***************************************	ŝ	3				21.0		98			***************************************				····	3.8E-07	
9	20(0)	•••••		- 11	13.00	7260		98	***************************************	21.40	1.45	12.55	4.35	84.70	5.10	-7.9	3.6E-07	
10	2010		3	12	44.00	5460	20.0	98	98	20.35	-1.05	15.35	2.80	80.50	3.60	-12.5	3.7E-07	
"	2010	<u>5</u>	3	14	8.00	5040	20.0	98	98	20.90	0.55	17.75	210	77.65	2.85	-8.6	3.6E-07	
12	2010	5	1	5	49.00	56· 16 0	20.0	98	98	24.90	-1.00	34.20	16.45	58.25	19.40	-8.2	3.5E-07	
13	2010	5	-1	- 5	58.00		0.0	98	98	25.15		34.20		100.75		······	***	
14	2010	5	4	8	0.00	7320	20.0	98	98	28.80	3.65	37.40	3.20	96.50	4.25	-14.1	3.5E-07	
15	2010		4	10	3.(10)	7380	20.0	98	98	26.20	-2.60	-10.30	2.90	9.3.00	3.50	-9.4	3.4E-07	
16	2010	5	4	12	0.00	7020	20.0	98	98	26.70	0.50	42.75	2.45	90.05	2.95	-9.3	3.4E-07	
17	2010	5	4	1.4	1.00	7260	20.0	98	98	27.30	0.60	45.00	2.25	87.35	2.70	-9.1	3.3E-07	
18	2010	5	4	16	10.00	77-10	20.0	98	98	27.80	0.50	:17.10	2.10	84.80	2.55	-9.7	3.3E-07	
19	2010	5	5	5	32.00	48120	20.0	98	98	30.75	2.95	55.65	8.55	74.35	10.45	-10.0	3.2E-07	
20	2010	5	5	5	-11.00		0.0	98	98	30.55		2.85		99.05				***************************************
21	2010	5	5	7	-15.00	7440	20.0	98	98	30.90	0.35	7.55	4.70	94.05	5.00	-3.1	3.1E-07	1
22	2010	5	5	9	45.00	7200	20,0	98	98	30.80	-0.10	11.55	-1.00	89.60	4.45	-5.3	3.1E-07	
23	2010	<u>5</u>	- 5	11	46.00	7260	20.0	98	98	30.90	0.10	15.20	3.65	85.63	3.95	-3.9	3.1E-07	
24	2010	5		13	46.00	7200	20.0	98	98	31.10								
	~				~						0.20	18.40	3.20	82.10	3.55	-5.2 1.5	3.0E-07	·····
25	2010	5	<u>5</u>		24.00	9480	20.0	98	98	31.40	0.30	22.15	3.75	78.00	4.10	1.5	3.0E-07	
26	2010	5 (0 in 1)	6 Vie co	7	41.00	55020	19.0	98	98	33.20	1.80	36.10	13.95	62.50	15.50	<i>-</i> 5.3	3.0E-07	*******
						eries of mea			,	Average	er for th	ose rows w	an a Lin i	ine Ave. co		livet - 4 d		cm/sec
1	(1 GLIJ/FI	i tellioi	ciele	tmme	a by stab	le Ky and lo	W 110W	carrerential.)						Kv ad	Busted For	temperature.	

		······			-			RMT. h	NC.		·····				Q	ic: dA	
						Falling I	Head Pern	eability	Test (AST	M D5084)				Q	(A: 9}	
	Pr∙jec	t Nan	ie: 1	WDNR -	Kewaunee					(Cell#:						5
ı	Projec	:t#:	C	12085.01.	001					1	USCS Desc	ription:					N/A
:	Sampl	le Nar	ne: .	AC10040	45					ı	JSCS Class	sification					N/A
	Visua	l Desc	ript:	Freatod S	ediment						Average K	(v =				1.8E-07	cm/sec
	Samp	le Typ	e: I	Remolde	d		lnitial	Final									
							Values	Values									
	Samp	le Dia	. (in)				2.85	2.72			Permeant.				V	Valer	
	Samp	le Ht.	(in)				2.23	2.10			Permeant S	Specific Gr	avity:		1.	,00	
	Tare 8	& Wet	(g)				316.03	537.40		:	Sample Sp	ecific Grav	rity:		2	.04	Est.
	Tare 8	& Dry	(g)				163.81	417.90			Contining	Pressure (1	psi):		1	0.00	
	Tare ((g)					0.00	254.09			Burette Di	ameter (in)) :		0	.2.50	
	Samp	le Wt.	(g)				316.03	283.31			Burette Ze	ro (cm):			1	0.00	
											Final Samp	ole Condit	ion:		C	Consolidated	
	Moist	ure (%	ລ				92.9	73.0			Maximum	Gradient			1	7.6	
			y (pcť))			84.6	88.4			Average C					2.0	
			r (pcf) r (pcf)				43.9	51.1			Max. Effec		si):			9	
	•	ation (,			99.7	100.0			Min, Effec					.3	
	Jului	unon ,	(.0)				,,,,	100.0			Ave. Effec	••				2.0	
	Date	T	T	ime	Run	Temp	Pressu	re (psi)		Cham.		Bot.	,	Тор	Flow	Kv ***	Ave.*
Yr.	Mo.	Day	1-ir.	Min.	Time	Coss	Bot	Тор	Cham	Dif.	Bot	Dif.	Top	Dif.	Dif.%	cm/sec	0,1
2010	4	30	10)	30.00		0.0	98	98	34.50		21.45		98.00				
					2040			98		11211111111111		31111111111111111111111111111111111111		- 10	37.4	2.10.00	(0) (4) (4) (4)
2010	-4	.30	12	41.00	7860	20.0	98		35.85	1.35	23.90	2.45	92.60	5.40	-37.6	3.1E-07	
2010	-1	30	13	42.00	3660	20.0	98	98	36.15	0.30	25.05	1.15	91.30	1.30	-6.1	2.2E-07	
2010	4	30	1.4	13.()()	1860	20,0	98	98	36.30	0.15	25.60	0.55	90.80	0,50	4.8	1.9E-07	
2010	5	3	6	13.00		(),()	98	98	47.10		2.30		100.80				
2010	5	3	7	13.00	3600	20.0	98	98	17.15	0.05	3.80	1.50	99.15	1.65	~ 1 .8	2.0E-07	
2010	5	3	8	13.00	3600	20.0	98	98	46.95	-0.20	5.30	1.50	97.60	1.55	-1.6	2.0E-07	
2010	5	3	9	13.00	3600	20,0	98	98	47.30	0.35	6.75	1.45	96.10	1.50	-1.7	2.0E-07	
2010	5	3	11	1.4.()()	7260	21.0	98	98	48.20	0.90	9.45	2.70	93.30	2,80	-1.8	1.9E-07	
2010	5	3	12	45.(X)	5460	20.0	98	98	46.85	-1.35	11.45	2.00	91.25	2.05	-1.2	2.0E-07	
2010	5	3	14	9.00	5040	20,0	98	98	47.10	0.25	13.15	1.70	89.55	1.70	0.0	1.9E-07	
2010	5	4	5	50.00	56460	20.0	98	98	48,60	1.50	27.75	14.60	74.70	14.85	-0.8	1.9E-07	
2010		4	8	1.00	7860	20.0	98	98	49.10	0.50	29.20	1,-15	73.20	1.50	-1.7	1.9E-07	
2010	<u>5</u>	- 4	10)	7.00	7560	20.0	98	98	49.00		30.55	1.35	71.80	1.40	-1.8	1.9E-07	
2010	5	-1	12	1.00	6840	20.0	98	98	49.30		31.70	1.15	70.60	1.20	-2.1	1.9E-07	
2010	5	-4	14	3.00	7320	20.0	98	98	49.70	0.40	32.85	1.15	69.45	1.15	0.0	1.9E-07	
2010	5	4	16	11.00	7680	20.0	98	98	5().9()	1.20	33.90	1.05	68.30	1.15	-4.5	1.8E-07	
2010	5	5	5	33.00	· 1 8120	2(),()	98	98	51.55	0.65	39.45	5.55	62.55	5,75	-1.8	1.9E-07	
2010	5	5	5	42.00		0.0	98	98	51.70		4.65		98.40				
2010	5	5	7	46.00	7440	20.0	98	98	52.00	0.30	7.40	2.75	95.40	3.00	-4.3	1.9E-07	1
2010	5	5	9	46.00	7200	20,0	98	98	51.80	-0.20	9.90	2.50	92.80	2.60	~2.0	1.9E-07	1
2010	5	5	11	47.00	7260	20.0	98	98	51.90		12.30	2.40	90.40	2.40	0.0	1.9E-07	1
2010	5		13	47.00		20.0	98	98	52.00		14.50		88.20		0.0	1.8E-07	
i		5	16	25.00			98	98	52.00		17.20		85.40		-1.8	1.8E-07	
2010	<u>5</u>																
2010		6	7	45.00		20.0	98	98	53.30		29.25		73.20		-0.6	1.8E-07	
2010		6	9	42.00			98	98	53.70		30.40		72.00		-2.1	1.8E-07	1
					eries of mea				*: Average	Kv for th	ose rows v	vith a 1 in	the Ave. c			-	cm/sec
Clerm	inatio	n dete	rmine	d by stat	ole Ky and l	ow flow	differential	.)						***Kv ac	ljusted for	temperature.	

	reprincipant property	-	****					RMT, li	ıc.		·········				ļ	ic: gr	-
						Falling	Head Peru	neability	Test (AST	M D508	·l)				IC	A: 10-	,
-	Projec	t Mar	ne:	WDNR -	Kowauneo					**********	Cell#:	· · · · · · · · · · · · · · · · · · ·					6
	Projec	t#:		02085.01.	001						USCS Desc	ription:					N/A
			me:	AC10040	16						USCS Class						N/A
	V isua	l Des	cript:	Treated S	ediment						Average K				ſ~	1.3E-0	
	Samp		weenstander=	Remolded		************	Initial	Final		74701111111	(/				/h	-www.	
account of the second		,					Values	Values									
	Samp	le Dia	a. (in)				2.85	2.75			Permeant:				1	Vater	
	Samp						2.31	2.10			Permeant S	Specific Gr	ravity:			.00	
	Tare						325.21	540,00			Sample Sp	•	•			.98	Est.
	Tare						169.89	421.40			Confining		•			00.0	
	Tare (•	10/				0.00	251.51			Burette Di		•			.250	
	Samp	-	. (g)				325.21	288.49			Burette Ze		,			0.00	
		***************************************			100000	-	-				Final Samp		ion:	//		Onsolidate	d
																	•
	Meis	ure ((<u>۱</u>				911	69.8			Maximum	Gradient:			1	7.8	
			ty (pcl)			84.1	88.1			Average G					3.4	
			y (pcf	•			-13.9	51.9			Max. Effec		osi).			3.1	
	Satur			,			99.8	100.0			Min. Effect					.2	
			,				,,,,				Ave. Effect	••	-			2.1	
	Date		7	ime	Run	Temp	Pressu	re (psi)		Cham.		Bot.	<u>, </u>	Тор	Flow	Kv***	Ave.*
Yr,	Mo.	Day	Hr.	Min.	Time	C***	Bot	Тор	Cham	Dit.	Bot	Dif.	Тор	Dif.	Dif.%	cm/sec	0,1
2010	-4	30	10	30.00		0.0	98	98	42.00				98.10				
		30	12	42.00	7920	20.0	98	98	43.15	1.15	22.05	2.20	95.40	2.70	10.2	1.00.6	<u> </u>
<u> </u>	4														-10.2	1.8E-0	
2010	4	3()	13	-13.00	3660	20.0	98	98	43.70	0.55	22.85	0.80	94.30	1.10	-15.8	1.6E-0	~~~~
2010	4	30	14	13.00	1800	20.0	98	98	43.90	0.20	23.30	0.45	93.80	0.50	-5.3	1.6E-0	7
2010	5	3	6	1-1.00		0.0	98	98	55.60		2.55		100.55				_
2010	5	3	7	14.00	3600	20.0	98	98	55.60	0.00	3.85	1.30	99.35	1.20	4.0	1.6E-0	17
2010	5	3	8	14.()()	3600	20.0	98	98	55.60	0.00	5.00	1.15	98.15	1.20	-2.1	1.5E-(J <i>7</i>
2010	5	3	9	14.00	3600	20.0	98	98	55.80	0.20	6.10	1.10	97.10	1.05	2.3	1.4E-0	17
2010	5	3	11	14.00	7200	21.0	98	98	56.60	0.80	8.30	2.20	95.05	2.05	3.5	1.4E-()7
2010	5	3	12	45.00	5460	20.0	98	98	55.45	-1.15	9.75	1.45	93.35	1.70	-7.9	1.5E-0)7
2010	5	3	H	9.00	5040	20.0	98	98	55.65	0.20	11.20	1.45	92.05	1.30	5.5	1.5E-0	
2 2010		4	5	50.00	56460	20.0	98	98	57.40	1.75	23.70	12.50	79.65	12.40	0.4	1.4E-0	
2010		<u>.</u>	8	2.00	7920	20.0	98	98	58,00	0.60	25.05	1.35					
#													78.30	1.35	0.0	1.4E-0	
2010		4	10	8.00	7560	20.0	98	98	58.10	0.10	26.35	1.30	77.05	1.25	2.0	1.4E-0	
2010		4	12	2.00	68-10	20.0	98	98	58.20	0.10		1.05	75.90	1.15	-÷l.5	1.4E-0)7
2010		1	14	5.0()	7380	20.0	98	98	58.50	0.30	28.55	1.15	74.85	1.05	⊰i.5	1.4E-0)7
7 2010	5	4	16	13.00	7680	20.0	98	98	59.00	0.50	29.65	1.10	73.75	1.10	0.0	1.4E-0)7
8 2010	5	5	5	34.00	48060	20.0	98	98	60.55	1.55	35.25	5.60	67.95	5.80	-1.8	1.4E-0	J7
9 2010	5	5	5	42.00		0.0	98	98	18.65		2.75		97.95				
0 2010	5	5	7	48.00	7560	20.0	98	98	19.80	1.15	4,55	1.80	95.25	2.70	-20.0	1.4E-	0 <u>7</u> 1
1 2010	5	5	9	48.00	7200	20.0	98	98	19.90	0.10	6.40	1.85	93.20	2.05	-5.1	1.3E-0	07 1
2 2010	5	5	13	48.00	7200	20.0	98	98	20.10	0.20	8.10	1.70	91.20	2.00	-8.1	1.3E-(07 1
3 2010) 5	5	13	48.00	7200	20.0	98	98	20.50	010		1.70	89.40	1.80	-2.9	1.3E-	
2010		5	16	26.00	9480	20.0	98	98	20.70	0.20		2.10	87:10	2.30	-1.5	1.3E-	
ï																	
5 2010		6	7	46.00	55200	20.0	98	98	22.80	2.10		9.90	76.40	10.70	-3.9	1.3E-	_
6 2010		6	, 9		7020	20.0	98	98	2,3,40	0.60		1.00	75.35	1.05	-2.4	1.2E-	- 20000
ll .					ries of mea:				Average	Ky for th	ose rows w	ath a 1 in	tne Ave. co			`	07 cm/sec
(i erm	มาสถ่อ	naete	rmine	ea by stab	le Kv and lo	w tlow	differential	.)		***************************************				***Kv ad	justed for	lemperatur	e.

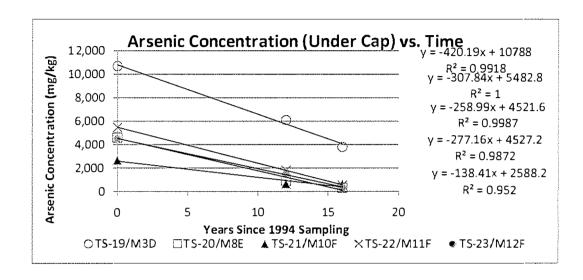
Superior and American P.

								RMT, h	ıc.						(oc: de	
						Falling I	Head Pern	neability	Test (AST	M D508	1)					2A: M	
	Projec	t Nai	ne:	WDNR - K	esvaunee				,		Cell #:		was reaching				7
	Projec	t #:		02085.01.00	01						USCS Desc	ription:					N/:
	, Samp		me:	AC1004047	7						USCS Class	•					N/:
	Visua	l Des	cript:	Treated Sec	diment						Average K	v =				1.1E-07	cm/se
	Samp	le Ty	pe:	Remolded	,		Initial	Final		a	<u> </u>				±		
	•		•				Values	Values									
	Samp	le Dia	a. (in)				2.85	2.72			Permeant:				,	Water	
	Samp						2.36	2.22			Permeant S	Specific Gr	avity:			1.00	
	Tare						337.68	565.00			Sample Sp	•	,			2.15	E
	Tare 8						171.84	433.70	•		Confining					100.0	
	Tare (-	107				0.00	261.86			Burette Dia		•			0.250	
	Samp		l. (g)				337.68	303.1-1			Burette Zei	,	,-			100.0	
				, , , , , , , , , , , , , , , , , , ,							Final Samp	<u> </u>	ion.			Consolidated	
											· z iii siiii;	ne contin				consonance	
	'\loist	nre (%)				96.5	76l			Maximum	Gradient:				7.4	
			w) Ly (pcl)			85.4	89.5			Average G					6.0	
			ty (pci	•			-13.5	50.7			Max, Effec		osi).			3.1	
	Satur			,			99.5	100.0			Min. Effect					1.4	
	Jatu	acion	(.0)				77.3	100.0			Ave. Effect					2.2	
	Date			ime	Run	Temp	Proces	re (psi)		Cham.	1110	Bot.	1,.	Тор	Flow	Kv***	Ave
Yr.	Mo.	Dave	Hr.	Min.	Time	C	Bot	Top	Cham	Dif.	Bot	Dif.	Top	ιορ Dữ.	Dif.%	cm/sec	0,1
				:5	(Harrista)					eliaisaan	<u>'</u>	144444444		Ou.		innistration	0,
2010	4	30_	lı)	31.00		0.0	98	98	60.75		19.35		97.45				
2010	4	30	12	-12.00	7860	20.0	98	98	62.70	1.95	20.70	1.35	95.00	2.45	-28.9	1.5E-07	
2010	4	30	13	43,00	3660	20.0	98	96	63.15	0.45	2110	0.70	94.20	0.80	-6.7	1.3E-07	
2010	4	30	14	14.00	1860	20.0	98	98	63.25	0.10	21.75	0.35	93.85	0.35	0.0	1.2E-07	
2010	5	3	ó	16.00		0.0	98	98	22.85		2.40		100.95				
2010	5	3	7	15.00	35-10	20.0	98	98	24.40	1,55	2.85	015	99.05	1.90	-61.7	1.6E-07	
2010	5	3	8	15.00	3600	20.0	98	98	24.65	0.25	3.55	0.70	98.05	1.00	-17.6	1.2E-07	
2010	5	3	9	15.00	3600	20.0	98	98	25.20	0.55	-1.30	0.75	97.10	0.95	-11.8	1.2E-07	
2010	5	3	11	15.00	7200	21.0	98	98	26.65	1.45	5.85	1.55	95.40	1.70	-4.6	1.2E-07	
2010	5	3	12		5460	20.0	98	98	25.75	-0.90	6.93		94.05	1.35	-10.2		
				46.00								1.10				1.2E-07	
2010	5	3	14	10.00	5040	20.0	98	98	26.30	0.55	7.95	1.00	92.90	1.15	-7.0	1.2E-07	
2010	5	4	5	51.00	56460	20.0	98	98	29.85	3.55	17.90	9.95	82.50	10.:10	-2.2	1.2E-07	
2010	5	4	8	3.00	7920	20.0	98	98	30.60	0.75	19.10	1.20	81.40	1.10	4.3	1.1E-07	
2010	5	4	10	9.00	7560	20.0	98	98	30.60	0.00	20.15	1.05	80.20	1.20	-6.7	1.2E-07	
2010	5	-1	12	3.00	6840	20.0	98	98	30.90	0.30	21.10	0.95	79.25	0.95	0.0	1.1E-07	
2010	5	4	1.1	6.00	7380	20.0	98	98	31.40	0.50	22.10	1.00	78.20	1.05	-2.4	1.2E-07	
2010	5	4	16	14.00	7680	20.0	98	98	31.90	0.50	23.10	1.00	77.20	1.00	0.0	1.1E-07	
2010	5	5	5	35.00	48060	20.0	98	98	34.05	2.15	28.40	5.30	71.55	5.65	-3.2	1.1E-07	
2010	5	5	7	49.00	8040	20.0	98	98	34.70	0.65	29.15	0.75	70.80	0.75	0.0	1.0E-07	
2010		5	9		7200	20.0	98	98	34.60	-0.10		0.65	70.05	0.75	-7.1	1.1E-07	
2010	5	5	11	49.00	7200	2().0	98	98	34.60	0.00		0.60	69.35	0.70	-7.7	1.1E-07	
2010	5	5	13	-19.00	7200	20.0	98	98	3-L80	0.20	31.05	0.65	68.75	0.60	4.0	1.1E-07	
2010	5	5	ló	27.00	9480	20.0	98	98	36.00	1.20	31.80	0.75	67.90	0.85	-6.2	1.1E-07	,
2010	5	6	7	47.00	55200	20.0	98	98	36.70	0.70	35.60	3.80	63.70	4.20	-5.0	1.1E-07	,
2010	5	6	9	44.00	7020	20.0	98	98	37.30	0.60	36.05	015	63.25	015	0.0	1.1E-07	,
																_	
**A zei	ro in I	his co	lumn	starts a ser	ies of mea	suremen	ıts.		*Awerage	Ky for th	iose rows w	rith a 1 in	the Ave. co	dumn.		1.1E-07	cm/s
				ed by stable				,	. 0-				. **			temperature.	

Appendix C Concentration Trend Over Time Analysis

Appendix C Evaluation of Arsenic Concentration Trends Under the Cap Kewaunee Marsh - Kewaunee, WI April 2010

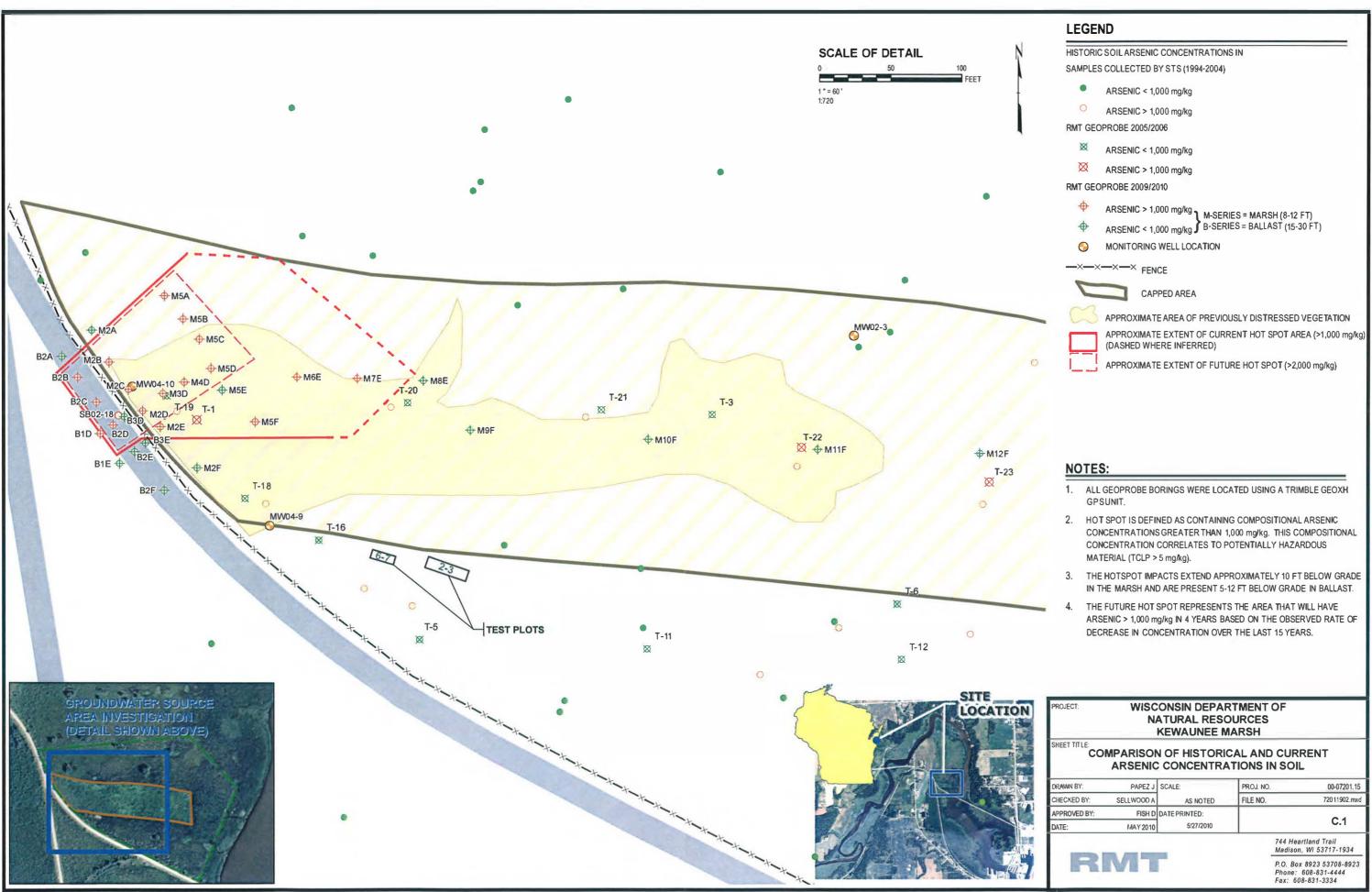
	ARSE	NIC CONCENTR (mg/kg)	ATION
LOCATION	STS 1994	RMT JUNE 2006	RMT MARCH 2010
YEARS	0.0	12	16
TS-18	2,030	340	
TS-19/M3D	10,700	6,100	3,800
TS-20/M8E	4,600	910	311
TS-21/M10F	2,660	640	589
TS-22/M11F	5,480	1,800	549
TS-23/M12F	4,500	1,500	313
TS-24	1,880	1,100	



What is the concentration today that will be approximately 1,000 mg/kg in 4 years?

- 1. Choose average slope = -245.6
- 2. Set x (years) to be 4 years
- 3. Set y (target concentration) to be 1000 mg/kg
- 4. Solve for starting concentration today (the y-intercept) [1000 = -245.6 * 4 + concentration]
- 5. Solution 2000 mg/kg

entration
307.84
258.99
277.16
138.41
245.6



Appendix D Detailed Cost and Quantity Estimating Sheets

Table of Contents

- Cost Estimates
- Quantity Estimates

Cost Estimates

OPTION 1a: IN SITU TREATMENT (11,000 cy)

ITEM	UNIT	UNIT COST	QTY	TOTAL
DIRECT CAPITAL COSTS				
Mobilization	ls	\$30,000	1	\$30,000
Site Preparation	Is	\$67,500	1	\$67,500
Mixing of treatment chemicals	week	\$46,750	5	\$233,750
Treatment Chemicals				
- Ferric sulfate	tons	\$6 00	300	\$180,000
- Limestone	tons	\$ 50	200	\$10,000
- Peroxide (50%)	gallon	\$ 5	1,000	\$4,600
- Bentonite	tons	\$275	6 00	\$165,000
Top Soil and Seed (Marsh Area)	sf	\$1.65	30,000	\$49,500
Fence Restoration	ls	\$10,000	1	\$10,000
Bike Path Restoration	ls	\$50,000	1	\$50,000
Demobilization	Is	\$15,000	1	\$15,000
Monitoring Well Construction	well	\$2,500	4	\$10,000
SUBTOTAL OF DIRECT CAPITAL COST				\$825,350
30 % CONTINGENCY	%	30%		\$247,605
INDIRECT CAPITAL COSTS				
Project management/administration	ls	\$20,000	1	\$20,000
Plans and Specifications	ls	\$30,000	1	\$30,000
Subcontracting	Is	\$25,000	1	\$25,000
Permitting	ls	\$10,000	1	\$10,000
Construction oversight	wk	\$7,500	6	\$45,000
Documentation reporting	ls	\$15,000	1	\$15,000
SUBTOTAL OF INDIRECT CAPITAL COSTS	-			\$145,000
SUBTOTAL OF DIRECT AND INDIRECT CAPITAL COSTS				\$1,217,955
FIRST YEAR OF GROUNDWATER MONITORING - SEMI-ANI	NUAL			
Project management/administration	hr	\$ 195	20	\$3,900
Groundwater sampling (4 wells, 2 times/yr)	hr	\$100	50	\$5,000
Field equipment/expenses	ls	\$1,000	1	\$1,000
Lab - As, Fe, SO4, pH , Calcium	each	\$100	8	\$800
Data evaluation	hr	\$130	20	\$2,600
Reporting	hr	\$130	30	\$3,900
SUBTOTAL OF FIRST YEAR OF MONITORING				\$17,200
30 % CONTINGENCY	%	30%	<u> </u>	\$ 5, 16 0
SUBTOTAL OF CAPITAL AND FIRST YEAR COSTS				\$1,240,315

OPTION 1a: IN SITU TREATMENT (11,000 cy)

ITEM	UNIT	UNIT COST	QTY	TOTAL
FUTURE ANNUAL COSTS				
MONITORING COSTS (ANNUAL - YEARS 2-20)				
Project management/administration	hr	\$195	15	\$2,925
Groundwater sampling (4 wells, once/yr)	hr	\$100	25	\$2,500
Field equipment and expenses	ls	\$500	1	\$500
Lab - As, Fe, SO4, pH , Calcium	each	\$100	4	\$400
Data evaluation	hr	\$100	10	\$1,000
Reporting	hr	\$130	20	\$2,600
SUBTOTAL FOR ANNUAL GROUNDWATER MONITORING				\$9,925
30 % CONTINGENCY	%	30%		\$2,978
PRESENT WORTH OF ANNUAL MONITORING	19	years @	3%	\$184,813
TOTAL COST (TOTAL CAPITAL + PRESENT WORTH)			Total	\$1,430,000
			+ 50%	\$2,150,000
			- 30%	\$1,000,000

Prepared By. A. Sellwood

ASSUMPTIONS:

- 1. Costs rounded up to the nearest ten thousand dollars.
- 2 Costs determined from experience and estimates from other similar projects.
- 3 Contingency is assumed to be 30% of direct capital costs, monitoring costs, and annual O&M.
- 4. Indirect costs do not include legal fees or public relations assistance.
- 5. Interest rate 3%; the balance of an 8% interest rate less a 5% inflation rate, based on EPA approach for remedial cost estimating.
- 6. All costs are based on preliminary concepts. They are intended for remedial option comparison and not for final budgeting.

REMEDIATION NOTES:

- 1. Mobilization includes the mobilization of equipment, swamp mats, chemicals and job trailer to the site.
- Site preparation includes removal of 100 LF of existing chain link fence, installation of approximately 4500 LF of silt fence, and set up of a site trailer and construction of a site laydown area for storage of equipment and materials at the intersection of the road and bike path. Assumes existing bike path can be used as access road.
- In situ treatment includes construction of a temporary access ramp to the marsh and assumes treatment of approximately 500 CY/day with the specified chemicals
- Bike path restoration includes backfilling the excavated area and grading up to 2,000 cy of gravel over the section of path used by trucks to access the site.
- 5. Site restoration includes repair of the 100 LF of chainlink fence and application of 6-inches of top soil and seed to the marsh. It does not include wetlands restoration.

OPTION 1B: IN SITU TREATMENT (3,000 cy)

ITEM	UNIT	UNIT COST	QTY	TOTAL.
DIRECT CAPITAL COSTS				
Mobilization	Is	\$30,000	1	\$30,000
Site Preparation	Is	\$50,000	1	\$50,000
Mixing of treatment chemicals	week	\$46,750	2	\$93,500
Treatment Chemicals				
- Ferric sulfate	tons	\$600	70	\$42,000
- Limestone	tons	\$50	50	\$2,500
- Peroxide (50%)	gallon	\$ 5	300	\$1,380
- Bentonite	tons	\$275	160	\$44,000
Top Soil and Seed (Marsh Area)	sf	\$1.65	12,000	\$19,800
Fence Restoration	Is	\$10,000	1	\$10,000
Bike Path Restoration	Is	\$50,000	1	\$50,000
Demobilization	Is	\$15,000	1	\$15,000
Monitoring Well Construction	well	\$2,500	3	\$7,500
SUBTOTAL OF DIRECT CAPITAL COST	!			\$365,680
30 % CONTINGENCY	%	30%		\$109,704
IND!RECT CAPITAL COSTS				
Project management/administration	Is	\$15,000	1	\$15,000
Plans and Specifications	Is	\$20,000	1	\$20,000
Subcontracting	Is	\$20,000	1	\$20,000
Permitting	Is	\$10,000	1	\$10,000
Construction oversight	wk	\$7,500	3	\$22,500
Documentation reporting	Is	\$10,000	1	\$10,000
SUBTOTAL OF INDIRECT CAPITAL COSTS	•	•	-	\$97,500
SUBTOTAL OF DIRECT AND INDIRECT CAPITAL COSTS				\$572,884
FIRST YEAR OF GROUNDWATER MONITORING - SEMI-ANI	NUAL			
Project management/administration	hr	\$195	20	\$3,900
Groundwater sampling (3 wells, 2 times/yr)	hr	\$100	40	\$4,000
Field equipment/expenses	ls	\$1,000	1	\$1,000
Lab - As, Fe, SO4, pH , Calcium	each	\$100	6	\$600
Data evaluation	hr	\$1 30	20	\$2,600
Reporting	hr	\$1 30	30	\$3,900
SUBTOTAL OF FIRST YEAR OF MONITORING	•	•		\$16,000
30 % CONTINGENCY	%	30%		\$4,800
SUBTOTAL OF CAPITAL AND FIRST YEAR COSTS				\$593,684

OPTION 1B: IN SITU TREATMENT (3,000 cy)

!TEM	UNIT	UNIT COST	QTY	TOTAL
FUTURE ANNUAL COSTS				
MONITORING COSTS (ANNUAL - YEARS 2-20)				
Project management/administration	hr	\$195	15	\$2,925
Groundwater sampling (3 wells, once/yr)	hr	\$100	25	\$2,500
Field equipment and expenses	Is	\$500	1	\$500
Lab - As, Fe, SO4, pH , Calcium	each	\$100	3	\$300
Data evaluation	hr	\$100	10	\$1,000
Reporting	hr	\$130	20	\$2,600
SUBTOTAL FOR ANNUAL GROUNDWATER MONITORING				\$9,825
30 % CONTINGENCY	%	30%		\$2,948
PRESENT WORTH OF ANNUAL MONITORING	19	years @	3%	\$182,951
TOTAL COST (TOTAL CAPITAL + PRESENT WORTH)			Total	\$780,000
			+ 50%	\$1,170,000
			- 30%	\$550,000

Prepared By. A. Sellwood

ASSUMPTIONS:

- 1. Costs rounded up to the nearest ten thousand dollars.
- 2. Costs determined from experience and estimates from other similar projects.
- 3. Contingency is assumed to be 30% of direct capital costs, monitoring costs, and annual O&M
- 4. Indirect costs do not include legal fees or public relations assistance.
- 5. Interest rate 3%; the balance of an 8% interest rate less a 5% inflation rate, based on EPA approach for remedial cost estimating.
- 6. All costs are based on preliminary concepts. They are intended for remedial option comparison and not for final budgeting.

REMEDIATION NOTES:

- 1. Mobilization includes the mobilization of equipment, swamp mats, chemicals and job trailer to the site.
- 2. Site preparation includes removal of 100 LF of existing chain link fence, installation of approximately 4500 LF of silt fence, and set up of a site trailer and construction of a site laydown area for storage of equipment and materials at the intersection of the road and bike path. Assumes existing bike path can be used as access road.
- 3. In situ treatment includes construction of a temporary access ramp to the marsh and assumes treatment of approximately 500 CY/day with the specified chemicals.
- 4. Bike path restoration includes backfilling the excavated area and grading up to 2,000 cy of gravel over the section of path used by trucks to access the site.
- 5. Site restoration includes repair of the 100 LF of chainlink fence and application of 6-inches of top soil and seed to the marsh. It does not include wetlands restoration.

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OPTION 2: IN SITU TREATMENT, WITH ON-SITE CONTAINMENT

ITEM	UNIT	UNIT COST	QTY	TOTAL
DIRECT CAPITAL COSTS				
Mobilization	Is	\$30,000	1	\$30,000
Site Preparation	Is	\$67,500	1	\$67,500
Mixing of treatment chemicals	week	\$46,750	4	\$187,000
Treatment Chemicals				
- Ferric sulfate	tons	\$600	300	\$180,000
- Limestone	tons	\$50	200	\$10,000
- Peroxide (50%)	gallon	\$ 5	1,000	\$4,600
Excavation and placement on cap	су	\$35	11,000	\$385,000
Backfill and Seed (Marsh excavation)	су	\$45	11,000	\$495,000
Top Soil and Seed (Capped Area)	sf	\$1.65	87,000	\$143,550
Fence Restoration	ls	\$10,000	1	\$10,000
Bike Path Restoration	ls	\$80,000	1	\$80,000
Demobilization	Is	\$15,000	1	\$15,000
Monitoring Well Construction	well	\$2,500	5	\$12,500
SUBTOTAL OF DIRECT CAPITAL COST	•			\$1,620,150
30 % CONTINGENCY	%	30%		\$486,045
INDIRECT CAPITAL COSTS				
Project management/administration	Is	\$25,000	1	\$25,000
Plans and Specifications	is	\$45,000	1	\$45,000
Subcontracting	ls	\$25,000	1	\$25,000
Permitting	Is	\$20,000	1	\$20,000
Construction oversight	wk	\$7,500	18	\$135,000
Documentation reporting	Is	\$25,000	1	\$25,000
SUBTOTAL OF INDIRECT CAPITAL COSTS	•			\$275,000
SUBTOTAL OF DIRECT AND INDIRECT CAPITAL COSTS				\$2,381,195
FIRST YEAR OF GROUNDWATER MONITORING - SEMI-ANN	NUAL			
Project management/administration	hr	\$195	20	\$3,900
Groundwater sampling (5 wells, 2 times/yr)	hr	\$100	55	\$ 5,500
Field equipment/expenses	Is	\$1,000	1	\$1,000
Lab- As, Fe, SO4, pH , Calcium	each	\$100	10	\$1,000
Data evaluation	hr	\$130	20	\$2,600
Reporting	hr	\$130	30	\$3,900
SUBTOTAL OF FIRST YEAR OF MONITORING	•	•		\$17,900
30 % CONTINGENCY	%	30%		\$5,370
SUBTOTAL OF CAPITAL AND FIRST YEAR COSTS				\$2,404,465

OPINION OF PROBABLE COST WDNR - KEWAUNEE MARSH HOT SPOT REMEDIATION KEWAUNEE, WI PROJECT NO. 02085.21.001

OPTION 2: IN SITU TREATMENT, WITH ON-SITE CONTAINMENT

ANNUAL COSTS HOT SPOT MONITORING COSTS (ANNUAL - YEARS 2-5) Project management/administration Groundwater sampling (3 wells, once/yr) Field equipment and expenses Is S500 Lab - As and pH Breading S25 S3 S75 Breading S30 Reporting FRESENT WORTH OF O&M TREATED MATERIAL MONITORING COSTS (ANNUAL - YEARS 2-20) Project management/administration Pressent worth OF ANNUAL GROUNDWATER MONITORING FRESENT WORTH OF ANNUAL GROUNDWATER MONITORING FRESENT WORTH OF O&M TREATED MATERIAL MONITORING COSTS (ANNUAL - YEARS 2-20) Freigld equipment and expenses Is S500 S13,484 TREATED MATERIAL MONITORING COSTS (ANNUAL - YEARS 2-20) Frield equipment and expenses Is S500 S500 FRESENT WORTH OF O&M TREATED MATERIAL MONITORING COSTS (ANNUAL - YEARS 2-20) Field equipment and expenses Is S500 S500 S500 S500 S500 S500 S500 S50	ITEM	UNIT	UNIT COST	QTY	TOTAL
Project management/administration	ANNUAL COSTS				
Stood Stoo	HOT SPOT MONITORING COSTS (ANNUAL - YEARS 2-5)				
Field equipment and expenses	Project management/administration	hr	\$195	10	\$1,950
Lab - As and pH . each S25 3 \$75 Data evaluation hr \$100 5 \$500 Reporting \$130 10 \$1,300 SUBTOTAL FOR ANNUAL GROUNDWATER MONITORING \$5,325 30 % CONTINGENCY % 30% \$1,598 PRESENT WORTH OF HOT SPOT MONITORING 4 years @ 3% \$25,732 TREATED MATERIAL O&M (ONE TIME REPAIR EVENT = YEAR 10) Construction Cost ls \$45,000 1 \$45,000 PRESENT WORTH OF O&M \$33,484 TREATED MATERIAL MONITORING COSTS (ANNUAL - YEARS 2-20) Project management/administration hr \$195 15 \$2,925 Groundwater sampling (2 wells, once/yr) hr \$100 25 \$2,500 Field equipment and expenses ls \$500 1 \$500 Lab - As, Fe, SO4, pH , Calcium each \$100 2 \$200 Data evaluation hr \$100 10 \$1,000 Reporting \$9,725 30 % CONTINGENCY % 30% \$2,918 PRESENT WORTH OF ANNUAL MONITORING 19 years @ 3% \$181,089 PRESENT WORTH OF TREATED MATERIAL O&M AND MONITORING \$225,732 PRESENT WORTH OF TREATED MATERIAL O&M AND MONITORING \$221,572.86 TOTAL COST (TOTAL CAPITAL + PRESENT WORTH) Total \$2,650,000 + 50% \$3,980,000	Groundwater sampling (3 wells, once/yr)	hr	\$100	10	\$1,000
Data evaluation	Field equipment and expenses	ls	\$500	1	\$500
Reporting	Lab - As and pH ,	each	\$25	3	\$75
SUBTOTAL FOR ANNUAL GROUNDWATER MONITORING \$5,325	Data evaluation	hr	\$100	5	\$500
30 % CONTINGENCY	Reporting	hr	\$130	10	\$1,300
PRESENT WORTH OF HOT SPOT MONITORING 4 years @ 3% \$25,732 TREATED MATERIAL O&M (ONE TIME REPAIR EVENT = YEAR 10) Is \$45,000 1 \$45,000 PRESENT WORTH OF O&M \$33,484 TREATED MATERIAL MONITORING COSTS (ANNUAL - YEARS 2-20) Project management/administration Inr \$195 15 \$2,925 Groundwater sampling (2 wells, once/yr) hr \$100 25 \$2,500 Field equipment and expenses is \$500 1 \$500 Lab - As, Fe, SO4, pH, Calcium each \$100 2 \$200 Data evaluation hr \$100 10 \$1,000 Reporting hr \$130 20 \$2,600 SUBTOTAL FOR ANNUAL GROUNDWATER MONITORING \$9,725 30 % CONTINGENCY % 30% \$2,918 PRESENT WORTH OF ANNUAL MONITORING 19 years @ 3% \$181,089 PRESENT WORTH OF TREATED MATERIAL O&M AND MONITORING \$214,572.86 TOTAL COST (TOTAL CAPITAL + PRESENT WORTH) Total \$2,650,000 + 50% \$3,	SUBTOTAL FOR ANNUAL GROUNDWATER MONITORING				\$5,325
TREATED MATERIAL O&M (ONE TIME REPAIR EVENT = YEAR 10) Construction Cost Is \$45,000 1 \$45,000 PRESENT WORTH OF O&M \$33,484 TREATED MATERIAL MONITORING COSTS (ANNUAL - YEARS 2-20) Project management/administration Inr \$195 15 \$2,925 Groundwater sampling (2 wells, once/yr) Inr \$100 25 \$2,500 Field equipment and expenses Is \$500 1 \$500 Lab - As, Fe, SO4, pH , Calcium each \$100 2 \$200 Data evaluation Inr \$100 10 \$1,000 Reporting Inr \$130 20 \$2,600 SUBTOTAL FOR ANNUAL GROUNDWATER MONITORING \$9,725 30 % CONTINGENCY % 30% \$2,918 PRESENT WORTH OF ANNUAL MONITORING 19 years @ 3% \$181,089 PRESENT WORTH OF TREATED MATERIAL O&M AND MONITORING \$214,572.86 TOTAL COST (TOTAL CAPITAL + PRESENT WORTH) Total \$2,650,000	30 % CONTINGENCY	%	30%		\$1,598
S \$45,000 1 \$45,000 1 \$45,000 1 \$45,000 1 \$45,000 1 \$45,000 1 \$45,000 1 \$33,484 1 \$34,500 1 \$33,484 1 \$34,500 1 \$33,484 1 \$34,500 1 \$33,484 1 \$34,500	PRESENT WORTH OF HOT SPOT MONITORING	4	years @	3%	\$25,732
S \$45,000 1 \$45,000 1 \$45,000 1 \$45,000 1 \$45,000 1 \$45,000 1 \$45,000 1 \$33,484 1 \$34,500 1 \$33,484 1 \$34,500 1 \$33,484 1 \$34,500 1 \$33,484 1 \$34,500					
PRESENT WORTH OF O&M \$33,484 TREATED MATERIAL MONITORING COSTS (ANNUAL - YEARS 2-20) hr \$195 15 \$2,925 Groundwater sampling (2 wells, once/yr) hr \$100 25 \$2,500 Field equipment and expenses Is \$500 1 \$500 Lab - As, Fe, SO4, pH, Calcium each \$100 2 \$200 Data evaluation hr \$100 10 \$1,000 Reporting hr \$130 20 \$2,600 SUBTOTAL FOR ANNUAL GROUNDWATER MONITORING \$9,725 \$30% \$2,918 PRESENT WORTH OF ANNUAL MONITORING 19 years @ 3% \$181,089 PRESENT WORTH OF TREATED MATERIAL O&M AND MONITORING \$25,732 \$214,572.86 TOTAL COST (TOTAL CAPITAL + PRESENT WORTH) Total \$2,650,000	TREATED MATERIAL O&M (ONE TIME REPAIR EVENT = YE	AR 10)			
TREATED MATERIAL MONITORING COSTS (ANNUAL - YEARS 2-20) Project management/administration	Construction Cost	ls	\$45,000	1	\$45,000
Project management/administration hr \$195 15 \$2,925 Groundwater sampling (2 wells, once/yr) hr \$100 25 \$2,500 Field equipment and expenses is \$500 1 \$500 Lab - As, Fe, SO4, pH, Calcium each \$100 2 \$200 Data evaluation hr \$100 10 \$1,000 Reporting hr \$130 20 \$2,600 SUBTOTAL FOR ANNUAL GROUNDWATER MONITORING \$9,725 30 % CONTINGENCY % 30% \$2,918 PRESENT WORTH OF ANNUAL MONITORING 19 years @ 3% \$181,089 PRESENT WORTH OF TREATED MATERIAL O&M AND MONITORING \$25,732 \$214,572.86 TOTAL COST (TOTAL CAPITAL + PRESENT WORTH) Total \$2,650,000 + 50% \$3,980,000	PRESENT WORTH OF O&M				\$33,484
Project management/administration hr \$195 15 \$2,925 Groundwater sampling (2 wells, once/yr) hr \$100 25 \$2,500 Field equipment and expenses is \$500 1 \$500 Lab - As, Fe, SO4, pH, Calcium each \$100 2 \$200 Data evaluation hr \$100 10 \$1,000 Reporting hr \$130 20 \$2,600 SUBTOTAL FOR ANNUAL GROUNDWATER MONITORING \$9,725 30 % CONTINGENCY % 30% \$2,918 PRESENT WORTH OF ANNUAL MONITORING 19 years @ 3% \$181,089 PRESENT WORTH OF TREATED MATERIAL O&M AND MONITORING \$25,732 \$214,572.86 TOTAL COST (TOTAL CAPITAL + PRESENT WORTH) Total \$2,650,000 + 50% \$3,980,000					
Groundwater sampling (2 wells, once/yr)	TREATED MATERIAL MONITORING COSTS (ANNUAL - YEAR	RS 2-20)			
Field equipment and expenses Is \$500 1 \$500 Lab - As, Fe, SO4, pH, Calcium each \$100 2 \$200 Data evaluation hr \$100 10 \$1,000 Reporting hr \$130 20 \$2,600 SUBTOTAL FOR ANNUAL GROUNDWATER MONITORING \$9,725 \$9,725 30 % CONTINGENCY % 30% \$2,918 PRESENT WORTH OF ANNUAL MONITORING 19 years @ 3% \$181,089 PRESENT WORTH OF HOT SPOT MONITORING \$25,732 \$25,732 PRESENT WORTH OF TREATED MATERIAL O&M AND MONITORING \$214,572.86 TOTAL COST (TOTAL CAPITAL + PRESENT WORTH) Total \$2,650,000 + 50% \$3,980,000	Project management/administration	hr	\$195	15	\$2,925
Lab - As, Fe, SO4, pH, Calcium each \$100 2 \$200 Data evaluation hr \$100 10 \$1,000 Reporting hr \$130 20 \$2,600 SUBTOTAL FOR ANNUAL GROUNDWATER MONITORING \$9,725 30 % CONTINGENCY % 30% \$2,918 PRESENT WORTH OF ANNUAL MONITORING 19 years @ 3% \$181,089 PRESENT WORTH OF HOT SPOT MONITORING \$25,732 PRESENT WORTH OF TREATED MATERIAL O&M AND MONITORING \$214,572.86 TOTAL COST (TOTAL CAPITAL + PRESENT WORTH) Total \$2,650,000 + 50% \$3,980,000	Groundwater sampling (2 wells, once/yr)	hr	\$100	25	\$2,500
Data evaluation Reporting hr \$100 10 \$1,000 SUBTOTAL FOR ANNUAL GROUNDWATER MONITORING \$9,725 30 % CONTINGENCY % 30% \$2,918 PRESENT WORTH OF ANNUAL MONITORING 19 years @ 3% \$181,089 PRESENT WORTH OF HOT SPOT MONITORING \$25,732 PRESENT WORTH OF TREATED MATERIAL O&M AND MONITORING \$214,572.86 TOTAL COST (TOTAL CAPITAL + PRESENT WORTH) Total \$2,650,000 + 50% \$3,980,000	Field equipment and expenses	is	\$500	1	\$500
Reporting hr \$130 20 \$2,600 SUBTOTAL FOR ANNUAL GROUNDWATER MONITORING \$9,725 30 % CONTINGENCY % 30% \$2,918 PRESENT WORTH OF ANNUAL MONITORING 19 years @ 3% \$181,089 PRESENT WORTH OF HOT SPOT MONITORING \$25,732 PRESENT WORTH OF TREATED MATERIAL O&M AND MONITORING \$214,572.86 TOTAL COST (TOTAL CAPITAL + PRESENT WORTH) Total \$2,650,000 + 50% \$3,980,000	Lab - As, Fe, SO4, pH , Calcium	each	\$100	2	\$200
SUBTOTAL FOR ANNUAL GROUNDWATER MONITORING \$9,725 30 % CONTINGENCY % 30% \$2,918 PRESENT WORTH OF ANNUAL MONITORING 19 years @ 3% \$181,089 PRESENT WORTH OF HOT SPOT MONITORING \$25,732 PRESENT WORTH OF TREATED MATERIAL O&M AND MONITORING \$214,572.86 TOTAL COST (TOTAL CAPITAL + PRESENT WORTH) Total \$2,650,000 + 50% \$3,980,000	Data evaluation	hr	\$100	10	\$1,000
30 % CONTINGENCY	Reporting	hr	\$130	20	\$2,600
PRESENT WORTH OF ANNUAL MONITORING 19 years @ 3% \$181,089 PRESENT WORTH OF HOT SPOT MONITORING \$25,732 PRESENT WORTH OF TREATED MATERIAL 0&M AND MONITORING \$214,572.86 TOTAL COST (TOTAL CAPITAL + PRESENT WORTH) Total \$2,650,000 + 50% \$3,980,000	SUBTOTAL FOR ANNUAL GROUNDWATER MONITORING				\$9,725
PRESENT WORTH OF HOT SPOT MONITORING \$25,732 PRESENT WORTH OF TREATED MATERIAL O&M AND MONITORING \$214,572.86 TOTAL COST (TOTAL CAPITAL + PRESENT WORTH) Total \$2,650,000 + 50% \$3,980,000	30 % CONTINGENCY	%	30%		\$2,918
PRESENT WORTH OF TREATED MATERIAL O&M AND MONITORING \$214,572.86 TOTAL COST (TOTAL CAPITAL + PRESENT WORTH) Total \$2,650,000 + 50% \$3,980,000	PRESENT WORTH OF ANNUAL MONITORING	19	years @	3%	\$181,089
PRESENT WORTH OF TREATED MATERIAL O&M AND MONITORING \$214,572.86 TOTAL COST (TOTAL CAPITAL + PRESENT WORTH) Total \$2,650,000 + 50% \$3,980,000					
PRESENT WORTH OF TREATED MATERIAL O&M AND MONITORING \$214,572.86 TOTAL COST (TOTAL CAPITAL + PRESENT WORTH) Total \$2,650,000 + 50% \$3,980,000					
TOTAL COST (TOTAL CAPITAL + PRESENT WORTH) Total \$2,650,000 + 50% \$3,980,000	PRESENT WORTH OF HOT SPOT MONITORING				\$25,732
+ 50% \$3,980,000	PRESENT WORTH OF TREATED MATERIAL O&M AND MONITORING				\$214,572.86
	TOTAL COST (TOTAL CAPITAL + PRESENT WORTH)			Total	\$2,650,000
20% \$4.950,000				+ 50%	\$3,980,000
- 50% \$1,860,000				- 30%	\$1,860,000

Prepare By. A. Sellwood

ASSUMPTIONS:

- 1. Costs rounded up to the nearest ten thousand dollars.
- $2. \ \ {\hbox{Costs determined from experience and estimates from other similar projects}}.$
- 3. Contingency is assumed to be 30% of direct capital costs, monitoring costs, and annual O&M.
- 4. Indirect costs do not include legal fees or public relations assistance,
- 5. Interest rate 3%; the balance of an 8% interest rate less a 5% inflation rate, based on EPA approach for remedial cost estimating,
- 6. All costs are based on preliminary concepts. They are intended for remedial option comparison and not for final budgeting.

REMEDIATION NOTES

- 1. Mobilization includes the mobilization of equipment, swamp mats, chemicals and job trailer to the site.
- Site preparation includes removal of 100 LF of existing chain link fence, installation of approximately 4500 LF of silt fence, and
 set up of a site trailer and construction of a site laydown area for storage of equipment and materials at the intersection of the
 road and bike path. Assumes existing bike path can be used as access road.
- In situ treatment includes construction of a temporary access ramp to the marsh and assumes treatment of approximately 500 CY/day with the specified chemicals.
- 4. Onsite containment assumes purchase/rental of 500 LF of additional swamp mats to reach outer aroa of cap, production rate of 300 CY per day to transport and place treated material over approximately 2 acres of the exiting in tact cap to a height of up to 4 feet.
- Bike path restoration includes backfilling the excavated area and grading up to 2,000 cy of gravel over the section of path used by trucks to access the site.
- 6. Site restoration includes repair of the 100 LF of chainlink fence and application of 6-inches of top soil and seed to the marsh. It does not include wetlands restoration.

OPINION OF PROBABLE COST WDNR - KEWAUNEE MARSH HOT SPOT REMEDIATION KEWAUNEE, WI PROJECT NO. 02085.21.001

OPTION 3: IN SITU TREATMENT WITH OFF-SITE DISPOSAL

ITEM	UNIT	UNIT COST	QTY	TOTAL
DIRECT CAPITAL COSTS				
Mobilization	Is	\$30,000	1	\$30,000
Site Preparation	Is	\$67,500	1	\$67,500
Mixing of treatment chemicals	week	\$46,750	4	\$187,000
Treatment Chemicals				
- Ferric sulfate	tons	\$600	200	\$120,000
- Limestone	tons	\$50	100	\$5,000
- Peroxide	gal	\$25	0	\$0
Dewater - Magnesium Sulfate	tons	\$175	1,200	\$210,000
Excavate and Transport to Hickory Meadows	tons	\$40	11,900	\$476,000
Disposal (Hickory Meadows - Veolia Contract)	tons	\$25	11,900	\$297,500
Backtill and Seed (Marsh excavation)	су	\$45	11,000	\$495,000
Fence Restoration	Is	\$10,000	1	\$10,000
Bike Path Restoration	Is	\$80,000	1	\$80,000
Demobilization	Is	\$15,000	1	\$15,000
Monitoring Well Construction	well	\$2,500	3	\$7.500
SUBTOTAL OF DIRECT CAPITAL COST	•			\$2,000,500
30 % CONTINGENCY	%	30%		\$600,150
INDIRECT CAPITAL COSTS				
Project management/administration	Is	\$25,000	1	\$25,000
Plans and Specifications	Is	\$35,000	1	\$35,000
Subcontracting	Is	\$25,000	1	\$25,000
Permitting	Is	\$20,000	1	\$20,000
Construction oversight	wk	\$7,500	13	\$97,500
Documentation reporting	ls	\$25,000	1	\$25,000
SUBTOTAL OF INDIRECT CAPITAL COSTS				\$227,500
SUBTOTAL OF DIRECT AND INDIRECT CAPITAL COSTS				\$2,828,150
		1		
FIRST YEAR OF GROUNDWATER MONITORING - SEMI-A	1			
Project management/administration	hr	\$195	20	\$3,900
Groundwater sampling (3 wells, 2 times/yr)	hr	\$100	50	\$5,000
Field equipment/expenses	ls .	\$1,000	1	\$1,000
Lab - As, pH	each	\$25	6	\$150
Data evaluation	hr	\$130	20	\$2,600
Reporting	hr	\$130	30	\$3,900
SUBTOTAL OF FIRST YEAR OF MONITORING				\$16,550
30 % CONTINGENCY	%	30%		\$4,965
CURTOTAL OF CARITAL AND FIRST VEAR COOTS				
SUBTOTAL OF CAPITAL AND FIRST YEAR COSTS				\$2,849,665

OPINION OF PROBABLE COST WDNR - KEWAUNEE MARSH HOT SPOT REMEDIATION KEWAUNEE, WI PROJECT NO. 02085.21.001

OPTION 3: IN SITU TREATMENT WITH OFF-SITE DISPOSAL

ITEM	UNIT	UNIT COST	QTY	TOTAL
FUTURE ANNUAL COSTS				
MONITORING COSTS (ANNUAL - YEARS 2-5)				
Project management/administration	hr	\$195	15	\$2,925
Groundwater sampling (3 wells, once/yr)	hr	\$100	25	\$2,500
Field equipment and expenses	Is	\$500	1	\$500
Lab - As, pH	each	\$25	3	\$7 5
Data evaluation	hr	\$100	10	\$1,000
Reporting	hr	\$130	20	\$2,600
SUBTOTAL FOR ANNUAL GROUNDWATER MONITORING		•		\$9,600
30 % CONTINGENCY	%	30%		\$2,880
PRESENT WORTH OF ANNUAL MONITORING	4	years @	3%	\$46,389
PRESENT WORTH OF MONITORING				\$46,389.39
TOTAL COST (TOTAL CAPITAL + PRESENT WORTH)			Total	\$2,900,000
			+ 50%	\$4,350,000
		i	- 30%	\$2,030,000

Prepared By. A. Sellwood

ASSUMPTIONS:

- 1. Costs rounded up to the nearest hundred thousand dollars.
- 2. Costs determined from experience and estimates from other similar projects.
- 3. Contingency is assumed to be 30% of direct capital costs, monitoring costs, and annual O&M.
- 4. Indirect costs do not include legal fees or public relations assistance.
- 5. Interest rate 3%; the balance of an 8% interest rate less a 5% inflation rate, based on EPA approach for remedial cost estimating.
- 6. All costs are based on preliminary concepts. They are intended for remedial option comparison and not for final budgeting.

REMEDIATION NOTES:

- 1. Mobilization includes the mobilization of equipment, swamp mats, chemicals and job trailer to the site.
- Site preparation includes removal of 100 LF of existing chain link fence, installation of approximately 4500 LF of silt fence, and set up of a site trailer and construction of a site laydown area for storage of equipment and materials at the intersection of the road and bike path. Assumes existing bike path can be used as access road.
- 3. In situ treatment includes construction of a temporary access ramp to the marsh and assumes treatment of approximately 500 CY/day with the specified chemicals.
- 4. Assumes excavation rate of 500 tons per day and disposal at the Veolia Hickory Meadows (53 miles from site).
- 5 Bike path restoration includes backfilling the excavated area and grading up to 2,000 cy of gravel over the section of path used by trucks to access the site.
- 6. Site restoration includes repair of the 100 LF of chainlink fence and application of 6-inches of top soil and seed to the marsh. It does not include wetlands restoration.

Quantity Estimates

Kewaunee Hot Spot Remediation In Situ Treatment (Small Volume)

Volumes				
Location	Area (sf)	Depth (ft)	Volume (cy)	
Ballast ("Clean")	1,750	5	400	
Ballast (Hot Spot)	1 ,7 50	7	500	
Marsh	5,600	8	1,7 00	
		Total Hot Spot	2,200	
	Benching	g/Slope (Add 25%)	3,000	

<u>Mass</u>				
Soil Type	Volume (cy)	γ _{sat} (lb/cf)	Mass (ton)	Mass (kg)
Sand/Silt	600	130	1,060	9.62E+05
Peat	2,400	65	2,110	1.92E+06
	****	Total	3,170	2.88E+06

Chemical Quantities			
Material	Dose (%)	Tons	
Ferric Sulfate	2.1	7 0	
Limestone	1.5	50	
Bentonite	5	160	
	Dose (L/kg)	Gallons	
Hydrogen Peroxide (30%)	0.000625	480	
Hydrogen Peroxide (50%)		290	

Prepared By: A. Sellwood 4/15/10

Kewaunee Hot Spot Remediation In Situ or On-Site Containment

<u>Volumes</u>			
Location	Area (sf)	Depth (ft)	Volume (cy)
Ballast ("Clean")	1,750	5	400
Ballast (Hot Spot)	1,750	7	500
Marsh	20,700	10	7,700
		Total Hot Spot	8,200
	Benching	g/Slope (Add 25%)	11,000

<u>Mass</u>				
Soil Type	Volume (cy)	γ_{sat} (lb/cf)	Mass (ton)	Mass (kg)
Sand/Silt	2,200	130	3,870	3.51E+06
Peat	8,800	65	7,730	7.02E+06
	leder .	Total	11,600	1.05E+07

Chemical Quantities			
Material	Dose (%)	Tons	
Ferric Sulfate	2.1	300	
Limestone	1.5	200	
Bentonite	5	600	
	Dose (L/kg)	Gallons	
Hydrogen Peroxide (30%)	0.000625	1,800	
Hydrogen Peroxide (50%)		1,080	

Prepared By: A. Sellwood 4/15/10

Kewaunee Hot Spot Remediation Off Site Disposal

Volumes			:
Location	Area (sf)	Depth (ft)	Volume (cy)
Ballast ("Clean")	1,750	5	400
Ballast (Hot Spot)	1,750	7	500
Marsh	20,700	10	7,7 00
	-	Total Hot Spot	8,200
	Benching	/Slope (Add 25%)	11,000

<u>Mass</u>				
Soil Type	Volume (cy)	γ_{sat} (lb/cf)	Mass (ton)	Mass (kg)
Sand/Silt	2,200	130	3,870	3.51E+06
Peat	8,800	65	7,730	7.02E+06
	*****	Total	11,600	1.05E+07

Chemical Quantities			
Material	Dose (%)	Tons	
Ferric Sulfate	1.05	200	
Limestone	0.75	100	
	Dose (L/kg)	Gallons	
Hydrogen Peroxide	0	0	

Prepared By: A. Sellwood 4/15/10

Attachment A Soil Boring Logs

07201DNR.GPJ WI DNR 2003.GDT 4/22/10

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

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07201DNR.GPJ WI DNR 2003.GDT 4/22/10

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

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07201DNR.GPJ WIDNR 2003.GDT 4/22/10

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

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SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

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1 (101111	ty II			Kewaunee		i i	31	ac	Kewa		-	rvinage					
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d			-	Soil/R	ock Descri	otion											
υ	Att. o	Blow Counts	Depth In Feet		ologic Orig					_		SSIVC			٠,		SIL
Typ.	gth /	υ V	th di	Eac	h Major Ui	nit		CS	ohic	l gram	PID/FID	apres ngth	Sture	pi ii	ticit;	0)/ mine
Number and Type	Length Att. & Recovered (in)	Blov	Dep					S D	Graphic Log	Well Diagram	PID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1	60			SAND (SP), with													
CS	30			small to large, sub brown 10YR 5/4,	angular g	gravel, yell	owish										
e S				010W111011C 3/4,	moist.												
			-														
			_ 2														
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			()	A 1 1/1 1	٠.												
0			-	As above, with cla	y, moist	to wet.											
472271			 10												:		
5 CS	60 15		-														
03.G			- 11														
18 20			-														
WI DNR 2003.GDT 4/22/10			 12				,-,-										
d I herel	by certif	y that		rmation on this form is tr	ue and corr	ect to the best	of my kn	owled	л 20.	L	1		L		1		
Signat	lure						f, Inc.		o * ·							י וברני	500 031 dada
Signat Signat						1 (111 1	t, mc. leartland T	frail N	4adison,	, WI 53	3717						508-831-4444 508-831-3334

Borin	g Numb	ocr	B2E	Use only as an attachment to Form 4400-	122.						Pag		oſ	2
	ple	~~~								Soil	Prope	erties		
	Length Att. & Recovered (in)	S.	ू इंद	Soil/Rock Description					ပ္					
	Au. red	oun	n Fc	And Geologic Origin For	S	l u			essí	211		ity		ents
Number and Type	ngth	Blow Counts	Depth In Feet	Each Major Unit	U	aphi	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid	Plasticity Index	P 200	RQD/ Comments
and	Le	<u></u>	De		S O	Garaphic 14 Log	ž ō	_ <u>=</u>	<u> </u>	ž S	33	<u> </u>	<u>c.</u>	<u> </u>
			-	PEAT, with organics (wood and root mass), dark brown 10YR 3/2, moist, soft.		2 24								
·			- - 13	111d35), dark 610 W1 10 1 K 3/2, 110l3t, 301t.		77. 7	1							
			-			1/2 1/2								
			14			77 7	1							
			-			77. 7								
4	60		<u>-</u> 15	ODCANIC SILT (OL) with challe and		J= 0	1							
4 CS	60		E	ORGANIC SILT (OL), with shells and trace organics, dark greenish gray GLEY1 4/1, moist, soft.		- G								
			16	4/1, moist, soft.		6								
			-			6								
·			17		OL									
			E				7							
			18 			7-0								
			-			7 €								
			19 	SANDY CLAY (CL), with gravel, medium grained, red brown gray 5YR 5/2, moist.		17								
				grained, red brown gray 5YR 5/2, moist.	CL									
_			2()	E.O.B. at 20 feet bgs.										
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SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

			Ro		'astewater 🔲 Redevelopment 🔲	Waste Other		ement								
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	y/Proje					License/	Permit	/Monito	ring N	umber		Boring	Numbe	er B2	\sim	
	vaune 3 Drilled			f crew chief (first, last) a	nd Firm	Date Dri	illing S	tarted		Da	ite Drilli	ng Con	pleted	132		ling Method
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Facilit		-		County		County Co		Civil T		•	Village					
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Sar	nple I			0.100								2011	Prope	rues		
	it. & 3 (in	ınts	Feet		ock Description ologic Origin For						ive					v,
ber Sype	th A	. Cor	n d		h Major Unit		CS	hic	ram	FID	press	turc	. E.	icity	0	J.
Number and Type	Length Att. & Recovered (in)	Bl•w Counts	Depth In Feet				O S (Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
CS 2 CCS	60 30 60 48		- 2 - 3 - 3 6 7	SAND (SP), with small to large, sub brown 10YR 5/4,	angular gravel, yo	ellowish	SP									
a CS	60 60			stiff. SAND (SP), with small to medium, yellowish brown 1 CLAY (CL), red to stiff. GRAVEL (GP), was large, medium grad 6/3, wet. SAND (SP), with	gravel, medium g subangular gravel OYR 5/4, moist. brown 5YR 5/3, m with sand, medium ined, light brown gravel, medium to	rained, , noist, 1 to 10YR	SP CL GP SP									
l herel Signat		y that	the info	rmation on this form is tr	Taux.		nowled	ge.								
ज्ञाहास्या	VII C				1 1/1	AT, Inc. Heartland	Trail N	//adison	, WI 5:	3717						608-831-4444 608-831-3334

Boring Nun	nber	······································	B20	Use only as an attachment to Form 4400-	122.	- 1	 -				 	Pag		oľ.	2
Number and Type Length Att. & Recovered (in)		Blow Counts	Depth In Fect	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	[3] Graphic	-0g	Well Diagram	PID/FID	Compressive Strength	 	Prope Limit	Plasticity Soll	P 200	RQD/ Comments
4 60 CS 30			13 14 15 18 19 20	grained, small to medium subangular to round gravel, brown 10YR 5/3, very wet. PEAT, with organics (wood and root mass), dark brown 10YR 3/2, moist, soft. ORGANIC SILT (OL), with shells and trace organics, dark greenish gray GLEY1 4/1, moist, soft. SILTY CLAY (CL-ML), with sand, red brown 5YR 5/3, moist, stiff. E.O.B. at 20 feet bgs.	OL OL				Id	S S	CC			<u>a</u>	
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SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

	y/Pro jed					License/	Permit	'Monitori	ing Nu	mber		Boring	Pag Numb	er		
	vaunce Drilled			ferew chief (First, last) and Fir	m	Date Dri	lling S	arted		Da	te Drilli	ng Cor	npleted	B2		ing Method
Dus On-	ty Ha Site E	rvey invirc	onmen	ital Services			12/7	/2009				12/7/2	2009		Ge	eoprobe
WI Un	ique W	'ell No		DNR Well ID No. Com	mon Well Name	Final Sta	tic Wa Feet l		1		e Elevat 587.0 I		4S1	Во		Diameter inches
Local (State	Grid Or	igin		stimated: (1) or Boring Lo ,973 N, 2,616,452 E	ocation 🛛	La		0 1			Local (cation	<u> </u>		
	1/4	of		/4 of Section , T	N, R	Long	<u> </u>	0 1		<u>u</u>		Feet			ı	Feet D V
Facilit	y ID			County Kewaunee		County Co 31	de	Civil To Kewai		y/ or \	√illage					
San					1							Soil	Prope	erties		
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Fect	Soil/Rock D And Geologic Each Maj	: Origin For		uscs	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
CS 2	60 36		-3 4 5 7	SAND (SP), with grav yellow brown 10YR 4/ stained material at 6.5 Ballast.	4, moist. Black		SP		***							
			-8	CLAY (CL), brownish soft. SAND (SP), with grav brown 10YR 5/3, mois	el, medium gra	/-	CL		****							
3 s	60 48		10 				SP									
		y that t	the info	rmation on this form is true and		of my kn	owledg	зe.								
Signati	ire					l', lnc.	Smill N	ladison,	WI 52	717						08-831-44 608-831-33

Borin	ng Numb	er	B21	Use only as an attachment to Form 4400-	122.						Pag	ge 2	oſ	2
Sar	nple				***************************************					Soil	Propo	rties		
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	uscs	Graphic Log	Well	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
WDNR SBL 1996 07201DNR GPJ WI DNR 2036DT 4/22/10	60 54			PEAT, with organics (wood and root mass), dark brown 10YR 3/2, moist, soft. SAND (SW), medium grained, light yellow brown 10YR 6/4, moist. PEAT, with organics (wood and root mass), dark brown 10YR 3/2, moist, soft. ORGANIC SILT (OL), with shells and trace organics, dark greenish gray GLEY1 4/1, moist, soft. GRAVEL WITH CLAY AND SAND (GW-GC), small to large gravel, medium to coarse grained, red-brown gray 5YR 5/3, wet. GRAVEL WITH SAND (GW), and clay, small to large gravel, sub-angular, medium to coarse grained, light red brown 2.5YR 7/3, wet. E.O.B. at 25 feet bgs.	SP SW OL GW		viocential designation of the second							
WDNR														12

07201DNR.GPJ WI DNR 2003.GDT 4/22/10

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

			<u>Rc</u>		/astewater /Redevelopment	Waste Other		gement								
Facili	ty/Proje	ct Nan	ne			License	/Permit	/Monito	rina Nu	umbe	r	Boring	Pag		of`	2
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				ferew chief (first, last) a	nd Firm	Date Di	illing S	tarted		E	Date Drilli	ing Cor	npleted			ling Method
	sty Ha -Site I		onmen	tal Services			12/7	7/2009		***************************************		12/7/2	2009		G	eoprobe
WLU	nique V	Vell No).	DNR Well ID No.	Common Well Nam	e Final St			2)	Surfa	ace Eleva			Во		Diameter
	2112						Feet	MSL			587.0				2.1	inches
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State		of		/4 of Section ,	T N, R	Lon		0	1	,		Feet	□ N □ S			Feet W
Facilit		01		County	1 18,18	County Co		Civil T	own/Ci	ty/ or	- r Village	1 001				1 CCI () 11
				Kewaunee		31		Kewa		-,						
Sai	nple			,				<u>, </u>				Soil	Prope	erties		
	·	1	-	Soil/R	ock Description										,	1
4.	3 H. &	unts	Fee		cologic Origin For						sive					S ₃
ber ype	th A	ပိ	<u> </u>		ch Major Unit		S	, 2 <u>2</u>	an.	9	ores gth	furc	Φ.	city	_) ncn
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	1540	in wagor our		SC	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	200	RQD/ Comments
Z. 73	60	<u> </u>		SAND (SP), with	arayal madium	vroined	=	10 -3	×Ω	4	O S	≥ ∪	77	a, =	<u>a</u>	<u> ∝∪</u>
CS 2 CS	60 36		- 2	Small to large grave 6/6, moist. Ballast Ballast CLAY (CL), brow moderately stiff. ESAND (SP), with	vel, yellow brown in red 5YR 5/3, n Balkıst gravel, medium t	noist,	SP CO.									
		y that		grained, small to lead to brown 10YR 6/6, As above, medium 10YR 5/2, very we contain the form is treation on this form is treation on this form is treation on this form is treation on the second contains the cont	moist, Ballast. n grained, browniet. ue and correct to the b	sh gray	SP	ge.								
Signat	ure		••••••			MT, Inc.								***************************************	Tel: (508-831-4444
						4 Heartland	Trail N	Aadison,	WI 53	717						508-831-3334

	g Numb	oer	B2I	Use only as an attachment to Form 4400-1	22.	T	1 1		-	Call	Pag		oſ	2
Number and Type	Length Att. & dd	Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	uscs	Graphic Log	Well Diagram	PID/FID	Compressive Strength		Prope Limit	ity	P 200	RQD/ Comments
4 CS	60		13 14 15 16 17	PEAT, with organics (wood and root mass), dark brown 10YR 3/2, moist, soft. ORGANIC SILT (OL), with shells and trace organics, dark greenish gray GLEY1 4/1, moist, soft.	SP									
5 CS	60 18			SANDY CLAY (CL), dark red gray 2.5YR 4/2, moist, soft.	CL									
iPJ WI DNR 2003.GDT 4/22/10			- 22 23 24 25	SAND (SP), with trace small gravel and fines, very fine grained, red brown 5YR 5/3, very wet. SANDY CLAY (CL), fine to medium grained, reddish brown 5YR 5/3, very wet, soft. GRAVEL WITH SAND (GW), and trace fines, small to large, subangular, coarse to medium grained sand, light red brown 2.5YR 7/3, wet. E.O.B at 25 feet bgs.	SP				COLONIA DE LOCATION DE LA COLONIA DE LA COLO					
WDNR SBL 1998 07201DNR.GPJ WI DNR 2003.GDT														14

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SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

			Ro	ute To:		Vastewater /Redevelopment		te Man	agen	nent								
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	ty/Projec						Licens	se/Pern	nit/N	1onito	ring N	umbe	ı.	Boring		er		·
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On	-Site E	inviro		tal Serv		70 W IIN	12: 1.0			2009		10 0	ice Eleva	12/7/	2009	(1)-		eoprobe Diameter
WLO	nique W	'eli No).	DINK	Well ID No.	Common Well Name	e Final s	Static V Fee			21	Surta	166 Elevi 587.0		лS1.	130		inches
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		····			Kewaunee		31		I	Kewa	unce	<u>, </u>	······································					
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	(ii)	nts	cet			Rock Description							s.c					
cı. ypc	h Att	Com	i i			cologic Origin For		0	,	j.	1 11		ressi	arc H		city		nemts
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet		Ea	ch Major Unit		7.5.1		Graphic Log	Well	PID/FID	Compressive Strength	Moisture	Liquid Li, t	Plasticity Index	P 200	RQD/ Comments
)	60	===	-	SANI	D (SP), with	gravel, medium g	grained,					1 124	0 0			<u> </u>		
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I herel Signat		y that	the info	mation o	n this form is t	rue and correct to the b			edge									
ઝકુલલા	are						MT, Inc. Heartlan		Ma	dison	WI 5	3717						508-831-4444 508-831-3334

Boring Number	B2I	Use only as an attachment to Form 4400-1	22.						Pag	ge 2	of	2
Sample								Soil	Prope	erties		
Number and Type Length Att. & Recovered (in) Blow Counts	Depth In Fect	Soil/Rock Description And Geologic Origin For Each Major Unit	nscs	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
4 60 CS 60	- 13 - 14 - 15 - 16 - 17 - 18	PEAT, with visible organics, very dark brown 10YR 2/2, moist, soft. ORGANIC SILT (OL), with shells and trace organics, dark greenish gray GLEY1 4/1, moist, soft.	SP OL.									
5 60 CS 60	- 19 - 20 - 21 - 22	CLAY (CL), with sand, very fine grained, dark grayish red 2.5YR 4/2, moist, moderately stiff.	CL									
WDNR SBL 1998 #7201 DNR.GPJ WI DNR 2003.GDT 4/22/10	23 24 25 26 27 28 29 30	GRAVEL WITH SAND (GW), and trace fines, small to large, subangular, coarse to medium grained sand, light red brown 2.5YR 7/3, wet.	GW									
WDNR SBL												16

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SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

			<u>Rc</u>	oute To:	Watershed/W Remediation/			Waste Other	-	gement								
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	y/Projec							License/	Permit	/Monito	ring No	ımber		Boring	Numbe		Ŋ	
	vaune			Corony ch	icf (first, last) a	nd Firm		Date Dr	illing S	Started		ID ₂	te Drilli	na Cor	moleted	B31		ing Method
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On	Site F	invira	mmen	tal Serv	vices .				12/7	7/2009				12/7/2	2009		Ge	eoprobe
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Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet		Eac	th Major Ui	nit		SC	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid	Plasticity Index	P 200	RQD/ Comments
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I herel	y certif	y that	the info	rmation o	on this form is tr	ue and corr	ect to the be	st of my kr	nowled	ge.								
Signat	ure				····		Firm RM	T, Inc.									Tel: (508-831-4444
								Heartland '	Trail 1	Madison,	WI 5	3717						608-831-3334

Borin	g Numb	ocı.	B3I	Usc only as an attachment to Form 4400-1	22.							je 2	of	2
	nple									Soil	Prope	erties		
	Length Att. & Recovered (in)	S	<u> </u>	Soil/Rock Description					į,					
ຼ ຂ	Att.	Blow Counts	Depth in Feet	And Geologic Origin For	S	0	=	Ω	Compressive Strength	5 L		Ž,		RQD/ Comments
Type:	gth		450	Each Major Unit	uscs	tphi(Well Diagram	PID/FID	mpri engt	Moisture Content	Liquid Limit	Plasticity Index	P 200)Qi
Number and Type	Len Rec	Blo	Del		S	Graphic Log		IId	Str	နို ပိ	<u> </u>	Pla		RQ Co
			_		SP	17, 1								
				PEAT, with visible organics, very dark										
			13	brown 10YR 2/2, moist, soft.		かなる								:
			-			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1							
			14	ORGANIC SILT (OL), with shells and trace organics, dark greenish gray GLEY1 4/1, moist, soft.		-6-								
			-	trace organics, dark greenish gray GLEY 1		7								
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07201DNR.GPJ WIDNR 2003.GDT 4/22/10

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

			<u>Rc</u>		/astewater /Redevelopment	Waste Other	-	ement								
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	ty/Proje waune					License/	Permi	'Monito	ring Ni	umbei		Boring	, Numb	er B3	E	
				f crew chief (first, last) a	nd Firm	Date Dr	illing S	tarted		D	ate Drill	ing Cor	npleted			ing Method
	sty Ha -Site E		onmen	tal Services			12/7	7/2009				12/7/	2009		Go	eoprobe
	nique W			DNR Well ID No.	Common Well Name	Final Sta				Surfa	ce Eleva			Во		Diameter
							Feet	MSL			586.0				2.1	inches
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				Kewaunee		31	·y	Kewa	unee				~~~~			
Sar	nple											Soil	Propo	erties		
	(in)	ıts	cet		ock Description		Ì				ve ve					
cr /pc	n Au	Cour	In F		eologic Origin For		L/J	ي	=	Ω	cssi th	lrc 1		ity	ı İ	cmts
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Eac	th Major Unit		SC	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
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2	60		5 -	CLAY (CL), brow	/n 7.5YR 4/6, moi	st, soft.	CL	///		Ì						
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			6	grained, yellow br	own 10YR 6/6, m	oist.										
							SP								ļ	! !
			7				j									
			8	CLAY (CL), brow	/n 7.5YR 4/6, moi	st, soft.	CL									
			-	SAND (SP), with	trace gravel, fine	lo										
			- ()	medium grained, very wet.	yellow brown 103	r R 6/2,	SP									
			-	very wear			21,					revine was to				
			- 10													
3 CS	60 39		F ''	PEAT, with visibl		ark		立立		·						
			-11	brown 10YR 2/2,	moist, sort.			70 77 7 77								
			E i l					7 777 — — —								
			_ 12					살 살								
I heret	y certif	y that	. ,	rmation on this form is tr	ue and correct to the be	est of my kn	owled:	ge.		1	t	I—————	h			
Signat					10:	IT, Inc.									Tel-7	508-831-44-14
						Heartland 1	Frail A	4adison	W/L 53	3717						708-831-3334 308-831-3334

	ig Numl nple		B3I	Use only as an attachment to Form 4400-						Soil		ge 2 erties	oľ`	
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	uscs	Gaphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid	Plasticity Index	P 200	RQD/ Comments
4 CS	60 42		-13 14 15 16 17	ORGANIC SILT (OL), with shells and trace organics, dark greenish gray GLEY1 4/1, moist, soft.	OL									
55 CS	60 48		- 20 - 21 - 22 - 23	SILTY CLAY (CL-ML), dark grayish red 2.5YR 4/2, moist, soft. GRAVEL WITH SAND (GW), and clay, small to large, subangular, coarse to medium grained sand, light red brown 2.5YR 7/3, wet. As above, trace fines.	CL-MI						i i	Transfer of the state of the st		
			25	E.O.B at 25 feet bgs.										
	NAMES OF THE PARTY													20

072010NR.GPJ WLDNR 2003.GDT 4/22/10

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

			<u>R</u>	oute To:		Wastewater [] n/Redevelopment []		Waste M Other	_	ement								
					Remedianoi	n/kedevelopment	,	Omer	[_]						Dα	ge 1	oſ	1
Facili	ty/Proje	ct Nan	10				Li	icense/l	Permit/	Monito	ring Nu	ımber		Boring	Numb	eı.		1
	waune					1.00	<u></u>									MI		
	g Drilleo ni Kap		Name o	I crew c	hicf (first, last)	and Firm	D	ate Dril	lling Si	larted		Da	te Drilli	ng Coi	npicted		Drill	ling Method
On	-Site E	Enviro		tal Ser	vices					/2010				3/17/2	2010			eoprobe
WIU	nique W	ell No).	DNR	Well ID No.	Common Well Nan	ie Fi			ter Leve	el		e Elevai			Bo		Diameter
Local	Grid Or	rigin	[] (c	stimated:	· 🗆) or Bo	pring Location			Feet I			:	582.0 I Local C			ļ	2.1	inches
	Plane		243	,962 N	l, 2,616,829	DE S/C/N		Lat	!	<u> </u>	·		1.300011	3110 130	[] N	1		□ Е
	1/4	oſ	I	/4 of Se		T N, R		Long		0	*			Feet	ı 🗆 S			Feet [] W
Facili	ty ID				County Kewaunee		Cou	inty Co	de	Civil T Kew	own/Ci aunee	ity/or	Village					
Sar	nple		1		Rewaunce		131			Itewa				Soil	Prop	erties		
		10	-		Soil/	Rock Description												-
. ບູ	Length Att. & Recovered (in)	Blow Counts	Depth In Feet			Geologic Origin For					_		Compressive Strength	U		>		nts
Number and Type	gth	Ŭ *	di di		Ea	ach Major Unit			CS	Graphic Log	Well Diagram	PID/FID	Compress Strength	Moisture Content	Liquid	Plasticity Index	200	RQD/ Comments
	Ler	Blo	Del						S	Grap	Well	PIC	Str	≗ ⊙	Liquid	Plastic Index	P 2	\$ 5
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			8	E.O.	B. at 8 feet b	ogs.												
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		y that	the info	rmation o	on this form is	true and correct to the	hest of	my kn	owledg	ge.								
Signat	ure						MT, 14 Beau		rail N	1adison	W153	1717						608-831-4444 608-831-3334

07201DNR.GPJ WI DNR 2003.GDT 4/22/10

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

			2.22		Vastewater /Redevelopment	Waste Other	_						Pag	va 1	oſ	2
Facili	ty/Proje	ct Nan	ne			License/	Permit	/Monito	ring No	umbe	: :	Boring			01	
	waune													MI		
	_	-	Name o	f crew chief (first, last) a	and Firm	Date Dri	lling S	arted		Ī	Date Drill	ing Cor	npleted		Drill	ing Method
On		inviro		tal Services				/2010				3/17/2	2010			eoprobe
WU	nique W	ell No).	DNR Well ID No.	Common Well Name	Final Sta			el	Surf	ace Eleva		101	Во		Diameter
Local	Grid Oı	rigin	T (cs	stimated: 🔲) or Bo	ring Location 🛛	1	Feet l	VISI			583.0	Grid Lo		<u> </u>	2,1	inches
	Plane 1/4		243	,956 N, 2,616,948		La Long	t	0	†		D		□ N L □ S		ı	☐ E Feet □ W
Facili		<u> </u>		County	I IN, K	County Co		Civil T	own/C	ity/ o	– I r Village	1,00	د لیا ۵	,		rect () vv
	•			Kewaunee		31		Kewa		-	Ü					
Sai	nple											Soil	Prope	erties		
	it. & d (in)	mts	fcc1		Rock Description cologic Origin For						ive					o,
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet		ch Major Unit		CS	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	i ig	Plasticity Index	0	RQD/ Comments
Nur		Blo	Dep				S O	Grap Log		PID	Con	Noi Con	Liquid Limit	Plastic Index	P 200	
I CS	48 30		_	PEAT, dark brow frozen, soft.	vn to black (10YR	3/2),		12 11/2 N								
			<u> </u>					77 7								
			- -					24 24								
			2 	As above, no long	ger frozen - wet.			4 34								
			- - 3	Styrofoam cap ma	aterial present			71/ 7								
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2	48		4 4					2 24								
CS	30							77 77 77 77								i I
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4. 4.			-					0 0 0 0								
3 CS	48		8 	ŌRGANIC SIL	(OL), with shells	, dark										
(3)	48		- - ()	greenish gray (gle	eyì 4/l´), moist, soft											
								-3								
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i			- - 12					- E								
I herel	اــــــا by certif	y that		rmation on this form is t	rue and correct to the be	st of my kn	owleds	ie.		.		.l	1	<u> </u>		
Signa		- "		***************************************	Firm RM	T, Inc.	•			~~~~					Tel: 6	08-831-4444
					744	Heartland T	rail N	dadison.	WL 53	3717					Fax: 6	608-831-3334

	ng Numl	oer 	M.1	1F Use only as an attachment to Form 4400-	122.		Т					ge 2	oľ	2
Sa	mple										Prop	erties		
	1. &]	nts	Sect	Soil/Rock Description					avc					s
ver Vpe	h At	Cou	I II I	And Geologic Origin For Each Major Unit	S	1ic	am	Q.	orcss	inro ant	p .	city		nem
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Bach Major Office	uscs	Craphic	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
4 CS	48			No recovery from 12 - 16 feet bgs. Drillers reported very soft material.		_			<u> </u>					
CS	()			reported very soft material.		- G								
			-13											
			- 14		OL									
			- ' '											
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			16	E.O.B. at 16 feet bgs		-C. -								
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01/2														
4123														
3.GDT														
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M DN														
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WDNR SBL 1998 07201DNR,GPJ WIDNR 2003,GDT - 4/22/10														
WDA														23

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

	<u>Ro</u>		'astewater \square Redevelopment \square		te Manag r 🔲	ement										
										Page 1 of 1						
Facility/Project Na				Licens	License/Permit/Monitoring Number Boring Num											
Kewaunee M		ferew chief (first, last) ai	al Eins	Data I								M 1		ling Method		
-	: Name o	r crew enter (tirst, tast) at	JCI 1. 11.111	Date Drilling Started Date Dr							npicted	וויזכו	ing Method			
Toni Kapugi On-Site Envi			Io	12: 1	3/17			3/17/2010				Geoprobe				
WI Unique Well N	NO.	DNR Well ID No.	Common Well Na	me Final S	Final Static Water Level Surface Elev Feet MSL 582.0						ACT.	Bo	orchole Diameter			
Local Grid Origin		stimated: 🔲) or Bor	ing Location M		Local								2.1 inches			
State Plane		,953 N, 2,617,062			Lat				·			ı	ОЕ			
1/4 of		/4 of Section ,	T N, R	La	ng	0	1	I	:	Feet S				Feet 🗍 W		
Facility ID		County		County (Civil T	own/Ci	ty/ or	· Village				1000 123 11			
		Kewaunee		31		Kewa	aunee									
Sample				······································						Soil Properti						
જ (iii) જ		Soil/R	ock Description													
od (C	.F.C	And Ge						Sivo	Moisture Content	id			JIS			
Type Type Type Co	L L	Eac		CS	Nic.	ran	FID	pres			icity	_	l co			
Number and Type Length Att. & Recovered (in) Blow Counts	Depth in Fect		•		U S (Graphic Log	Well Diagram	PID/FID	Compressive Strength	fois	Liquid Limit	Plasticity Index	P 200	RQD/ Comments		
1 48 1	<u> </u>	PEAT, dark brow	n to black (LOY	′R 3/2)	+-	<u> </u>	> -	<u> </u>	S	20				<u> </u>		
CS 9.6	-	moist, soft.	ii to bluck (101	10 3/2),		4 11										
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w						12 11/2										
	- 2					77 7										
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						12 14										
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2 48		As above, wet.			7 77											
2 48 CS 30	-	713 400 70, 11 01.				711 71										
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	7 	ORGANIC SILT	(OL), with she	lls, dark												
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I hereby certify tha	t the infor	mation on this form is tru		e best of my	knowledg	ge.										
Signature				RMT, Inc.										508-831-4444		
I hereby certify that Signature				44 Heartland	l Trail A	ladison,	, WI 53	717		~~~~~			Fax: (508-831-3334		

07201DNR,GPJ WI DNR 2003.GDT 4/22/10

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

			R		Watershed/V Remediation			Waste Other	-	ement											
								1						Page I of I [Boring Number							
Facility/Project Name								License/	License/Permit/Monitoring Number								. ^				
Kewaunee Marsh Boring Drilled By: Name of crew chief (first, last) and Firm									Date Drilling Started Date Dril							M2A lling Completed Drilling Method					
Toni Kapugi									Date Drining Started 1941							ing completed (1997)					
On-	-Site E	nvir		ntal Servic		B: 10:	3/17/2010						3/17/2010 acc Elevation Born								
WI U	nique W	'ell No) <i>.</i>	DNR We		Final Static Water Level Surf Feet MSL						rface Elevation Bor 584.0 Feet MSL									
Local	Grid Or	ioin	(c	estimated: [1						cation	i	2.1 inches							
Local Grid Origin (estimated:) or Boring Location State Plane 244,040 N, 2,616,437 E S/C/N								La	l	G	1 			OH 130		1	Ов				
							N, R	Long	3	0	1			Fee	ι 🗒 s			Feet D W			
Facili	ıy ID				unty			1	County Code Civil Town/City/ or Village												
				K	ewaunee			31		Kewa	unee										
Sar	nple													Soil	Prope						
	Length Att. & Recovered (in)	S	ಶ		Soil/F	Rock Descr	ription						رو								
. ગ્ર	Att.	Blow Counts	Depth In Feet		And Geologic Origin F						-		Compressive Strength	ي		<u>></u>		nts			
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Number and Type	Len	Blo	Dep						N.S	Graphic Log	Well Diagram	PID/FID	Compress	Moisture Content	Liquid Limit	Plasticity Index	p 2(RQD/ Comments			
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			-	POOD	LY GRA		大野花														
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, i			-	ORGA	NIC SIL	L (OL), '	with shell	s, dark	OL	[-											
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			, , .	<u> </u>					L	<u> </u>	<u> </u>			}	ļ	<u> </u>					
	•	y that	the info	ormation on t	this form is t	rue and cor	1951		owledg	ge.								<u></u>			
Signat	urc							MT, Inc.	rast k	tadie:	Ma es	715						508-831-4444			
							/444	Heartland [*]	rian IV	raca5011	, w. 1. J.	111					rax.	508-831-3334			

07201DNR.GPJ WI DNR 2003.GDT 4/22/10

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

			Ro	watershed/Wastewa Remediation/Redev		Waste ? Other	-	ement										
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	y/Projec					License/Permit/Monitoring Number Boring Number												
	watine			ferew chief (first, last) and Fin	Date Dri	lling St	arted		Da	mg Completed Drilling Metho								
	ıi Kap	-	varne o	refer emer (1113), lasty and r in	Date Div	ining of	artec		154	Date Drilling Completed					Drining Wethou			
On	-Site E	inviro		tal Services			/2010			3/17/2010					Geoprobe			
WLU	nique W	'ell No		DNR Well ID No. Com	Final Static Water Level Sur Feet MSL					rface Elevation B 584.0 Feet MSL					Borchole Diameter			
Local	Grid Or	ioin	[~] (cs	stimated: []) or BoringLo	,	reet f	MSL	ļ	- :	584.U I Local C			2.1 inches					
	Plane	'5'''		,017 N, 2,616,449 E	Lat°					D N					ОЕ			
	1/4	of	1	/4 of Section , T	N, R	Long		·	·		" Feet \square S					Feet 🗍 W		
Facilit	y ID			County		County Code Civil Town/City/ or Village 31 Kewaunee												
- Sar	nple			Kewaunee		31	<u> </u>	Kewa	unee		1	Soil	Prope	ortiec				
341	7			Soil/Rock D	acquintion								TTOP	Tues				
	ររ. & d (in	ımts	Depth In Feet	And Geologic	•						sive	Moisture Content	pi.	Plasticity Index	ı	2		
ber ype	Length Att. & Recovered (in)	Con	Ξ	Each Maj	-		C S	hic	ram Lam	QI-	pres				0	men		
Number and Type	Suo?	Blow Counts)cpt				n s (Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plastic Index	P 200	RQD/ Comments		
CS	60			TOPSOIL.	,-		3 /2 3		<u> </u>	1 0 0)		<u> </u>						
CS	30		- - -	POORLY GRADED		/ /*	SP	<u> </u>		and and and and and and and and and and					i			
			- 1	unedium grained, light			2 24											
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SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Facilit	y/Projec	et Nam	ıc		License	/Permit	/Monitor	ing No	mher		Borine	Pag Numb		of]
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ignati	ire			Firm R	MT, Inc.						~~~~			11.51.7	508-831-44

gresult in forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable grinformation on this form is not intended to be be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent

SOIL BORING LOG INFORMATION

Form 44()()-122 Rev. 7-98

Facility/Project Name	<u> </u>			License/I	ormit/	'Monito	ring Nu	mber		Boring	Pag Numb	cı.	of	1
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I hereby certify that the Signature	ne information	on this form is tru	ie and correct to the be	st of my kn	owled	ge.				1			Tel	608-831-444
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SOIL BORING LOG INFORMATION

Form 4400-122

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ignat	ure	*			Firm RM	T, Inc.							***************************************		Tel: 6	508-8.31-44
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gresult in forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable ginformation on this form is not intended to be be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

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Signat	ure							T, Inc. Teartland	Frail N	Aadison	, WI 53	717						508-831-4444 508-831-3334

State of Wisconsin
Department of Natural Resources

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## SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

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## SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

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Signat	ure				•••••••••••••••••••••••••••••••••••••••		Firm RM	T, Inc.									Tel: (	
								Heartland	Frail N	1adison	<u>, WI 53</u>	<u> 3717</u>						508-831-3334

## SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

			Ro		astewater		_	ement								
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07201DNR.GPJ WI DNR 2003.GDT 4/22/10

# SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

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07201DNR.GPJ WI DNR 2003.GDT 4/22/10

# SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

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07201DNR.GPJ WI ONR 2003.GDT 4/22/10

# SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

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# SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

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							4 Heartland	Trail N	Madison	. WL51	3717						608-831-3334

Form 44()()-122A

Boring Number	M5	Use only as an attachment to Form 4400-1	22						Pag		of :	2
Sample								Soil	Prope	rties		
Number and Type Length Att. & Recovered (in) Blow Counts	Depth in Feet	Soil/Rock Description And Geologie Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
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07201DNR.GPJ WI DNR 2003.GDT 4/22/10

# SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

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							i , inc. feartland T	rail M	ladison,	, WI 53	3717							608-831-4444 608-831-3334

07201DNR,GPJ WIDNR 2003.GDT 4/22/10

# SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

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07201DNR.GPJ WI DNR 2003.GDT 4/22/10

# SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

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07201DNR,GP3 WLDNR 2003,GDT 4/22/10

# SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

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07201DNR.GPJ WI DNR 2003.GDT 4/22/10

# SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

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Signat	aire						Γ, Inc. leartland T	Frail N	4adison.	. WI 53	3717						508-831-4444 508-831-3334

# Attachment B Laboratory Reports



December 29, 2009

BOB STANFORTH RMT MADISON 744 Heartland Trail Madison, WI 537171934

RE: Project: 7201.10 KEWAUNEE MARSH

Pace Project No.: 4026525

#### Dear BOB STANFORTH:

Enclosed are the analytical results for sample(s) received by the laboratory on December 15, 2009. The results relate only to the samples included in this report. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

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

Sincerely,

Tod Noltemeyer

Tod holteneyor

tod.noltemeyer@pacelabs.com Project Manager

Enclosures

cc: ALEX GOERGEN, RMT - MADISON

4 age 10132







#### **CERTIFICATIONS**

7201.10 KEWAUNEE MARSH Project:

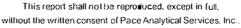
Pace Project No.: 4026525

Green Bay Certification IDs California Certification #: 09268CA Florida/NELAP Certification #: E87948 Illinois Certification #: 200050 Kentucky Certification #: 82 Louisiana Certification #: 04168 Minnesota Certification #: 055-999-334 New York Certification #: 11887

New York Certification #: 11888 North Carolina Certification #: 503 North Dakota Certification #: R-150 South Carolina Certification #: 83006001 Wisconsin Certification #: 405132750 Wisconsin DATCP Certification #: 105-444 1241 Bellevue Street Green Bay, WI 54302

REPORT OF LABORATORY ANALYSIS

Page 2 of 52







## **SAMPLE SUMMARY**

Project:

7201.10 KEWAUNEE MARSH

Pace Project No.: 4026525

Lab ID	Sample ID	Matrix	Date Collected	Date Received
4026525001	B1D-0-2'	Solid	12/10/09 13:00	12/15/09 08:55
4026525002	B1D-2-4'	Solid	12/10/09 13:00	12/15/09 08:55
4026525003	B1D-4-6'	Solid	12/10/09 13:00	12/15/09 08:55
4026525004	B1D-6-8'	Solid	12/10/09 13:00	12/15/09 08:55
4026525005	B1D-8-10'	Solid	12/10/09 13:00	12/15/09 08:55
4026525006	B1D-10-12'	Solid	12/10/09 13:00	12/15/09 08:55
4026525007	B1D-12-14'	Solid	12/10/09 13:00	12/15/09 08:55
4026525008	B1D-15-19'	Solid	12/10/09 13:00	12/15/09 08:55
4026525009	B1D-19-20'	Solid	12/10/09 13:00	12/15/09 08:55
4026525010	B1E-0-2'	Solid	12/10/09 13:00	12/15/09 08:55
4026525011	B1E-2-4'	Solid	12/10/09 13:00	12/15/09 08:55
4026525012	B1E-4-6'	Solid	12/10/09 13:00	12/15/09 08:55
4026525013	B1E-6-8'	Solid	12/10/09 13:00	12/15/09 08:55
4026525014	B1E-8-10'	Solid	12/10/09 13:00	12/15/09 08:55
4026525015	B1E-10-12'	Solid	12/10/09 13:00	12/15/09 08:55
4026525016	B1E-12-14'	Solid	12/10/09 13:00	12/15/09 08:55
4026525017	B1E-14-16'	Solid	12/10/09 13:00	12/15/09 08:55
<b>402652501</b> 8	B1E-16-19'	Solid	12/10/09 13:00	12/15/09 08:55
4026525019	B1E-19-20'	Solid	12/10/09 13:00	12/15/09 08:55
4026525020	B2A-0-2'	Solid	12/10/09 13:00	12/15/09 08:55
4026525021	B2A-2-4'	Solid	12/10/09 13:00	12/15/09 08:55
4026525022	B2A-4-6'	Solid	12/10/09 13:00	12/15/09 08:55
4026525023	B2A-6-8'	Solid	12/10/09 13:00	12/15/09 08:55
4026525024	B2A-8-10'	Solid	12/10/09 13:00	12/15/09 08:55
4026525025	B2A-10-12'	Solid	12/10/09 13:00	12/15/09 08:55
4026525026	B2A-12-14'	Solid	12/10/09 13:00	12/15/09 08:55
4026525027	B2A-14-15'	Solid	12/10/09 13:00	12/15/09 08:55
4026525028	B2B-0-2'	Solid	12/10/09 13:00	12/15/09 08:55
4026525029	B2B-2-4'	Solid	12/10/09 13:00	12/15/09 08: <b>5</b> 5
4026525030	B2B-4-6'	Solid	12/10/09 13:00	12/15/09 08:55
4026525031	B2B-6-8'	Solid	12/10/09 13:00	12/15/09 08:55
4026525032	B2B-8-10'	Solid	12/10/09 13:00	12/15/09 08:55
4026525033	B2B-10-12'	Solid	12/10/09 13:00	12/15/09 08:55
4026525034	B2B-12-15'	Solid	12/10/09 13:00	12/15/09 08:55
4026525035	B2B-15-19'	Solid	12/10/09 13:00	12/15/09 08:55
4026525036	B2B-19-20'	Solid	12/10/09 13:00	12/15/09 08:55
4026525037	B2C-0-2'	Solid	12/10/09 13:00	12/15/09 08:55

## REPORT OF LABORATORY ANALYSIS

Page 3 of 52





## **SAMPLE SUMMARY**

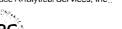
7201.10 KEWAUNEE MARSH Project:

Pace Project No.: 4026525

Lab ID	Sample ID	Matrix	Date Collected	Date Received
4026525038	B2C-2-4'	Solid	12/10/09 13:00	12/15/09 08:55
4026525039	B2C-4-6'	Solid	12/10/09 13:00	12/15/09 08:55
4026525040	B2C-6-8'	Solid	12/10/09 13:00	12/15/09 08:55
4026525041	B2C-8-10'	Solid	12/10/09 13:00	12/15/09 08:55
4026525042	B2C-10-12'	Solid	12/10/09 13:00	12/15/09 08:55
4026525043	B2C-12-14'	Solid	12/10/09 13:00	12/15/09 08:55
4026525044	B2C-14-20'	Solid	12/10/09 13:00	12/15/09 08:55
4026525045	B2D-0-2'	Solid	12/10/09 13:00	12/15/09 08:55
4026525046	B2D-2-4'	Solid	12/10/09 13:00	12/15/09 08:55
4026525047	B2D-4-6'	Solid	12/10/09 13:00	12/15/09 08:55
4026525048	B2D-6-8'	Solid	12/10/09 13:00	12/15/09 08:55
4026525049	B2D-8-10'	Solid	12/10/09 13:00	12/15/09 08:55
4026525050	B2D-10-12'	Solid	12/10/09 13:00	12/15/09 08:55
4026525051	B2D-12-14'	Solid	12/10/09 13:00	12/15/09 08:55
4026525052	B2D-14-15'	Solid	12/10/09 13:00	12/15/09 08:55
4026525053	B2D-15-17,5'	Solid	12/10/09 13:00	12/15/09 08:55
4026525054	B2D-17.5-20'	Solid	12/10/09 13:00	12/15/09 08:55
4026525055	B2D-20-25'	Solid	12/10/09 13:00	12/15/09 08:55
4026525056	B2E-0-2'	Solid	12/10/09 13:00	12/15/09 08:55
4026525057	B2E-2-4'	Solid	12/10/09 13:00	12/15/09 08:55
4026525058	B2E-4-6'	Solid	12/10/09 13:00	12/15/09 08:55
4026525059	B2E-6-8'	Solid	12/10/09 13:00	12/15/09 08:55
4026525060	B2E-8-10'	Solid	12/10/09 13:00	12/15/09 08:55
4026525061	B2E-10-13.8'	Solid	12/10/09 13:00	12/15/09 08:55
4026525062	B2E-13.8-15'	Solid	12/10/09 13:00	12/15/09 08:55
4026525063	B2E-20-23'	Solid	12/10/09 13:00	12/15/09 08:55
4026525064	B2E-23-25'	Solid	12/10/09 13:00	12/15/09 08:55
4026525065	B2F-0-2'	Solid	12/10/09 13:00	12/15/09 08:55
4026525066	B2F-2-4'	Solid	12/10/09 13:00	12/15/09 08:55
4026525067	B2F-4-6'	Solid	12/10/09 13:00	12/15/09 08:55
4026525068	B2F-6-8'	Solid	12/10/09 13:00	12/15/09 08:55
4026525069	B2F-8-10'	Solid	12/10/09 13:00	12/15/09 08:55
4026525070	B2F-10-12'	Solid	12/10/09 13:00	12/15/09 08:55
4026525071	B2F-12-13.8'	Solid	12/10/09 13:00	12/15/09 08:55
4026525072	B2F-13.8-15'	Solid	12/10/09 13:00	12/15/09 08:55
4026525073	B2F-15-16'	Solid	12/10/09 13:00	12/15/09 08:55
4026525074	B2F-16-20'	Solid	12/10/09 13:00	12/15/09 08:55

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## **SAMPLE SUMMARY**

Project: 7201.10 KEWAUNEE MARSH

Pace Project No.: 4026525

Pace Project No	5.: 4026525			
Lab ID	Sample ID	Matrix	Date Collected	Date Received
4026525075	B2F-23-25'	Solid	12/10/09 13:00	12/15/09 08:55
4026525076	B2F-25-30'	Solid	12/10/09 13:00	12/15/09 08:55
4026525077	B3D-0-2'	Solid	12/10/09 13:00	12/15/09 08:55
4026525078	B3D-2-4'	Solid	12/10/09 13:00	12/15/09 08:55
4026525079	B3D-4-6'	Solid	12/10/09 13:00	12/15/09 08:55
4026525080	B3D-6-8'	Solid	12/10/09 13:00	12/15/09 08:55
4026525081	B3D-8-10'	Solid	12/10/09 13:00	12/15/09 08:55
4026525082	B3D-10-12'	Solid	12/10/09 13:00	12/15/09 08:55
4026525083	B3D-12-14'	Solid	12/10/09 13:00	12/15/09 08:55
4026525084	B3D-14-16'	Solid	12/10/09 13:00	12/15/09 08:55
4026525085	B3E-0-2'	Solid	12/10/09 13:00	12/15/09 08:55
4026525086	B3E-2-4'	Solid	12/10/09 13:00	12/15/09 08:55
4026525087	B3E-4-6'	Solid	12/10/09 13:00	12/15/09 08:55
4026525088	B3E-6-8'	Solid	12/10/09 13:00	12/15/09 08:55
4026525089	B3E-8-10'	Solid	12/10/09 13:00	12/15/09 08:55
4026525090	B3E-10-12'	Solid	12/10/09 13:00	12/15/09 08:55
4026525091	B3E-12-14'	Solid	12/10/09 13:00	12/15/09 08:55
4026525092	B3E-14-16'	Solid	12/10/09 13:00	12/15/09 08:55
4026525093	B3E-16-20'	Solid	12/10/09 13:00	12/15/09 08:55
4026525094	B3E-20-25'	Solid	12/10/09 13:00	12/15/09 08:55
4026525095	M2D-0-2'	Solid	12/10/09 13:00	12/15/09 08:55
4026525096	M2D-2-4'	Solid	12/10/09 13:00	12/15/09 08:55
4026525097	M2D-4-6'	Solid	12/10/09 13:00	12/15/09 08:55
4026525098	M2D-6-8'	Solid	12/10/09 13:00	12/15/09 08:55
4026525099	M2D-8-10'	Solid	12/10/09 13:00	12/15/09 08:55
4026525100	M3D-0-2'	Solid	12/10/09 13:00	12/15/09 08:55
4026525101	M3D-2-4'	Solid	12/10/09 13:00	12/15/09 08:55
4026525102	M3D-4-6'	Solid	12/10/09 13:00	12/15/09 08:55
4026525103	M3D-6-8'	Solid	12/10/09 13:00	12/15/09 08:55
4026525104	M3D-8-10'	Solid	12/10/09 13:00	12/15/09 08:55
4026525105	M4D-0-5'	Solid	12/10/09 13:00	12/15/09 08:55
4026525106	M4D-5-7'	Solid	12/10/09 13:00	12/15/09 08:55
4026525107	M4D-7-10'	Solid	12/10/09 13:00	12/15/09 08:55
4026525108	M5D-0-5'	Solid	12/10/09 13:00	12/15/09 08:55
4026525109	M5D-5-7'	Solid	12/10/09 13:00	12/15/09 08:55
4026525110	M5D-7-10'	Solid	12/10/09 13:00	12/15/09 08:55

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Project:

7201.10 KEWAUNEE MARSH

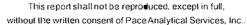
Pace Project No.: 4026525

Lab ID	Sample ID	Method	Analysts	Analytes Reported
4026525001	B1D-0-2'		DLB	1
		ASTM D2974-87	MRN	1
4026525002	B1D-2-4'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525003	B1D-4-6'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525004	B1D-6-8'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525005	B1D-8-10'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525006	B1D-10-12'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525007	B1D-12-14'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525008	B1D-15-19'	EPA <b>6</b> 010	DLB	1
		ASTM D2974-87	MRN	1
4026525009	B1D-19-20'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525010	B1E-0-2'	EPA6010	DLB	1
		ASTM D2974-87	MRN	1
4026525011	B1E-2-4'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525012	B1E-4-6'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525013	B1E-6-8'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525014	B1E-8-10'	EPA6010	DLB	1
		ASTM D2974-87	MRN	1
4026525015	B1E-10-12'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525016	B1E-12-14'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525017	B1E-14-16'	EPA 6010	DI_B	1
		ASTM D2974-87	MRN	1
4026525018	B1E-16-19'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525019	B1E-19-20'	EPA 6010	DLB	1

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Project:

7201.10 KEWAUNEE MARSH

Pace Project No.: 4026525

Lab ID	Sample ID	Method	Analysts	Analytes Reported
•		ASTM D2974-87	MRN	1
4026525020	B2A-0-2'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525021	B2A-2-4'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525022	B2A-4-6'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525023	B2A-6-8'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525024	B2A-8-10'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525025	B2A-10-12'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525026	B2A-12-14'	EPA6010	DLB	1
		ASTM D2974-87	MRN	1
4026525027	B2A-14-15'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525028	B2B-0-2'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525029	B2B-2-4'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525030	B2B-4-6'	EPA <b>6</b> 010	DLB	1
		ASTM D2974-87	MRN	1
4026525031	B2B-6-8'	EPA6010	DLB	1
		ASTM D2974-87	MRN	1
4026525032	B2B-8-10'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525033	B2B-10-12'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525034	B2B-12-15'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525035	B2B-15-19'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525036	B2B-19-20'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525037	B2C-0-2'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1

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Project:

7201.10 KEWAUNEE MARSH

Pace Project No.: 4026525

Lab ID	Sample ID	Method	Analysts	Analytes Reported
4026525038	B2C-2-4'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525039	B2C-4-6'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525040	B2C-6-8'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525041	B2C-8-10'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525042	B2C-10-12'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525043	B2C-12-14'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525044	B2C-14-20'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525045	B2D-0-2'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525046	B2D-2-4'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525047	B2D-4-6'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525048	B2D-6-8'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525049	B2D-8-10'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525050	B2D-10-12'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525051	B2D-12-14'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525052	B2D-14-15'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525053	B2D-15-17.5'	EPA 6010	DLB	1
		ASTM D2974-67	MRN	1
4026525054	B2D-17.5-20'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525055	B2D-20-25'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525056	B2E-0-2'	EPA 6010	DLB	1

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Project⁻

7201.10 KEWAUNEE MARSH

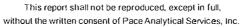
Pace Project No.: 4026525

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		ASTM D2974-87	MRN	1
4026525057	B2E-2-4'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525058	B2E-4-6'	EPA6010	DLB	1
		ASTM D2974-87	MRN	1
4026525059	B2E-6-8'	EPA 6 0 1 0	DLB	1
		ASTM D2974-87	MRN	1
4026525060	B2E-8-10'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
1026525061	B2E-10-13.8'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525062	026525062 B2E-13.8-15'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
1026525063	B2E-20-23'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
1026525064	B2E-23-25'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
026525065	B2F-0-2'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
026525066	B2F-2·4'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
026525067	B2F-4-6'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
026525068	B2F-6-8'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
<b>40265250</b> 69	B2F-8-10'	EPA6010	DLB	1
		ASTM D2974-87	MRN	1
4026525070	B2F-10-12'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
1026525071	B2F-12-13.8'	EPA6010	DLB	1
		ASTM D2974-87	MRN	1
1026525072	B2F-13.8-15'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525073	B2F-15-16'	E <b>P</b> A 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525074	B2F-16-20'	EPA 6010	DLB	1

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Project:

7201.10 KEWAUNEE MARSH

Pace Project No.: 4026525

Lab ID	Sample ID	Method	Analysts	Analytes Reported
4026525075	B2F-23-25'	EPA 6010		1
		ASTM D2974-87	MRN	1
4026525076	B2F-25-30'	EPA6010	DLB	1
		ASTM D2974-87	MRN	1
4026525077	B3D-0-2'	EPA6010	DLB	1
		ASTM D2974-87	MRN	1
4026525078	B3D-2-4'	EP <b>A 6</b> 0 1 0	DLB	1
		ASTM D2974-87	MRN	1
4026525079	B3D-4-6'	EPA6010	DLB	1
		ASTM D2974-87	MRN	1
4026525080	B3D-6-8'	EPA6010	DLB	1
		ASTM D2974-87	MRN	1
4026525081	B3D-8-10'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525082	B3D-10-12'	EPA6010	DLB	1
		ASTM D2974-87	MRN	1
4026525083	B3D-12-14'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525084	B3D-14-16'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525085	B3E-0-2'	EPA6010	DLB	1
		ASTM D2974-87	MRN	1
4026525086	B3E-2-4'	EPA 6010	DLB	1
		ASTM D297 <b>4</b> -87	MRN	1
4026525087	B3E-4-6'	EP <b>A</b> 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525088	B3E-6-8'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525089	B3E-8-10'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525090	B3E-10-12'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525091	B3E-12-14'	EPA6010	DLB	1
		ASTM D2974-87	MRN	1
4026525092	B3E-14-16'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525093	B3E-16-20'	EPA <b>6</b> 010	DLB	1

REPORT OF LABORATORY ANALYSIS

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Project:

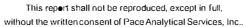
7201.10 KEWAUNEE MARSH

Pace Project No.: 4026525

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		ASTM D2974-87	MRN	1
4026525094	B3E-20-25'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525095	M2D-0-2'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525096	M2D-2-4'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525097	M2D-4-6'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525098	M2D-6-8'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525099	M2D-8-10'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525100	M3D-0-2'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
1026525101	M3D-2-4'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
1026525102	M3D-4-6'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
1026525103	M3D-6-8'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525104	M3D-8-10'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
1026525105	M4D-0-5'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
1026525106	M4D-5-7'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
1026525107	M4D-7-10'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
1026525108	M5D-0-5'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
1026525109	M5D-5-7'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1
4026525110	M5D-7-10'	EPA 6010	DLB	1
		ASTM D2974-87	MRN	1

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Project:

7201.10 KEWAUNEE MARSH

Pace Project No.:

4026525

Sample: B1D-0-2'

Lab ID: 4026525001

Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Matrix: Solid

Results reported on a "dry-we	eight" basis										
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual		
6010 MET ICP	Analytical	Analytical Method: EPA 6010 Preparation Method: EPA 3050									
Arsenic	<b>7.1</b> r	ng/kg	2.2	0.13	1	12/16/09 13:45	12/17/09 13:52	7440-38-2			
Percent Moisture	Analytical	Method: ASTN	л D2974-87								
Percent Moisture	14.7 %	<b>%</b>	0.10	0.10	1		12/18/09 08:01				
Sample: B1D-2-4'	Lab ID:	4026525002	Collected	12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid			
Results reported on a "dry-we	eight" basis										
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual		
6010 MET ICP	Analytical	Method: EPA	6010 Prepara	ation Meth	od: EPA	A 3050					
Arsenic	<b>105</b> n	ng/kg	2.1	0.12	1	12/16/09 13:45	12/17/09 13:56	7440-38-2			
Percent Moisture	Analytical	Method: ASTN	л D2974-87								
Percent Moisture	<b>12.8</b> % 0.10 0.10 1 12/18/09 08:01										
Sample: B1D-4-6' Results reported on a "dry-we		4026525003	Collected	12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid			
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual		
6010 MET ICP	Analytical	Method: EPA 6	6010 Prepara	ation Meth	od: EP <i>F</i>	A 3050					
Arsenic	<b>719</b> n	ng/kg	2.4	0.14	1	12/16/09 13:45	12/17/09 14:00	7440-38-2			
Percent Moisture	Analytical	Method: ASTN	и D2974-87								
Percent Moisture	20.2 %	6	0.10	0.10	1		12/18/09 08:01				
Sample: B1D-6-8'	Lab ID:	4026525004	Collected	12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid			
Results reported on a "dry-we	ight" basis										
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual		
6010 MET ICP	Analytical	Method: EPA 6	6010 Prepara	ation Meth	od: EPA	N3050					
Arsenic	<b>1850</b> n	ng/kg	2.7	0.15	1	12/16/09 13:45	12/17/09 14:04	7440-38-2			
	1850 mg/kg 2.7 0.15 1 12/16/09 13:45 12/17/09 14:04 7440-38-2  Analytical Method: ASTM D2974-87										
Percent Moisture	Analytical	Method: ASTM	1D2974-87								

Date: 12/29/2009 12:11 PM

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Project:

7201.10 KEWAUNEE MARSH

Pace Project No.: 4026525

Sample: B1D-8-10'

Lab ID: 4026525005

Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Matrix: Solid

ght" basis								
Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
Analytical	I Method: EPA 6	6010 Prepara	ation Meth	od: EPA	A3050			
<b>2160</b> mg/kg		8.3	0.48	1	12/16/09 13:45	12/17/09 14:08	7440-38-2	
Analytical	I Method: ASTM	1D2974-87						
75.9 %	%	0.10	0.10	1		12/18/09 08:01		
Lab ID:	4026525006	Collected	12/10/0	9 13:00	Received: 12/	1 <b>5</b> /09 08:55 Ma	atrix: Solid	
ht" basis								
Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
Analytical	I Method: EPA6	6010 Prepara	ation Meth	od: EPA	A3050			
1070 r	ng/kg	10.2	0.59	1	12/16/09 13:45	12/17/09 14:19	7440-38-2	
Analytical	I Method: ASTM	1 D2974-87						
80.8 %	%	0.10	0.10	1		12/18/09 08:02		
Lab ID:	4026525007	Collected	12/10/09	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
Analytical	Method: EPA 6	3010 Prepara	ition Meth	od: EPA	3050			
<b>151</b> n	ng/kg	4.3	0.25	1	12/16/09 13:45	12/17/09 14:23	7440-38-2	
Analytical	Method: ASTM	1 D2974-87						
53.4 %	%	0.10	0.10	1		12/18/09 08:02		
Lab ID:	4026525008	Collected	12/10/09	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
ght" basis								
Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
Analytical	Method: EPA 6	6010 Prepara	ation Meth	od: EPA	3050			
8 <b>6.4</b> n	ng/kg	4.4	0.25	1	12/16/09 13:45	12/17/09 14:27	7440-38-2	
	ng/kg I Method: ASTM		0.25	1	12/16/09 13:45	12/17/09 14:27	7440-38-2	
	Results  Analytica 2160 r Analytica 75.9 S  Lab ID: pht" basis  Results  Analytica 80.8 S  Lab ID: pht" basis  Results  Analytica 151 r Analytica 53.4 S  Lab ID: pht" basis  Results  Analytica	Results Units  Analytical Method: EPA 6 2160 mg/kg Analytical Method: ASTM 75.9 %  Lab ID: 4026525006 pht" basis  Results Units  Analytical Method: EPA 6 1070 mg/kg Analytical Method: ASTM 80.8 %  Lab ID: 4026525007 pht" basis  Results Units  Analytical Method: EPA 6 151 mg/kg Analytical Method: ASTM 53.4 %  Lab ID: 4026525008 pht" basis Results Units  Lab ID: 4026525008 pht" basis Results Units	Results Units LOQ  Analytical Method: EPA 6010 Prepara 2160 mg/kg 8.3  Analytical Method: ASTM D2974-87 75.9 % 0.10  Lab ID: 4026525006 Collected: htt" basis  Results Units LOQ  Analytical Method: EPA 6010 Prepara 1070 mg/kg 10.2  Analytical Method: ASTM D2974-87 80.8 % 0.10  Lab ID: 4026525007 Collected: htt" basis  Results Units LOQ  Analytical Method: EPA 6010 Prepara 151 mg/kg 4.3  Analytical Method: EPA 6010 Prepara 151 mg/kg 4.3  Analytical Method: ASTM D2974-87 53.4 % 0.10  Lab ID: 4026525008 Collected: htt" basis Results Units LOQ  Analytical Method: ASTM D2974-87 53.4 % 0.10	Results	Analytical Method: EPA 6010 Preparation Method: EPA 2160 mg/kg 8.3 0.48 1  Analytical Method: ASTM D2974-87  75.9 % 0.10 0.10 1  Lab ID: 4026525006 Collected: 12/10/09 13:00 pht" basis  Results Units LOQ LOD DF  Analytical Method: EPA 6010 Preparation Method: EPA 1070 mg/kg 10.2 0.59 1  Analytical Method: ASTM D2974-87  80.8 % 0.10 0.10 1  Lab ID: 4026525007 Collected: 12/10/09 13:00 pht" basis  Results Units LOQ LOD DF  Analytical Method: ASTM D2974-87  80.8 % 0.10 0.10 1  Lab ID: 4026525007 Collected: 12/10/09 13:00 pht" basis  Results Units LOQ LOD DF  Analytical Method: EPA 6010 Preparation Method: EPA 151 mg/kg 4.3 0.25 1  Analytical Method: ASTM D2974-87  53.4 % 0.10 0.10 1  Lab ID: 4026525008 Collected: 12/10/09 13:00 pht" basis  Results Units LOQ LOD DF	Results	Results	Results

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7201.10 KEWAUNEE MARSH Project: Pace Project No.: 4026525

Sample: B1D-19-20'	Lab ID:	4026525009	Collected	: 12/10/0	9 13:00	Received: 12/	15/09 08:55 M	atrix: Solid	
Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	Method: EPA	6010 Prepara	ation Meth	od: EPA	3050			
Arsenic	<b>4.6</b> m	ig/kg	2.4	0.14	1	12/16/0 <b>9</b> 13:45	12/17/09 14:32	7440-38-2	
Percent Moisture	Analytical	Method: ASTN	и D2 <b>9</b> 74-87						
Percent Moisture	16.2 %	ò	0.10	0.10	1		12/18/09 08:02		
Sample: B1E-0-2' Results reported on a "dry-w		4026525010	Collected	12/10/09	9 13:00	Received: 12/	15/09 08:55 M	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	Method: EPA	6010 Prepara	ation Meth	od: EPA	3050			
Arsenic	2.8 m	ıg/kg	2.2	0.13	1	12/16/09 13:45	12/17/09 13:36	7440-38-2	
Percent Moisture	Analytical	Method: ASTN	M D2974-87						
Percent Moisture	8.6 %	)	0.10	0.10	1		12/18/09 08:02		
Sample: B1E-2-4' Results reported on a "dry-w		4026525011	Collected	12/10/0	9 13:00	Received: 12/	15/09 08:5 <b>5</b> M	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	Method: EPA	6010 Prepara	ation Meth	od: EPA	3050			
Arsenic	35.4 m	ıg/kg	2.4	0.14	1	12/16/09 13:45	12/17/09 14:36	7440-38-2	
Percent Moisture	Analytical	Method: ASTN	и D2974-87						
Percent Moisture	17.8 %		0.10	0.10	1		12/18/09 08:02		
Sample: B1E-4-6' Results reported on a "dry-w		4026525012	Collected	l: 12/10/09	9 13:00	Received: 12/	15/09 08:55 M	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	Method: EPA		ation Meth	od: EPA	3050			
Arsenic	<b>49.9</b> m	ıg/kg	2.4	0.14	1	12/16/09 13:45	12/17/09 14:40	7440-38-2	
Percent Moisture	Analytical	Method: ASTN	и D2974-87						
Percent Moisture	18.0 %		0.10	0.10	1		12/18/09 08:03		

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Project:

7201.10 KEWAUNEE MARSH

Pace Project No.: 4026525

Sample: B1E-6-8'

Lab ID: 4026525013

Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Matrix: Solid

Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	l Method: EPA	6010 Prepar	ation Meth	nod: EP/	A3050			
Arsenic	<b>232</b> r	mg/kg	2.6	0.15	1	12/16/09 13:45	12/17/09 14:44	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	M D2974-87						
Percent Moisture	23.2	%	0.10	0.10	1		12/18/09 08:04		
Sample: B1E-8-10'	Lab ID:	4026525014	Collected	12/10/0	9 13:00	Received: 12/	/15/09 08:55 Ma	atrix: Solid	
Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	l Method: EPA	6010 Prepara	ation Meth	nod: EPA	A3050			
Arsenic	<b>932</b> r	mg/kg	8.6	0.50	1	12/16/09 13:45	12/17/09 14:48	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	и D2974-87						
Percent Moisture	77.5 %	%	0.10	0.10	1		12/18/09 08:04		
Sample: B1E-10-12' Results reported on a "dry-wa		4026525015	Collected	: 12/10/0	9 13:00	Received: 12/	/15/09 08:55 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	I Method: EPA 6		ation Meth	od: EPA	A 3050			
Arsenic	294 r	ng/kg	5.3	0.31	1	12/16/09 13:45	12/17/09 14:52	7440-38-2	
Percent Moisture	Analytical	l Melhod: ASTN	л D2974-87						
Percent Moisture	63.3 %	%	0.10	0.10	1		12/18/09 08:04		
Sample: B1E-12-14'	Lab ID:	4026525016	Collected	: 12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Results reported on a "dry-we	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	Method: EPA (	6010 Prepara	ation Meth	od: EPA	3050			
Arsenic	341 r	ng/kg	8.7	0.50	1	12/16/09 13:45	12/17/09 14:56	7440-38-2	
Percent Moisture	Analytical	Method: ASTN	и D2974-87						
D									

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Percent Moisture

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0.10

0.10

77.1 %

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Project:

7201.10 KEWAUNEE MARSH

Pace Project No.:

4026525

Sample: B1E-14-16'

Lab ID: 4026525017

Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Matrix: Solid

Results reported on a "dry-weight" basis

ght" basis											
Results	Units	LOQ _	LOD	DF	Prepared	Analyzed	CAS No.	Qual			
Analytica	I Method: EPA 6	6010 Prepar	ation Meth	od: EPA	3050	-					
<b>6.2</b> r	mg/kg	4.7	0.27	1	12/16/09 13:45	12/17/09 15:07	7440-38-2				
Analytica	I Method: ASTN	и D2974-87									
58.0	%	0.10	0.10	1		12/18/09 08:04					
Lab ID:	4026525018	Collected	d: 12/10/09	9 13:00	Received: 12/	115/09 08:55 Ma	atrix: Solid				
Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual			
Analytica	l Method: EPA 6	6010 Prepara	ation Meth	od: EPA	3050						
<b>3.4</b> J r	ng/kg	4.3	0.25	1	12/16/09 13:45	12/17/09 15:11	7440-38-2	В			
Analytica	I Method: ASTN	л D2974-87									
53.6 %	%	0.10	0.10	1		12/18/09 08:04					
Lab ID: ght" basis	4026525019	Collected	l: 12/10/09	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid				
Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual			
Analytica	l Method: EPA 6	6010 Prepara	alion Melh	od: EPA	\3050						
2.7 n	ng/kg	2.5	0.14	1	12/16/09 13:45	12/17/09 15:16	7440-38-2				
Analytical	Method: ASTM	1 D2974-87									
21.5 %	<b>%</b>	0.10	0.10	1		12/18/09 08:04					
Lab ID: ht" basis	4026525020	Collected	l: 12/10/09	9 13:00	Received: 12/	15/09 08:55 Ma	trix: Solid				
Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual			
Analytical	Melhod: EPA 6	6010 Prepara	ation Meth	od: EP <i>F</i>	3050						
3.8 n	ng/kg	2.1	0.12	1	12/16/09 14:00	12/17/09 15:35	7440-38-2				
Analytical	Method: ASTM	1 D2974-87									
130	<i>l</i>	0.10	0.10	1		12/18/09 08:04					
	Results  Analytica 58.0 G  Lab ID: ght" basis  Results  Analytica 3.4J r  Analytica 53.6 G  Lab ID: ght" basis  Results  Analytica 2.7 r  Analytica 21.5 G  Lab ID: ght" basis  Results  Analytica 3.8 r  Analytical 3.8 r	Results Units  Analytical Method: EPA ( 6.2 mg/kg  Analytical Method: ASTM 58.0 %  Lab ID: 4026525018  Analytical Method: EPA ( 3.4J mg/kg  Analytical Method: ASTM 53.6 %  Lab ID: 4026525019  Analytical Method: EPA ( 2.7 mg/kg  Analytical Method: ASTM 21.5 %  Lab ID: 4026525020  Analytical Method: ASTM 21.5 %  Lab ID: 4026525020  Analytical Method: EPA ( 3.8 mg/kg	Results Units LOQ  Analytical Method: EPA 6010 Prepar 6.2 mg/kg 4.7  Analytical Method: ASTM D2974-87 58.0 % 0.10  Lab ID: 4026525018 Collected and the basis  Results Units LOQ  Analytical Method: EPA 6010 Prepar 3.4 J mg/kg 4.3  Analytical Method: ASTM D2974-87 53.6 % 0.10  Lab ID: 4026525019 Collected and the basis  Results Units LOQ  Analytical Method: EPA 6010 Prepar 2.7 mg/kg 2.5  Analytical Method: ASTM D2974-87 21.5 % 0.10  Lab ID: 4026525020 Collected and the basis  Results Units LOQ  Analytical Method: ASTM D2974-87 21.5 % 0.10  Analytical Method: EPA 6010 Prepar 3.8 mg/kg 2.1  Analytical Method: EPA 6010 Prepar 3.8 mg/kg 2.1  Analytical Method: ASTM D2974-87	Results	Results	Results	Results	Results			

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Project:

7201.10 KEWAUNEE MARSH

Pace Project No.:

4026525

Sample: B2A-2-4'

Lab ID: 4026525021

Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Matrix: Solid

Sample: BZA-Z-4	Lab ID	4020020021	Collecte	u. 12/10/0	9 13.00	Received. 12	/ 13/09 00.33 W	atrix. Soliu		
Results reported on a "dry-w	eight" basis									
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual	
6010 MET ICP	Analytica	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	2.2	<b>2.2</b> mg/kg		0.11	1	12/16/09 14:00	12/17/09 15:55	7440-38-2		
Percent Moisture	Analytica	l Method: ASTN	M D2974-87							
Percent Moisture	3.0	%	0.10	0.10	1		12/18/09 08:04			
Sample: B2A-4-6'	Lab ID	: 4026525022	Collecte	d: 12/10/0	9 13:00	Received: 12	/15/09 08:55 M	atrix: Solid		
Results reported on a "dry-w	eight" basis									
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual	
6010 MET ICP	Analytica	al Method: EPA	6010 Prepa	ration Meth	nod: EPA	A 3050				
Arsenic	<b>30.9</b> mg/kg		2.1	0.12	1	12/16/09 14:00	12/17/09 15:59	7440-38-2		
Percent Moisture	Analytica	I Method: ASTN	и D2974-87							
Percent Moisture	6.3	%	0.10	0.10	1		12/18/09 08:05			
Sample: B2A-6-8' Results reported on a "dry-w		: 4026525023	Collecte	d: 12/10/0	9 13:00	Received: 12	/15/09 08:55 M	atrix: Solid		
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual	
6010 MET ICP	Analytica	Method: EPA	6010 Prepa	ration Meth	od: EP	A 3050	<u> </u>			
Arsenic	27.5	mg/kg	2.2	0.13	1	12/16/09 14:00	12/17/09 16:03	7440-38-2		
Percent Moisture	Analytica	al Method: ASTN	и D2974-87							
Percent Moisture	12.9	%	0.10	0.10	1		12/18/09 08:05			
Sample: B2A-8-10'	Lab ID:	: 4026525024	Collecte	d: 12/10/0	9 13:00	Received: 12/	/15/09 08:55 M	atrix: Solid		
Results reported on a "dry-w	eight" basis									
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual	
6010 MET ICP	Analytica	I Melhod: EPA	———— - 6010 Prepai	ration Meth	 od: EP#	- <del> </del>	_			
Arsenic	1.6J	mg/kg	2.3	0.13	1	12/16/09 14:00	12/17/09 16:07	7440-38-2		
Percent Moisture	Analytica	al Method: ASTN	и D2974-87							

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Percent Moisture

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0.10

0.10

12.6 %

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12/18/09 08:05





Project:

7201.10 KEWAUNEE MARSH

Pace Project No.: 4026525

Sample: B2A-10-12'

Lab ID: 4026525025

Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Matrix: Solid

Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	LOQ _	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	l Method: EPA	6010 Prepara	ation Meth	nod: EP <i>A</i>	A 3050			
Arsenic	2.4 1	mg/kg	2.4	0.14	1	12/16/09 14:00	12/17/09 16:11	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	M D2974-87						
Percent Moisture	17.6	%	0.10	0.10	1		12/18/09 08:05		
Sample: B2A-12-14'	Lab ID:	4026525026	Collected	: 12/10/0	9 13:00	Received: 12/	/15/09 08:55 Ma	atrix: Solid	
Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA	6010 Prepara	ation Meth	nod: EP <i>A</i>	A 3050			
Arsenic	7.1J r	mg/kg	7.3	0.42	1	12/16/09 14:00	12/17/09 16:15	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	и D <b>2</b> 974-87						
Percent Moisture	74.2	%	0.10	0.10	1		12/18/09 08:05		
Sample: B2A-14-15' Results reported on a "dry-w		4026525027	Collected	: 12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Parameters	Results -	Units	LOQ _	LOD	DF	Prepared	Analyzed ————	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA	6010 Prepara	ation Meth	od: EPA	3050			
Arsenic	2.9J r	mg/kg	4.1	0.24	1	12/16/09 14:00	12/17/09 16:19	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	и D2974-87						
Percent Moisture	56.2	%	0.10	0.10	1		12/18/09 08:05		
Sample: B2B-0-2' Results reported on a "dry-w		4026525028	Collected	12/10/09	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Parameters	Results	Units	LOQ _	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: IEPA (	6010 Prepara	ation Meth	od: EPA	3050			
Arsenic	9.5 r	ng/kg	2.0	0.12	1	12/16/09 14:00	12/17/09 16:23	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	л D2974-87						
Percent Moisture	3.3	%	0.10	0.10	1		12/18/09 08:05		

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Project:

7201.10 KEWAUNEE MARSH

Pace Project No.:

4026525

Sample: B2B-2-4' Lab ID: 4026525029 Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Matrix: Solid

Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA	6010 Prepara	ation Metl	nod: EP	A3050			
Arsenic	<b>527</b> r	mg/kg	2.1	0.12	1	12/16/09 14:00	12/17/09 16:27	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	и D2974-87						
Percent Moisture	5.8	%	0.10	0.10	1		12/18/09 08:05		
Sample: B2B-4-6'	Lab ID:	4026525030	Collected	l: 12/10/0	9 13:00	Received: 12/	15/09 08:55 M	atrix: Solid	
Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	I Method: EPA 6	6010 Prepara	ation Meth	nod: EPA	A 3050			
Arsenic	3830 r	mg/kg	2.1	0.12	1	12/16/09 14:00	12/17/09 16:31	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	л D2974-87						
Percent Moisture	7.4 %	%	0.10	0.10	1		12/18/09 08:06		
Sample: B2B-6-8' Results reported on a "dry-w		4026525031	Collected	l: 12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	I Method: EPA 6	6010 Prepara	ation Meth	nod: EPA	A 3050			
Arsenic	309 r	ng/kg	2.1	0.12	1	12/16/09 14:00	12/17/09 16:43	7440-38-2	
Percent Moisture	Analytical	Method: ASTM	1 D2974-87						
Percent Moisture	15.1 %	%	0.10	0.10	1		12/18/09 08:06		
Sample: B2B-8-10'		4026525032	Collected	: 12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	I Method: EPA 6	6010 Prepara	ation Meth	od: EP	A 3050			
Arsenic	343 r	ng/kg	2.3	0.13	1	12/16/09 14:00	12/17/09 16:47	7440-38-2	
Percent Moisture	Analytical	l Method: ASTN	1 D2974-87						
Percent Moisture	14.0 %	%	0.10	0.10	1		12/18/09 08:09		

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Project:

7201.10 KEWAUNEE MARSH

Pace Project No.: 4026525

Sample: B2B-10-12'

Lab ID: 4026525033

Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Matrix: Solid

Results reported on a "dry-weight" basis

Results reported on a "dry-weig	nt" basis											
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual			
6010 MET ICP	Analytica	l Method: EPA 6	6010 Prepara	ation Meth	nod: EPA	3050						
Arsenic	<b>240</b> r	ng/kg	2.3	0.13	1	12/16/09 14:00	12/17/09 16:50	7440-38-2				
Percent Moisture	Analytica	I Method: ASTN	л D2974-87									
Percent Moisture	15.5 %	%	0.10	0.10	1		12/18/09 08:09					
Sample: B2B-12-15' Results reported on a "dry-weig		4026525034	Collected	: 12/10/0	9 13:00	Received: 12/	115/09 08:55 Ma	atrix: Solid				
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual			
6010 MET ICP	Analytical	Method: EPA 6	3010 Prepara	ation Meth	od: EPA	N3050						
Arsenic	<b>140</b> n	ng/kg	4.3	0.25	1	12/16/09 14:00	12/17/09 16:55	7440-38-2				
Percent Moisture	Analytical	Analytical Method: ASTM D2974-87										
Percent Moisture	54.9 %	<b>%</b>	0.10	0.10	1		12/18/09 08:10					
Sample: B2B-15-19'		4026525035	Collected	12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid				
Results reported on a "dry-weig												
Parameters	Results -	Units	LOQ _	LOD	DF	Prepared	Analyzed	CAS No.	Qual			
6010 MET ICP	Analytical	Method: EPA 6	010 Prepara	ation Meth	od: EP <i>A</i>	3050						
Arsenic	8.7 n	ng/kg	4.0	0.23	1	12/16/09 14:00	12/17/09 16:59	7440-38-2				
Percent Moisture	Analytical	Method: ASTM	1 D <b>2</b> 974-87									
Percent Moisture	50.6 %	%	0.10	0.10	1		12/18/09 08:10					
Sample: B2B-19-20' Results reported on a "dry-weig		4026525036	Collected	: 12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid				
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual			
6010 MET ICP	— ———— – Analytical	Method: EPA 6	6010 Prepara	ation Meth	od: EP <i>F</i>	· 3050	-		•			
Arsenic	2.8 n	ng/kg	2.3	0.13	1	12/16/09 14:00	12/17/09 17:03	7440-38-2				

Date: 12/29/2009 12:11 PM

Percent Moisture Percent Moisture

## REPORT OF LABORATORY ANALYSIS

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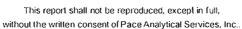
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Analytical Method: ASTM D2974-87

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Project:

7201.10 KEWAUNEE MARSH

Pace Project No.:

4026525

Sample: B2C-0-2'

Lab ID: 4026525037

Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	l Method: EPA	6010 Prepara	ation Meth	od: EP	<b>A</b> 3050			
Arsenic	<b>332</b> r	mg/kg	1.9	0.11	1	12/16/09 14:00	12/17/09 17:06	7440-38-2	
Percent Moisture	Analytica	l Method: AST	M D2974-87						
Percent Moisture	3.9 %	%	0.10	0.10	1		12/18/09 08:10		
Sample: B2C-2-4'	Lab ID:	4026525038	Collected	12/10/0	9 13:00	Received: 12/	/15/09 08:55 M	atrix: Solid	
Results reported on a "dry-we	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	l Method: EPA	6010 Prepara	ation Meth	od: EPA	A 3050			
Arsenic	804 r	<b>n</b> g/kg	1.9	0.11	1	12/16/09 14:00	12/17/09 17:11	7440-38-2	
Percent Moisture	Analytical	Melliod: AST	M D2974-87						
Percent Moisture	4.9	%	0.10	0.10	1		12/18/09 08:10		
Sample: B2C-4-6' Results reported on a "dry-wo		4026525039	Collected	12/10/0	9 13:00	Received: 12/	/15/09 08:55 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	Method: EPA	6010 Prepara	ition Meth	od: EPA	\3050			
Arsenic	<b>2880</b> r	ng/kg	2.0	0.11	1	12/16/09 14:00	12/17/09 17:15	7440-38-2	
Percent Moisture	Analytical	Method: ASTN	и D2974-87						
Percent Moisture	5.6 %	%	0.10	0.10	1		12/18/09 08:10		
Sample: B2C-6-8'	Lab ID:	4026525040	Collected	12/10/0	9 13:00	Received: 12/	/15/09 08: <b>55</b> Ma	atr'ıx: Solid	
Results reported on a "dry-wo	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	Method: EPA	6010 Prepara	ntion Meth	od: EPA	3050			
Arsenic	<b>996</b> n	ng/kg	2.3	0.14	1	12/16/09 14:25	12/17/09 17:38	7440-38-2	P6
Percent Moisture	Analytical	Method: ASTN	л D2974-87						

Date: 12/29/2009 12:11 PM

Percent Moisture

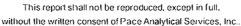
#### REPORT OF LABORATORY ANALYSIS

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Project:

7201.10 KEWAUNEE MARSH

Pace Project No.:

4026525

Sample: B2C-8-10' Lab ID: 4026525041 Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Matrix: Solid

Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	LOQ _	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA	6010 Prepara	ation Meth	od: EPA	A 3050			
Arsenic	1470 :	mg/kg	2.1	0.12	1	12/16/09 14:25	12/17/09 17:50	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	M D2974-87						
Percent Moisture	8.7 (	%	0.10	0.10	1		12/18/09 08:10		
Sample: B2C-10-12' Results reported on a "dry-wa		4026525042	Collected	: 12/10/0	9 13:00	Received: 12/	/15/09 08:55 Mi	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	ıl Method: EPA	6010 Prepara	ation Meth	od: EPA	A 3050	_		
Arsenic	1270 r	mg/kg	2.2	0.13	1	12/16/09 14: <b>2</b> 5	12/17/09 17:54	7440-38-2	
Percent Moisture	Analytica	l Method: ASTN	M D2974-87						
Percent Moisture	13.3 9	%	0.10	0.10	1		12/18/09 08:11		
Sample: B2C-12-14' Results reported on a "dry-w		4026525043	Collected	12/10/0	9 13:00	Received: 12/	/15/09 08:55 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA	6010 Prepara	ation Meth	od: EP	A3050	_		
Arsenic	9050 r	ng/kg	7.3	0.42	1	12/16/09 14:25	12/17/09 17:58	7440-38-2	
Percent Moisture	Analytica	l Method: ASTN	M D2974-87						
Percent Moisture	72.6	%	0.10	0.10	1		12/18/09 08:11		
Sample: B2C-14-20'	Lab ID:	4026525044	Collected	12/10/0	9 13:00	Received: 12/	/15/09 08:55 Ma	atrix: Solid	
Results reported on a "dry-we	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA	6010 Prepara	ation Meth	od: EPA	A 3050			
Arsenic	708 r	mg/kg	3.9	0.23	1	12/16/09 14:25	12/17/09 18:02	7440-38-2	
Percent Moisture	Analytica	l Method: ASTN	M D2974-87						

Date: 12/29/2009 12:11 PM

Percent Moisture

# REPORT OF LABORATORY ANALYSIS This report shall not be reproduced, except in full,

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Project: 7201.10 KEWAUNEE MARSH

Pace Project No.: 4026525

Sample: B2D-0-2' Lab ID: 4026525045 Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Matrix: Solid

Sample: B2D-0-2	Lab ID	: 4026525045	Collected	1: 12/10/0	9 13:00	Received: 12	/15/09 08:55 Ma	atrix: Solid	
Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	al Method: EPA	6010 Prepar	ation Meth	od: EPA	A 3050			
Arsenic	4.3	mg/kg	2.0	0.12	1	12/16/09 14: <b>2</b> 5	12/17/09 18:06	7440-38 <b>-2</b>	
Percent Moisture	Analytica	al Method: ASTN	и D2974-87						
Percent Moisture	6.7	%	0.10	0.10	1		12/18/09 08:11		
Sample: B2D-2-4'		: 4026525046	Collected	d: 12/10/0	9 13:00	Received: 12	/15/09 08:55 Ma	atrix: Solid	
Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	al Method: EPA	6010 Prepar	ation Meth	od: EPA	3050			
Arsenic	3.3	mg/kg	1.9	0.11	1	12/16/09 14:25	12/17/09 18:18	7440-38-2	
Percent Moisture	Analytica	al Method: ASTM	1 D2974-87						
Percent Moisture	2.3	%	0.10	0.10	1		12/18/09 08:11		
Sample: B2D-4-6'	Lab ID	4026525047	Collected	i: 12/10/0	9 13:00	Received: 12/	/15/09 08:55 Ma	atrix: Solid	
Results reported on a "dry-we	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	al Method: EPA 6	6010 Prepara	ation Meth	od: EPA	A 3050			
Arsenic	4.1	m <b>•</b> /kg	2.0	0.12	1	12/16/09 14: <b>2</b> 5	12/17/09 18:22	7440-38-2	
Percent Moisture	Analytica	I Method: ASTM	1 D2974-87						
Percent Moisture	5.7	%	0.10	0.10	1		12/18/09 08:11		
Sample: B2D-6-8'	Lab ID:	4026525048	Collected	1: 12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Results reported on a "dry-we	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	nl Method: EPA 6	3010 Prepara	ation Meth	od: EPA	3050			
Arsenic	1030	mg/kg	2.2	0.13	1	12/16/09 14:25	12/17/09 18:26	7440-38- <b>2</b>	
Percent Moisture	Analytica	al Method: ASTN	1 D2974-87						
Descent Mainture	40.4	0.4	0.40	0.40			10/11/0/100 0.0.11		

Date: 12/29/2009 12:11 PM

Percent Moisture

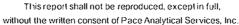
## **REPORT OF LABORATORY ANALYSIS**

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Project:

7201.10 KEWAUNEE MARSH

Pace Project No.: 4026525

Sample: B2D-8-10'

Lab ID: 4026525049

Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Matrix: Solid

Results reported on a "dry-we	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA	6010 Prepara	ation Meth	nod: EPA	3050			
Arsenic	<b>1420</b> r	mg/kg	2.1	0.12	1	12/16/09 14:25	12/17/09 18:30	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	и D2974-87						
Percent Moisture	12.8 %	%	0.10	0.10	1		12/18/09 08:11		
Sample: B2D-10-12'	Lab ID:	4026525050	Collected	l: 12/1 0/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Results reported on a "dry-we	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA	6010 Prepara	ation Meth	nod: EPA	N3050			
Arsenic	798 r	mg/kg	2.2	0.13	1	12/16/09 14:25	12/17/09 18:34	7440-38- <b>2</b>	
Percent Moisture	Analytical	I Method: ASTN	и D2974-87						
Percent Moisture	17.4 %	%	0.10	0.10	1		12/18/09 08:11		
Sample: B2D-12-14' Results reported on a "dry-we		4026525051	Collected	: 12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	I Method: EPA		ation Meth	nod: EPA	3050			-
Arsenic	533 r	ng/kg	2.1	0.12	1	12/16/09 14:25	12/17/09 18:38	7440-38-2	
Percent Moisture	Analytical	I Method: ASTN	и D2974-87						
Percent Moisture	13.9 %	%	0.10	0.10	1		12/18/09 08:11		
Sample: B2D-14-15'	Lab ID:	4026525052	Collected	: 12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Results reported on a "dry-we	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	Method: EPA 6	6010 Prepara	ation Meth	od: EPA	3050			
Arsenic	<b>2820</b> n	ng/kg	6.9	0.40	1	12/16/09 14:25	12/17/09 18:42	7440-38-2	
Percent Moisture	Analytical	I Method: ASTN	1 D2974-87						

Date: 12/29/2009 12:11 PM

Percent Moisture

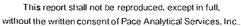
## REPORT OF LABORATORY ANALYSIS

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Project:

7201.10 KEWAUNEE MARSH

Pace Project No.:

4026525

Sample: B2D-15-17.5'

Lab ID: 4026525053

Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Matrix: Solid

Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	l Method: EPA	6010 Prepara	ation Meth	nod: EP	3050			
Arsenic	<b>1330</b> r	ng/kg	3.6	0.21	1	12/16/09 14:25	12/17/09 18:46	7440-38-2	
Percent Moisture	Analytica	l Method: ASTN	M D2974-87						
Percent Moisture	44.9 %	<b>%</b>	0.10	0.10	1		12/18/09 08:13		
Sample: B2D-17.5-20'	Lab ID:	4026525054	Collected	: 12/10/0	9 13:00	Received: 12/	/15/09 08: <b>55</b> Ma	atrix: Solid	
Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	Method: EPA	6010 Prepara	ation Meth	nod: EPA	3050			
Arsenic	81.5 r	ng/kg	2.4	0.14	1	12/16/09 14:25	12/17/09 18:50	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	M D2974-87						
Percent Moisture	24.7 %	<b>%</b>	0.10	0.10	1		12/18/09 08:13		
Sample: B2D-20-25' Results reported on a "dry-w		4026525055	Collected	: 12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	Method: EPA	6010 Prepara	ation Meth	nod: EPA	A3050			
Arsenic	<b>15.5</b> r	ng/kg	2.1	0.12	1	12/16/09 14:25	12/17/09 18:54	7440-38-2	
Percent Moisture	Analytical	Method: ASTN	и D2974-87						
Percent Moisture	9.7 %	%	0.10	0.10	1		12/18/09 08:13		
Sample: B2E-0-2'	Lab ID:	4026525056	Collected	: 12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	IMethod: EPA	6010 Prepara	ation Meth	nod: EPA	A 3050			
Arsenic	<b>2.6</b> n	ng/kg	1.9	0.11	1	12/16/09 14:25	12/17/09 19:06	7440-38-2	
Percent Moisture	Analytical	Method: ASTN	M D2974-87						
December Mainture	2.00	,	0.10	0.10	4		12/10/00 00:12		

Date: 12/29/2009 12:11 PM

Percent Moisture

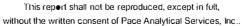
#### REPORT OF LABORATORY ANALYSIS

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Project:

7201.10 KEWAUNEE MARSH

Pace Project No.:

4026525

Sample: B2E-2-4'

Lab ID: 4026525057

Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	LOQ _	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	Method: EPA	6010 Prepara	ation Metho	od: EPA	3050			
Arsenic	1.5J n	ng/kg	2.0	0.11	1	12/16/09 14:25	12/17/09 19:10	7440-38-2	В
Percent Moisture	Analytical	Method: ASTI	M D2974-87						
Percent Moisture	4.2 %	<b>6</b>	0.10	0.10	1		12/18/09 08:13	<b>;</b>	
Sample: B2E-4-6'	Lab ID:	4026525058	Collected	: 12/10/09	13:00	Received: 12	/15/09 08: <b>5</b> 5 N	latrix: Solid	

Results reported on a "dry-weight" basis

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	al Method: EPA 6	6010 Prepara	ation Meth	od: EP	A3050			
Arsenic	112	mg/kg	2.1	0.12	1	12/16/09 14:25	12/17/09 19:14	7440-38-2	
Percent Moisture	Analytica	al Method: ASTN	и D2974-87						
Percent Moisture	6.2	%	0.10	0.10	1		12/18/09 08:13		
Sample: B2E-6-8'	Lab ID	: 4026525059	Collected	: 12/10/09	9 13:00	Received: 12/	15/09 08:55 M	atrix: Solid	
Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual

Parameters	Results Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method:	EPA 6010 Prepara	ition Metho	d: EPA	3050			
Arsenic	<b>100</b> mg/kg	2.3	0.13	1	12/16/09 14:25	12/17/09 19:18	7440-38-2	
Percent Moisture	Analytical Method:	ASTM D2974-87						
Percent Moisture	14.6 %	0.10	0.10	1		12/18/09 08:13		
Sample: B2E-8-10'	Lab ID: 4026525	i060 Collected:	12/10/09	13:00	Received: 12/	15/09 08: <b>5</b> 5 M	atrix: Solid	
Results reported on a "dry-wi	oight" basis							

Results reported on a "dry-weight" basis

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA3050								
Arsenic	<b>107</b> m	ng/kg	2.3	0.13	1	12/16/09 14:45	12/17/09 19:34	7440-38-2	<b>M</b> 0
Percent Moisture	Analytical	Method: ASTI	M D2974-87						
Percent Moisture	13.1 %	,	0.10	0.10	1		12/18/09 08:13		

Date: 12/29/2009 12:11 PM

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Project:

7201.10 KEWAUNEE MARSH

Pace Project No.: 4026525

Sample: B2E-10-13.8'

Lab ID: 4026525061

Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Matrix: Solid

Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA	6010 Prepa	ration Meth	nod: EPA	A 3050			
Arsenic	87.1	mg/kg	2.2	0.13	1	12/16/09 14:45	12/17/09 19:53	7440-38-2	
Percent Moisture	Analytica	Il Method: ASTN	M D2974-87						
Percent Moisture	10.1	%	0.10	0.10	1		12/18/09 08:14		
Sample: B2E-13.8-15'	Lab ID:	4026525062	Collecte	d: 12/10/0	9 13:00	Received: 12/	/15/09 08:55 M	atrix: Solid	
Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA	6010 Prepa	ration Meth	nod: EPA	₹ 3050	_		
Arsenic	324 1	mg/kg	7.7	0.44	1	12/16/09 14:45	12/17/09 19:58	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	м D2974-87						
Percent Moisture	75.2 9	%	0.10	0.10	1		12/18/09 08:14		
Sample: B2E-20-23' Results reported on a "dry-w		4026525063	Collecte	d: 12/10/0	9 13:00	Received: 12/	/15/09 08:55 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA		ration Meth	nod: EPA	A 3050	_		
Arsenic	86.5 r	mg/kg	5.0	0.29	1	12/16/09 14:45	12/17/09 20:02	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	M D29'74-87						
Percent Moisture	<b>62</b> .8 9	%	0.10	0.10	1		12/18/09 08:14		
Sample: B2E-23-25'		4026525064	Collecte	d: 12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Results reported on a "dry-we	eight" basis								
Parameters	Results	Units	LOQ _	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA 6	6010 Prepai	ration Meth	od: EPA	3050			
Arsenic	2.6 r	mg/kg	2.1	0.12	1	12/16/09 14:45	12/17/09 20:05	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	и D2974-87						

Date: 12/29/2009 12:11 PM

Percent Moisture

## REPORT OF LABORATORY ANALYSIS

0.10

0.10

12.4 %

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Project:

7201.10 KEWAUNEE MARSH

Pace Project No.:

4026525

Sample: B2F-0-2'

Lab ID: 4026525065

Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Matrix: Solid

Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	L.OQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA	6010 Prepara	ation Meth	od: EPA	A 3050			
Arsenic	<b>4.1</b> r	mg/kg	1.9	0.11	1	12/16/09 14:45	<b>12/17/</b> 09 <b>2</b> 0:10	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	и D2974-87						
Percent Moisture	2.7 %	%	0.10	0.10	1		12/18/09 08:14		
Sample: B2F-2-4'	Lab ID:	4026525066	Collected	: 12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Results reported on a "dry-we	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	Method: EPA	 6010 Prepara	ation Meth	od: EP	A 30 <b>5</b> 0			
Arsenic	<b>1.8</b> J r	mg/kg	2.0	0.11	1	12/16/09 14:45	12/17/09 20:14	7440-38-2	
Percent Moisture	Analytical	I Method: ASTN	и D2974-87						
Percent Moisture	4.8 %	%	0.10	0.10	1		12/18/09 08:14		
Sample: B2F-4-6' Results reported on a "dry-we		4026525067	Collected	: 12/10/0	9 13:00	Received: 12/	15/09 08: <b>55</b> Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	Method: EPA	6010 Pre <b>p</b> ara	ation Meth	od: EPA	3050			
Arsenic	21.8 n	ng/kg	2.0	0.11	1	12/16/09 14:45	12/17/09 20:18	7440-38-2	
Percent Moisture	Analytical	Method: ASTN	и D2974-87						
Percent Moisture	5.4 %	%	0.10	0.10	1		12/18/09 08:14		
Sample: B2F-6-8' Results reported on a "dry-we		4026525068	Collected	: 12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP									
Arsenic	68.1 n	l Method: EPA 6	2.1	o.12	00: EPA		12/17/09 20:22	7440 28 2	
Percent Moisture				0.12	'	12/10/09 14:45	12/1//09/20:22	1440-30-2	
	•	Method: ASTN		0.40	4		10/10/00 00:44		
Percent Moisture	10.5 %	<b>′</b> 0	0.10	0.10	1		12/18/09 08:14		

Date: 12/29/2009 12:11 PM

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Project: 7201.10 KEWAUNEE MARSH

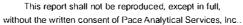
Pace Project No.: 4026525

Lab ID:	4026525069	Collected	: 12/10/0	3 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
eight" basis								
Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
Analytical	Method: EPA 6	3010 Prepara	ation Meth	od: EPA	3050			
<b>10.4</b> n	ng/kg	2.2	0.13	1	12/16/09 14:45	12/17/09 20:26	7440-38-2	
Analytical	Method: ASTM	1 D2974-87						
12.2 %	6	0.10	0.10	1		12/18/09 08:14		
Lab ID: eight" basis	4026525070	Collected	: 12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
Analytical	Method: EPA 6	6010 Prepara	ation Meth	od: EP <i>F</i>	\3050			
<b>11.8</b> n	ng/kg	2.2	0.13	1	12/16/09 14:45	12/17/09 20:30	7440-38-2	
Analytical	Method: ASTM	1 D2974-87						
15.6 %	6	0.10	0.10	1		12/18/09 08:14		
Lab ID: eight" basis	4026525071	Collected	: 12/10/09	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
Analytical	Method: EPA 6	6010 Prepara	ation Meth	od: EPA	3050			
<b>16.0</b> m	ng/kg	2.3	0.13	1	12/16/09 14:45	12/17/09 20:42	7440-38-2	
Analytical	Method: ASTM	1 D2974-87						
16.7 %	6	0.10	0.10	1		12/18/09 08:14		
Lab ID: eight" basis	4026525072	Collected	: 12/10/09	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
Analytical	Method: EPA 6	6010 Prepara	ation Meth	od: EPA	3050			
4.8J m	ng/kg	7.5	0.43	1	12/16/09 14:45	12/17/09 20:46	7440-38-2	
Analytical	Method: ASTM	1 D2974-87						
76.0 %	6	0.10	0.10	1		12/18/09 08:15		
	Results  Analytical 10.4 n Analytical 12.2 %  Lab ID: eight" basis  Results  Analytical 15.6 %  Lab ID: eight" basis  Results  Analytical 16.0 n Analytical 16.7 %  Lab ID: eight" basis  Results  Analytical Analytical Analytical Analytical Analytical Analytical Analytical Analytical Analytical Analytical Analytical Analytical Analytical Analytical	Results Units  Analytical Method: EPA 6  10.4 mg/kg  Analytical Method: ASTM 12.2 %  Lab ID: 4026525070  sight" basis  Results Units  Analytical Method: EPA 6  11.8 mg/kg  Analytical Method: ASTM 15.6 %  Lab ID: 4026525071  sight" basis  Results Units  Analytical Method: EPA 6  16.0 mg/kg  Analytical Method: ASTM 16.7 %  Lab ID: 4026525072  sight" basis  Results Units  Analytical Method: ASTM 16.7 %  Lab ID: 4026525072  sight" basis  Results Units  Analytical Method: EPA 6  4.8J mg/kg	Analytical Method: EPA 6010 Preparation of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the	Results	Results	Results Units LOQ LOD DF Prepared  Analytical Method: EPA 6010 Preparation Method: EPA 3050  10.4 mg/kg 2.2 0.13 1 12/16/09 14:45  Analytical Method: ASTM D2974-87  12.2 % 0.10 0.10 1  Lab ID: 4026525070 Collected: 12/10/09 13:00 Received: 12/16/10/10/14:45  Analytical Method: EPA 6010 Preparation Method: EPA 3050  11.8 mg/kg 2.2 0.13 1 12/16/09 14:45  Analytical Method: ASTM D2974-87  15.6 % 0.10 0.10 1  Lab ID: 4026525071 Collected: 12/10/09 13:00 Received: 12/16/10/10/10/10/10/10/10/10/10/10/10/10/10/	Results Units LOQ LOD DF Prepared Analyzed  Analytical Method: EPA 6010 Preparation Method: EPA 3050  10.4 mg/kg 2.2 0.13 1 12/16/09 14:45 12/17/09 20:26  Analytical Method: ASTM D2974-87  12.2 % 0.10 0.10 1 12/18/09 08:14  Lab ID: 4026525070 Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Might" basis  Results Units LOQ LOD DF Prepared Analyzed  Analytical Method: EPA 6010 Preparation Method: EPA 3050  11.8 mg/kg 2.2 0.13 1 12/16/09 14:45 12/17/09 20:30  Analytical Method: ASTM D2974-87  15.6 % 0.10 0.10 1 12/18/09 08:55 Might" basis  Results Units LOQ LOD DF Prepared Analyzed  Analytical Method: ASTM D2974-87  16.0 mg/kg 2.3 0.13 1 12/16/09 14:45 12/17/09 20:42  Analytical Method: ASTM D2974-87  16.7 % 0.10 0.10 1 12/18/09 08:55 Might" basis  Results Units LOQ LOD DF Prepared Analyzed  Analytical Method: ASTM D2974-87  16.7 % 0.10 0.10 1 12/18/09 08:14  Lab ID: 4026525072 Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Might" basis  Results Units LOQ LOD DF Prepared Analyzed  Analytical Method: ASTM D2974-87  16.7 % 0.10 0.10 1 12/18/09 08:14  Lab ID: 4026525072 Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Might" basis  Results Units LOQ LOD DF Prepared Analyzed  Analytical Method: EPA 6010 Preparation Method: EPA 3050  4.8J mg/kg 7.5 0.43 1 12/16/09 14:45 12/17/09 20:46  Analytical Method: ASTM D2974-87	Results

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Project:

7201.10 KEWAUNEE MARSH

Pace Project No.: 4026525

Sample: B2F-15-16' Lab ID: 4026525073

Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Matrix: Solid

Results reported on a "dry-we	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	l Method: EPA	6010 Prepara	ation Meth	od: EPA	3050			
Arsenic	37.5 ।	mg/kg	6.1	0.35	1	12/16/09 14:45	12/17/09 20:50	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	M D2974-87						
Percent Moisture	67.0	%	0.10	0.10	1		12/18/09 08:16		
Sample: B2F-16-20' Results reported on a "dry-we		4026525074	Collected	: 12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	l Method: EPA	6010 Prepara	alion Meth	od: EP	A3050			
Arsenic	2.6J ı	mg/kg	3.0	0.17	1	12/16/09 14:45	12/17/09 20:54	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	M D2974-87						
Percent Moisture	37.6	%	0.10	0.10	1		12/18/09 08:16		
Sample: B2F-23-25' Results reported on a "dry-we		4026525075	Collected	12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA (	6010 Prepara	ation Meth	od: EPA	\3050			
Arsenic	1.9J r	ng/kg	2.0	0.12	1	12/16/09 14:45	12/17/09 20:58	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	M D2974-87						
Percent Moisture	7.8 9	%	0.10	0.10	1		12/18/09 08:16		
Sample: B2F-25-30' Results reported on a "dry-we		4026525076	Collected:	12/10/09	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	Method: EPA	6010 Prepara	ation Meth	od: EPA	N3050			
Arsenic	<b>3.2</b> r	ng/kg	2.1	0.12	1	12/16/09 14:45	12/17/09 21:02	7440-38-2	
Percent Moisture	Analytica	Method: ASTM	л D2974-87						

Date: 12/29/2009 12:11 PM

Percent Moisture

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0.10

10.9 %

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12/18/09 08:16



1

0.10



Project: 7201.10 KEWAUNEE MARSH

Pace Project No.: 4026525

Sample: B3D-0-2' Lab ID: 4026525077 Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Matrix: Solid

Paramelers	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA	6010 Prepara	ation Meth	od: EP <i>A</i>	A 3050			
Arsenic	408 1	mg/kg	3.5	0.20	1	12/16/09 14:45	12/17/09 21:06	7440-38-2	
Percent Moisture	Analytica	l Method: ASTN	M D2974-87						
Percent Moisture	46.5	%	01.0	0.10	1		12/18/09 08:16		
Sample: B3D-2-4' Results reported on a "dry-we		4026525078	Collected	12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA 6	 6010 Prepara	ation Meth	od: EPA	3050			
Arsenic	11.8 г	mg/kg	2.2	0.13	1	12/16/09 14:45	12/17/09 21:10	7440-38-2	
Percent Moisture	Analytica	I Method: ASTM	1 D2974-87						
Percent Moisture	8.5 9	%	0.10	0.10	1		12/18/09 08:16		
Sample: B3D-4-6' Results reported on a "dry-wo		4026525079	Collected	12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	Method: EPA 6	6010 Prepara	ition Meth	od: EPA	\3050			
Arsenic	<b>14.9</b> r	ng/kg	2.1	0.12	1	12/16/09 14:45	12/17/09 21:14	7440-38-2	
Percent Moisture	Analytical	Method: ASTM	1 D2974-8 <b>7</b>						
Percent Moisture	13.5	<b>%</b>	0.10	0.10	1		12/18/09 08:16		
Sample: B3D-6-8' Results reported on a "dry-we		4026525080	Collected:	12/10/09	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	Method: EPA 6	3010 Prepara	ition Meth	od: EPA	3050			
Arsenic	<b>538</b> r	ng/kg	2.3	0.13	1	12/16/09 17:00	12/17/09 21:38	7440-38-2	P6
Percent Moisture	Analytica	I Method: ASTM	1 D2974-87						

Date: 12/29/2009 12:11 PM

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Project:

7201.10 KEWAUNEE MARSH

Pace Project No.:

4026525

Sample: B3D-8-10'

Lab ID: 4026525081

Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	LOQ _	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	Method: EPA	6010 Prepara	ation Meth	od: EPA	43050			
Arsenic	<b>21</b> 30 r	ng/kg	2.3	0.13	1	12/16/09 17:00	12/17/09 21:50	7440-38-2	
Percent Moisture	Analytical	Method: ASTI	M D2974-87						
Percent Moisture	17.5 %	<b>%</b>	0.10	0.10	1		12/18/09 08:16		
Sample: B3D-10-12'		4026525082	Collected	: 12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Results reported on a "dry-we	eignt" basis								
Parameters	Results	Units	LOQ _	LOD	DF_	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	Method: EPA	6010 Prepara	ation Meth	od: EPA	A 3050			
Arsenic	<b>1210</b> n	ng/kg	2.3	0.13	1	12/16/09 17:00	12/17/09 21:54	7440-38-2	
Percent Moisture	Analytical	Method: ASTN	и D2974-87						
Percent Moisture	18.4 %	6	0.10	0.10	1		12/18/09 08:17		
Sample: B3D-12-14' Results reported on a "dry-we		4026525083	Collected:	12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	Method: EPA	6010 Pre <b>p</b> ara	ation Meth	od: EPA	\3050			
Arsenic	<b>2030</b> n	ng/kg	7.9	0.46	1	12/16/09 17:00	12/17/09 21:58	7440-38-2	
Percent Moisture	Analytical	Method: ASTN	и D2974-87						
Percent Moisture	77.3 %	6	0.10	0.10	1		12/18/09 08:17		
Sample: B3D-14-16'	Lab ID:	4026525084	Collected:	12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Results reported on a "dry-we	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	Method: EPA		ation Meth	od: EP <i>R</i>	A3050			
Arsenic	759 n	ng/kg	4.7	0.27	1	12/16/09 17:00	12/17/09 22:02	7440-38-2	
Percent Moisture	Analytical	Method: ASTN	и D2974-87						

Date: 12/29/2009 12:11 PM

Percent Moisture

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0.10

0.10

59.4 %

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Project:

7201.10 KEWAUNEE MARSH

Pace Project No.:

4026525

Sample: B3E-0-2'

Lab ID: 4026525085

Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	Method: EPA	 6010 Prepara	ation Meth	od: EPA	3050			
Arsenic	<b>2.9</b> r	ng/kg	2.1	0.12	1	12/16/09 17:00	12/17/09 22:06	7440-38-2	
Percent Moisture	Analytical	Method: ASTN	и D2974-87						
Percent Moisture	8.9	<b>%</b>	0.10	0.10	1		12/18/09 08:17		
Sample: B3E-2-4'	Lab iD:	4026525086	Collected	: 12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	Method: EPA	6010 Prepara	ation Meth	od: EPA	3050			
Arsenic	<b>23.2</b> r	ng/kg	2.0	0.12	1	12/16/09 17:00	12/17/09 22:18	7440-38-2	
Percent Moisture	Analytica	Method: ASTN	л D2974-87						
Percent Moisture	9.9 %	6	0.10	0.10	1		12/18/09 08:17		
Sample: B3E-4-6' Results reported on a "dry-w		4026525087	Collected	12/10/09	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 METICP	Analytical	Method: EPA 6	 3010 Prepara	ation Meth	od: EP <i>F</i>	\3050			
Arsenic	33 <b>0</b> r	ng/kg	2.3	0.13	1	12/16/09 17:00	12/17/09 22:22	7440-38-2	
Percent Moisture	Analytical	Method: ASTM	1 D2974-87						
Percent Moisture	17.3 %	6	0.10	0.10	1		12/18/09 08:17		
Sample: B3E-6-8' Results reported on a "dry-w		4026525088	Collected:	12/10/09	9 13:00	Received: 12/	15/09 08:55 Ma	trix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	Method: EPA 6	6010 Prepara	ntion Meth	od: EPA	3050			
Arsenic	<b>249</b> n	ng/kg	2.2	0.13	1	12/16/09 17:00	12/17/09 22:26	7440-38-2	
Percent Moisture		Method: ASTM							

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Percent Moisture

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0.10

0.10

17.4 %

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Project:

7201.10 KEWAUNEE MARSH

Pace Project No.:

4026525

Sample: B3E-8-10' Lab ID: 4026525089 Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Matrix: Solid

Results reported on a "dry-wei	ight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA	6010 Prepara	ation Meth	nod: EPA	3050			
Arsenic	<b>151</b> r	mg/kg	2.3	0.13	1	12/16/09 17:00	12/17/09 22:30	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	и D297 <b>4-87</b>						
Percent Moisture	14.0 9	%	0.10	0.10	1		12/18/09 08:17		
Sample: B3E-10-12'	Lab ID:	4026525090	Collected	: 12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Results reported on a "dry-wei	ight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA	6010 Prepara	ation Meth	nod: EPA	3050			
Arsenic	927 r	mg/kg	5.5	0.32	1	12/16/ <b>0</b> 9 <b>17</b> :00	12/17/09 22:34	744 <b>0-</b> 38-2	
Percent Moisture	Analytica	I Method: ASTN	1 D2974-87						
Percent Moisture	66.8	%	0.10	0.10	1		12/18/09 08:17		
Sample: B3E-12-14' Results reported on a "dry-wei		4026525091	Collected	: 12/10/0	9 13:00	Received: 12/	/15/09 08:55 Ma	atrix: Solid	
Parameters	Results	Units	LOQ _	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA (	6010 Prepara	ation Meth	nod: EP <i>F</i>	3050			
Arsenic	582 r	mg/kg	9.5	0.55	1	12/16/09 17:00	12/17/09 22:38	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	D2974-87						
Percent Moisture	79.0 9	%	0.10	0.10	1		12/18/09 08:17		
Sample: B3E-14-16' Results reported on a "dry-wei		4026525092	Collected	: 12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	Method: EPA 6	6010 Prepara	ation Meth	nod: EPA	\3 <b>0</b> 50			
Arsenic	63.1 r	ng/kg	5.1	0.30	1	12/16/09 17:00	12/17/09 22:42	7440-38-2	
Percent Moisture	Analytical	Method: ASTN	1 D2974-8 <b>7</b>						
Percent Moisture	61.7 %	<b>%</b>	0.10	0.10	1		12/18/09 08:18		

Date: 12/29/2009 12:11 PM

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Project:

7201.10 KEWAUNEE MARSH

Pace Project No.:

4026525

Sample: B3E-16-20'

Lab ID: 4026525093

Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Matrix: Solid

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	ll Method: EPA	6010 Prepar	ation Meth	od: EPA	3050			
Arsenic	11.7	mg/kg	4.2	0.24	1	12/16/09 17:00	12/17/09 22:46	7440-38-2	
Percent Moisture	Analytica	I Method: AST	M D2974-87						
Percent Moisture	53.0	%	0.10	0.10	1		12/18/09 08:18		
Sample: B3E-20-25' Results reported on a "dry-w		4026525094	Collected	: 12/10/09	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	<del></del>
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA	6010 Prepara	ation Meth	od: EPA	3050			
Arsenic	2.9	ng/kg	2.3	0.13	1	12/16/09 17:00	12/17/09 22:50	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	и D2974-87						
Percent Moisture	15.4	%	0.10	0.10	1		12/18/09 08:19		
Sample: M2D-0-2' Results reported on a "dry-w		4026525095	Collected	: 12/10/09	9 13:00	Received: 12/	15/09 08:55 Ma	ntrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
Parameters 6010 MET ICP		Units  Il Method: EPA				· - · · · · · · · · · · · · · · · · · ·	Analyzed	CAS No.	Qual
6010 METICP	Analytica					3050	Analyzed 12/17/09 22:54		Qual
	Analytica	Il Method: EPA	6010 Prepara	ation Meth		3050	·		Qual
6010 MET ICP Arsenic Percent Moisture	Analytica	il Method: EPA mg/kg il Method: ASTN	6010 Prepara	ation Meth		3050	·		Qual
6010 MET ICP Arsenic Percent Moisture Percent Moisture	Analytica 454 Analytica 19.5	il Method: EPA mg/kg il Method: ASTN	2.4 A D2974-87 0.10	ation Meth	od: EPA	3050	12/17/09 22:54 12/18/09 08:19		Qual
6010 MET ICP Arsenic Percent Moisture Percent Moisture Sample: M2D-2-4'	Analytica 454 Analytica 19.5	il Method: EPAi mg/kg il Method: AS i N	2.4 A D2974-87 0.10	0.14 0.10	od: EPA	3050 12/16/09 17:00	12/17/09 22:54 12/18/09 08:19	7440-38-2	Qual
6010 MET ICP Arsenic Percent Moisture Percent Moisture Sample: M2D-2-4' Results reported on a "dry-w	Analytica 454 Analytica 19.5 Lab ID eight" basis	Il Method: EPA mg/kg Il Method: AS I N %	2.4 A D2974-87 0.10  Collected	0.14 0.10 0.10 0.10	od: EPA 1 1 9 13:00	3050 12/16/09 17:00 Received: 12/	12/17/09 22:54 12/18/09 08:19 15/09 08:55 Ma	7440-38-2 atrix: Solid	MINISTRAÇÃO
6010 MET ICP Arsenic Percent Moisture Percent Moisture  Sample: M2D-2-4' Results reported on a "dry-w Parameters	Analytica 454 Analytica 19.5 Lab ID eight" basis	Il Method: EPAI mg/kg Il Method: ASTM  4026525096  Units Il Method: EPAI	2.4 A D2974-87 0.10  Collected	0.14 0.10 0.10 0.10	od: EPA 1 1 9 13:00	3050 12/16/09 17:00 Received: 12/ Prepared	12/17/09 22:54 12/18/09 08:19 15/09 08:55 Ma	7440-38-2 atrix: Solid CAS No.	MINISTRAÇÃO

Date: 12/29/2009 12:11 PM

Percent Moisture

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0.10

0.10

71.1 %

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Project⁻

7201.10 KEWAUNEE MARSH

Pace Project No.:

4026525

Sample: M2D-4-6'

Lab ID: 4026525097

Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Matrix: Solid

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	l Method: EPA	6010 Prepa	ration Meth	od: EPA	A 3050			
Arsenic	<b>1930</b> r	mg/kg	9.3	0.54	1	12/16/09 17:00	12/17/09 23:10	7440-38-2	
Percent Moisture	Analytica	l Method: ASTI	M D2974-87						
Percent Moisture	78.6	%	0.10	0.10	1		12/18/09 08:19		
Sample: M2D-6-8'	Lab ID:	4026525098	Collecte	d: 12/10/09	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Sample: M2D-6-8' Results reported on a "dry-w		4026525098	Collecte	d: 12/10/09	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
•		4026525098 Units	Collecte	d: 12/10/09	9 13:00 DF	Received: 12/	15/09 08:55 Ma	etrix: Solid  CAS No.	Qual
Results reported on a "dry-w Parameters	reight" basis  Results		LOQ	LOD	DF	Prepared			Qual
Results reported on a "dry-w	reight" basis  Results	Units I Method: EPA	LOQ	LOD	DF	Prepared		CAS No.	Qual
Parameters 6010 MET ICP	Results Analytica	Units I Method: EPA	LOQ 6010 Prepar 10.5	LOD ration Meth	DF	Prepared A 3050	Analyzed	CAS No.	Qual
Parameters  6010 MET ICP  Arsenic	Results Analytica	Units I Method: EPA ng/kg I Method: ASTN	LOQ 6010 Prepar 10.5	LOD ration Meth	DF	Prepared A 3050	Analyzed	CAS No.	Qual

Parameters	Results U	nits LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Meth	od: EPA 6010 Prep	aration Meth	od: EPA	A 3050			
Arsenic	63 <b>3</b> mg/kg	6.1	0.35	1	12/16/09 17:00	12/17/09 23:18	7440-38-2	
Percent Moisture	Analytical Meth	od: ASTM D2974-87	•					
Percent Moisture	67.4 %	0.10	0.10	1		12/18/09 08:19		
Sample: M3D-0-2'	Lab ID: 4020	3525100 Collect	ed: 12/10/0	9 13:00	Received: 12	/15/09 08:55 Ma	atrix: Solid	

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual		
6010 MET ICP	Analytical Method. EPA 6010 Preparation Method: EPA 3050										
Arsenic	<b>2310</b> m	ng/kg	4.6	0.26	1	12/16/09 17:00	12/17/09 11:57	7440-38-2	P6,R1		
Percent Moisture	Analytical	Method: AST	M D2974-87								
Percent Moisture	56.5 %	ó	0.10	0.10	1		12/18/09 08:19				

Dato: 12/29/2009 12:11 PM

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Project:

7201.10 KEWAUNEE MARSH

Pace Project No.:

4026525

Sample: M3D-2-4'

Lab ID: 4026525101

Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Matrix: Solid

Results reported on a "dry-weight" basis

Results reported on a "dry-we									
Parameters	Results	Units		LOD DF		Prepared	Analyzed ————	CAS No.	Qual
6010 MET ICP	Analytica	l Method: EPA	6010 Prepara	ation Meth	od: EPA	A30 <b>5</b> 0			
Arsenic	3800 r	mg/kg	10.6	0.61	1	12/16/09 17:00	12/17/09 12:08	7440-38-2	
Percent Moisture	Analytica	M D2974-87							
Percent Moisture	82.3	82.3 %			1		12/18/09 08:19		
Sample: M3D-4-6' Lab ID: 402652510			Collected	: 12/10/0	9 13:00	Received: 12/	atrix: Solid		
Results reported on a "dry-we	eight" basis								
Parameters	Results	Results Units			DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	l Method: EPA	6010 Prepara	ation Meth	od: EPA	3050			
Arsenic	2450 ı	mg/kg	9.4	0.55	1	12/16/09 17:00	12/17/09 12:12	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	и D2974-87						
Percent Moisture	78.8 %		0.10	0.10	1		12/18/09 08:20		
Sample: M3D-6-8' Results reported on a "dry-we		4026525103	Collected	: 12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	trix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA 6		ation Meth	od: EPA	√3050			
Arsenic	1610 r	ng/kg	7.9	0.46	1	12/16/09 17:00	12/17/09 12:16	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	л D2974-87						
Percent Moisture	75.7 9	%	0.10	0.10 0.10 1			12/18/09 08:20		
Sample: M3D-8-10'	Lab ID:	4026525104	Collected	: 12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	ıtrix: Solid	
Results reported on a "dry-we	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA 6	6010 Prepara	ation Meth	od: EPA	3050			
Arsenic	654 r	ng/kg	6.0	0.35	1	12/16/09 17:00	12/17/09 12:20	7440-38-2	
Percent Moisture	Analytical Method: ASTM D2974-87								

Date: 12/29/2009 12:11 PM

Percent Moisture

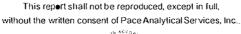
#### REPORT OF LABORATORY ANALYSIS

0.10

0.10

67.1 %

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Project:

7201.10 KEWAUNEE MARSH

Pace Project No.:

4026525

Sample: M4D-0-5' Lab ID: 4026525105 Collect

Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Matrix: Solid

Parameters	Results	Units	LOQ _	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA 6	6010 Prepara	ation Meth	od: EPA	3050			
Arsenic	1850 r	<b>1850</b> mg/kg			1	12/16/09 17:00	12/17/09 12:24	7440-38-2	
Percent Moisture	Analytica	л D2974-87							
Percent Moisture	53.5	53.5 %			1		12/18/09 08:20		
Sample: M4D-5-7' Results reported on a "dry-we		4026525106	Collected	: 12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA6	6010 Prepara	ation Meth	od: EPA	\3050			-
Arsenic	4770 r	ng/kg	11.6	0.67	1	12/16/09 17:00	12/17/09 12:28	7440-38-2	
Percent Moisture	Analytical	Method: ASTM	1 D2974-87						
Percent Moisture	84.5 %		0.10	0.10	1		12/18/09 08:20		
Sample: M4D-7-10' Results reported on a "dry-we		4026525107	Collected	12/10/0	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	Method: EPA 6	6010 Prepara	ation Meth	od: EP <i>F</i>	3050			
Arsenic	628 r	ng/kg	5.7	5.7 0.33		12/16/09 17:00	12/17/09 12:32	7440-38-2	
Percent Moisture	Analytical	l Melliod: ASTM	1 D2974-87						
Percent Moisture	67.9 %	<b>%</b>	0.10	0.10 1			12/18/09 08:20		
Sample: M5D-0-5'		4026525108	Collected	12/10/09	9 13:00	Received: 12/	15/09 08:55 Ma	atrix: Solid	
Results reported on a "dry-we	eignt basis								
Parameters	Results	Units	LOQ _	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	Method [,] EPA 6	010 Prepara	ition Meth	od: EPA	\3050			
Arsenic	4960 n	ng/kg	8.7	8.7 0.51 1		12/16/09 17:00	12/17/09 13:00	7440-38-2	
Percent Moisture	Analytical	Method: ASTM	1 D2974-87						
	Moisture 77.7 %		0.10	0.10	1		12/18/09 08:20		

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Project:

7201.10 KEWAUNEE MARSH

Pace Project No.: 4026525

Percent Moisture

Sample: M5D-5-7'

Lab ID: 4026525109

68.8 %

Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Matrix: Solid

12/18/09 08:20

Parameters	Results	Results Units		LOD	DF	Prepared	Analyzed	CAS No.	Qual	
6010 MET ICP	Analytica	I Method: EPA6	3010 Prepai	ation Meth	od: EP	A3050				
Arsenic	7300 r	7300 mg/kg			1	12/16/09 17:00	12/17/09 13:04	7440-38-2		
Percent Moisture	Analytical Method: ASTM D2974-87									
Percent Moisture	87.9	%	0.10	0.10	1		12/18/09 08:20			
Sample: M5D-7-10'	Lab ID: 4026525110 Collected: 12/10/09 13:00 Received: 12/15/09 08:55 Matrix: Sc									
Results reported on a "dry-w	eight" basis									
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual	
6010 MET ICP	Analytica	I Method: EPA6	010 Prepar	ation Meth	od: EP	A3050				
Arsenic	500 r	500 mg/kg		0.35	1	12/16/09 17:00	12/17/09 13:08	7440-38-2		

0.10

0.10

Date: 12/29/2009 12:11 PM

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Project:

7201.10 KEWAUNEE MARSH

Pace Project No.:

4026525

QC Batch:

MPRP/3476

Analysis Method:

EPA 6010

QC Batch Method:

EPA 3050

Analysis Description:

6010 MET

Associated Lab Samples:

4026525019, 4026525010, 4026525011, 4026525012, 4026525013, 4026525014, 4026525015, 4026525016,

4026525017, 4026525018, 4026525019

METHOD BLANK: 246938

Matrix: Solid

Associated Lab Samples:

4026525001, 4026525002, 4026525003, 4026525004, 4026525005, 4026525006, 4026525007, 4026525008, 4026525009, 4026525010, 4026525011, 4026525012, 4026525013, 4026525014, 4026525015, 4026525016,

4026525017, 4026525018, 4026525019

Blank

Reporting Limit

Parameter

Units

Units

Result

Analyzed

Qualifiers

Arsenic

Arsenic

mg/kg

0.19J

2.0 12/17/09 13:20

LABORATORY CONTROL SAMPLE:

Parameter

246939

Units

mg/kg

Spike Conc

LCS Result

LCS % Rec % Rec Limits

50 49.8 100 80-120 mg/kg

MATRIX SPIKE & MATRIX SPIKE DUPLICATE:

246940

2.8

Result

MS 4026525010 Spike

MSD

246941 MS

55.7

MSD

MS

MSD % Rec

% Rec Limits

Max RPD RPD Qual

Parameter Arsenic

Conc.

54.7

Spike Conc.

54.7

Result

Result

56.7

% Rec

97

98

Qualifiers

75-125 2 20





Project:

7201.10 KEWAUNEE MARSH

Pace Project No.:

4026525

QC Batch:

MPRP/3477

Analysis Method:

EPA 6010

QC Batch Method:

EPA 3050

Analysis Description:

6010 MET

Associated Lab Samples:

4026525020, 4026525021, 4026525022, 4026525023, 4026525024, 4026525025, 4026525026, 4026525027, 4026525028, 4026525029, 4026525030, 4026525031, 4026525032, 4026525033, 4026525034, 4026525035,

4026525036, 4026525037, 4026525038, 4026525039

METHOD BLANK: 246942

Matrix: Solid

Associated Lab Samples:

4026525020, 4026525021, 4026525022, 4026525023, 4026525024, 4026525025, 4026525026, 4026525027, 4026525028, 4026525029, 4026525030, 4026525031, 4026525032, 4026525033, 4026525034, 4026525035,

4026525036, 4026525037, 4026525038, 4026525039

Blank

Reporting

Parameter

Units

Units

Result

Limit Analyzed Qualifiers

Arsenic

mg/kg

< 0.12

12/17/09 15:27 2.0

LABORATORY CONTROL SAMPLE:

Parameter

246943

Units

mg/kg

Spike Conc.

LCS Result

LCS % Rec % Rec Limits

Qualifiers

Arsenic 50 49.2 98 mg/kg

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 246944

MSD

52.2

MS

MSD

MS

MSD

% Rec

Max

Qual

Parameter

Spike Conc

MS Result

55.4

246945

99

80-120

RPD RPD

Arsenic

Result 3.8

4026525020

Spike Conc 52.2

Result 56.2 % Rec

% Rec 100 Limits 75-125

20





Project:

QC Batch:

7201.10 KEWAUNEE MARSH

Pace Project No.:

4026525

MPRP/3478

Analysis Method:

EPA 6010

QC Batch Method:

EPA 3050

Analysis Description:

6010 MET

Associated Lab Samples:

4026525040, 4026525041, 4026525042, 4026525043, 4026525044, 4026525045, 4026525046, 4026525047,

4026525048, 4026525049, 4026525050, 4026525051, 4026525052, 4026525053, 4026525054, 4026525055,

4026525056, 4026525057, 4026525058, 4026525059

METHOD BLANK: 247057

Matrix: Solid

Associated Lab Samples:

4026525040, 4026525041, 4026525042, 4026525043, 4026525044, 4026525045, 4026525046, 4026525047, 

4026525056, 4026525057, 4026525058, 4026525059

Blank Result

Reporting

Parameter

Units

Limit

Qualifiers

80-120

Arsenic

mg/kg

0.16J

2.0 12/17/09 17:30

Analyzed

100

LABORATORY CONTROL SAMPLE:

247058

Spike

LCS

LCS

% Rec

Parameter

Units

mg/kg

Units

mg/kg

Conc.

Result 50.2 % Rec

Limits

Qualifiers

MATRIX SPIKE & MATRIX SPIKE DUPLICATE:

247059

50

MSD

247060

1040

MS

MSD

% Rec

Max

Qual

Parameter Arsenic

Arsenic

4026525040 Result

996

MS Spike

58.8

Spike Conc. Conc.

MS Result

58.7

MSD Result

967

% Rec

82

% Rec

-49

Limits 75-125 RPD RPD

8 20 P6





Project:

7201.10 KEWAUNEE MARSH

Pace Project No.:

4026525

QC Batch:

MPRP/3479

Analysis Method:

EPA6010

QC Batch Method:

EPA 3050

Analysis Description:

6010 MET

Associated Lab Samples:

4026525060, 4026525061, 4026525062, 4026525063, 4026525064, 4026525065, 4026525066, 4026525067, 4026525068, 4026525069, 4026525070, 4026525071, 4026525072, 4026525073, 4026525074, 4026525075,

4026525076, 4026525077, 4026525078, 4026525079

METHOD BLANK: 247061

Matrix: Solid

Associated Lab Samples:

4026525060, 4026525061, 4026525062, 4026525063, 4026525064, 4026525065, 4026525066, 4026525067, 4026525068, 4026525069, 4026525070, 4026525071, 4026525072, 4026525073, 4026525074, 4026525075,

4026525076, 4026525077, 4026525078, 4026525079

Blank

Reporting

Parameter

Units

Units

4026525060

Result

107

Result

Limit

Qualifiers

Arsenic

mg/kg

0.12J

2.0 12/17/09 19:26

Analyzed

99

LABORATORY CONTROL SAMPLE:

MATRIX SPIKE & MATRIX SPIKE DUPLICATE:

247062

Spike

LCS

LCS % Rec % Rec

Parameter

Units

mg/kg

mg/kg

Conc.

Result 49.7

Limits

Qualifiers

MSD

247064 MS Result

185

MSD

219

MSD

135

80-120

% Rec

75-125

Max

RPD RPD Qual

Parameter Arsenic

Arsenic

Conc.

MS Spike

57.4

50

Spike Conc.

57.4

Result

MS % Rec

% Rec

196

Limits

17 20 M0





Project:

7201.10 KEWAUNEE MARSH

Pace Project No.:

4026525

QC Batch:

MPRP/3480

Analysis Method:

EPA 6010

QC Batch Method:

EPA 3050

Analysis Description:

6010 MET

Associated Lab Samples:

4026525088, 4026525089, 4026525090, 4026525091, 4026525092, 4026525093, 4026525094, 4026525095,

4026525096, 4026525097, 4026525098, 4026525099

METHOD BLANK: 247065

Matrix: Solid

Associated Lab Samples:

4026525080, 4026525081, 4026525082, 4026525083, 4026525084, 4026525085, 4026525086, 4026525087, 4026525088, 4026525089, 4026525090, 4026525091, 4026525092, 4026525093, 4026525094, 4026525095,

4026525096, 4026525097, 4026525098, 4026525099

Blank

Reporting

Parameter

Units

Units

4026525080

Result

538

Result

Limit

Analyzed

Qualifiers

Arsenic

mg/kg

< 0.12

2.0 12/17/09 21:30

LABORATORY CONTROL SAMPLE:

Parameter

247066

Units

mg/kg

Spike Conc.

LCS Result

LCS % Rec % Rec Limits

Qualifiers

50 51.1 102 mg/kg 80-120

MATRIX SPIKE & MATRIX SPIKE DUPLICATE:

247067

MSD

247068

MSD

MS MSD

% Rec

Max

Qual

MS Spike

56.6

Spike

MS Result

% Rec

Limits

RPD RPD

Parameter Arsenic

Arsenic

Conc

Conc. 56.6

Result 505 537

% Rec -58

~.3

75-125

6

20 P6





Project:

Arsenic

Arsenic

Arsenic

7201.10 KEWAUNEE MARSH

Pace Project No.:

QC Batch Method:

4026525

QC Batch:

MPRP/3481

Analysis Method:

EPA 6010

EPA 3050

Analysis Description:

6010 MET

Associated Lab Samples:

4026525100, 4026525101, 4026525102, 4026525103, 4026525104, 4026525105, 4026525106, 4026525107,

4026525108, 4026525109, 4026525110

METHOD BLANK: 247093

Matrix: Solid

Associated Lab Samples:

4026525100, 4026525101, 4026525102, 4026525103, 4026525104, 4026525105, 4026525106, 4026525107,

4026525108, 4026525109, 4026525110

Units

Reporting

Parameter

Units mg/kg

Result < 0.12

Blank

Limit

Analyzed

2.0 12/17/09 11:27

Qualifiers

LABORATORY CONTROL SAMPLE:

Parameter

Parameter

247094

mg/kg

Units

mg/kg

Spike Conc.

50

LCS % Rec

Limits

% Rec

80-120

Qualifiers

247095

Result

2310

247096

115

LCS

Result

MS

MSD

MSD

MS % Rec

-289

MSD

-633

Max

Qual

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4026525100

Spike Conc.

114

Spike Conc.

MS Result

1980

49.3

Result 1580 % Rec

% Rec Limits

75-125

RPD RPD

20 P6,R1







Project:

7201.10 KEWAUNEE MARSH

Pace Project No.:

Percent Moisture

4026525

QC Batch:

PMST/3428

Analysis Method:

ASTM D2974-87

QC Batch Method: AS

ASTM D2974-87

Analysis Description:

Dry Weight/Percent Moisture

Associated Lab Samples: 4

4026525001, 4026525002, 4026525003, 4026525004, 4026525005, 4026525006, 4026525007, 4026525008,

4026525009, 4026525010, 4026525011

Units

%

SAMPLE DUPLICATE: 247630

Parameter

4026507001	Dup		Max	
Result	Result	RPD	RPD	Qualifiers
84.9	85.7	0	10	







Project:

7201.10 KEWAUNEE MARSH

Pace Project No.:

4026525

QC Batch:

PMST/3429

Analysis Method:

ASTM D2974-87

QC Batch Method:

ASTM D2974-87

Analysis Description:

Dry Weighl/Percent Moisture

Associated Lab Samples:

4026525012, 4026525013, 4026525014, 4026525015, 4026525016, 4026525017, 4026525018, 4026525019, 4026525020, 4026525021, 4026525022, 4026525023, 4026525024, 4026525025, 4026525026, 4026525027,

4026525028, 4026525029, 4026525030, 4026525031

SAMPLE DUPLICATE: 247636

Parameter

4026525012 Result Dup Result

RPD

Max RPD

Qualifiers

Percent Moisture

%

Units

18.0

18.7

3

10







Project:

QC Batch:

7201.10 KEWAUNEE MARSH

Pace Project No.:

4026525

PMST/3430

Analysis Method:

ASTM D2974-87

QC Batch Method:

ASTM D2974-87

Analysis Description:

Dry Weight/Percent Moisture

Associated Lab Samples:

Units

 $\frac{4026525032,4026525033,4026525034,4026525035,4026525036,4026525037,4026525038,4026525039,4026525040,4026525041,4026525042,4026525043,4026525044,4026525045,4026525046,4026525047,\\$ 

4026525048, 4026525049, 4026525050, 4026525051

SAMPLE DUPLICATE: 247664

4026525032 Result

Dup Result

RPD

Max RPD

Qualifiers

Parameter Percent Moisture

%

14.0

16.2

14

10







Project:

7201.10 KEWAUNEE MARSH

Pace Project No.:

4026525

QC Batch:

PMST/3431

Analysis Method:

ASTM D2974-87

QC Batch Method:

ASTM D2974-87

Analysis Description:

Dry Weight/Percent Moisture

Associated Lab Samples:

4026525052, 4026525053, 4026525054, 4026525055, 4026525056, 4026525057, 4026525058, 4026525059, 4026525060, 4026525061, 4026525062, 4026525063, 4026525064, 4026525065, 4026525066, 4026525067, 4026525066, 4026525066, 4026525067, 4026525066, 4026525066, 4026525067, 4026525066, 4026525066, 4026525067, 4026525066, 4026525066, 4026525067, 4026525066, 4026525066, 4026525067, 4026525066, 4026525066, 4026525067, 4026525066, 4026525067, 4026525066, 4026525067, 4026525066, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026525067, 4026

4026525068, 4026525069, 4026525070, 4026525071

SAMPLE DUPLICATE: 247665

Parameter

4026525052 Result

Dup Result

RPD

Max RPD

Qualifiers

Percent Moisture

Units

72.8

72.1

10

Date: 12/29/2009 12:11 PM

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full, without the written consent of Pace Analytical Services, Inc..







Project:

7201.10 KEWAUNEE MARSH

Pace Project No.:

4026525

QC Batch:

PMST/3432

Analysis Method:

ASTM D2974-87

QC Batch Method:

Percent Moisture

ASTM D2974-87

Analysis Description:

Dry Weight/Percent Moisture

Associated Lab Samples:

Units

4026525072, 4026525073, 4026525074, 4026525075, 4026525076. 4026525077, 4026525078, 4026525079,

4026525080, 4026525081, 4026525082, 4026525083, 4026525084, 4026525085, 4026525086, 4026525087,

4026525088, 4026525089, 4026525090, 4026525091

SAMPLE DUPLICATE: 247666

4026525072 Result

Dup Result

RPD

Max RPD

Qualifiers

Parameter

%

76.0

74.3

2

10

Date: 12/29/2009 12:11 PM

50







Project:

7201.10 KEWAUNEE MARSH

Pace Project No.:

4026525

QC Batch:

PMST/3433

Analysis Method:

ASTM D2974-87

QC Batch Method.

ASTM D2974-87

Analysis Description:

Dry Weight/Percent Moisture

Associated Lab Samples:

4026525092, 4026525093, 4026525094, 4026525095, 4026525096, 4026525097, 4026525098, 4026525099, 4026525100, 4026525101, 4026525102, 4026525103, 4026525104, 4026525105, 4026525106, 4026525107,

4026525108, 4026525109, 4026525110

Units

SAMPLE DUPLICATE: 247667

4026525092 Result

Dup Result

**RPD** 

Max RPD

Qualifiers

Parameter Percent Moisture

61.7

59.8

3

10





#### **QUALIFIERS**

Project: 7201.10 KEWAUNEE MARSH

Pace Project No.: 4026525

#### **DEFINITIONS**

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

ND - Not Detected at or above adjusted reporting limit.

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

MDL - Adjusted Method Detection Limit.

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

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

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

#### **ANALYTE QUALIFIERS**

Date: 12/29/2009 12:11 PM

B Analyte was detected in the associated method blank.

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

P6 Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the

spike level.

R1 RPD value was outside control limits.

out the written consent of Pace



# **CHAIN OF CUSTODY RECORD**

J WA

63847

4026525

	RMT Inc., 744 Heartland Trail, Madison, WI 53717-1934 Phone 608/831-4444 • Fax 608/831-3334 • www.rmtinc.com								Filter				1 (Yes/No) /10						
r	***************************************	······································	***************************************	<del></del>								ed (Co		A/	/	Ζ,		///	
Project No.	b	Pr	oject/	'Client: zuner Mars L								ره.	//	//			///	PRESERVED CO	DOES
Project Manager/Contact Person:										N		Ι,	//				A - NONE		
Dick Fish / Bob Star Part				Total Number of Containers	ainers X		And Was Requested				//	//			///	8 — HNO ₃ C — H ₂ SO ₄ D — N⊌OH			
Lab No.	No. Yr. 09				MATRIX		President of				//	//				E — HCI			
200 110.	Date	Time	e	Sample Station ID				~			/	/	/	//	//		Comments:	F — METHANOL G —	
001	12-10	13:0	00	BID-0-2	· · · · · · · · · · · · · · · · · · ·	Į.	So	,,	$\kappa$						1	1,1	z poly		
002	1			BIP-2-41		. [		1	と								1 7 34		
003				B10-4-C1					Ø										
004				1310-6-8,					نح										
005				BID-8-10,					$\propto$										***************************************
006				BID-10-121					火										
007				B1P-12-141		1			Х					-					
00%				BID-15-1	1	1	٥		X										
000	)2-10	13:0	) ⁽⁾	BID- 19-20	>	}	S	oil.	X								)		
SPECIAL IN	STRUCTI	ONS	**********										· · · ·						
															***************************************				
SAMPLER Relinquished by (Signature) ate/Time Received by (Signature)  Alex Gran 12-14-09  12-14-09					12/14/9	Date/Time 2/14/9/345			HAZARDS ASSOCIATED WITH SAMPLES  Flommable			Turn Around (circle one) Normal Rush Report Due							
Relinquished by (Signature)  Date/Time Received by (Signature)  Relinquished by (Signature)  Date/Time Received by (Signature)					' Dat	e/Tii	me	☐ Солтоsive☐ Highly Toxic				(For Lab Use Only)							
Relinquished by (Signature)  Date/Time Received by (Signature)  12/15/09 855 All 8024 Liberty				12/15/0	Date/Time 12/15/09855			Other (list)			Temp Blank (Y) N (We					Receipt pH (Wet/Metals)			
Custody Seal: Present/Absent Intact/Not Intact Seal #s						<u> </u>							] -	10	1			NA	



## **CHAIN OF CUSTODY RECORD**

4026525

**Nº** 063507

746 Uportlan	I Trail D A	D 0022	• Madian WE 52700 0022 • DL (/0	.0\ 021 <i>AAAA</i>	\ 021 222 4			Filtere	d (Yes/N	10) /h	1//			
744 neuman	1 11011, P.V.	. BOX 8923	<ul> <li>Madison, WI 53708-8923</li> <li>Phone (60</li> </ul>	18) 831-4444 ♥ FAX (6U8	) 831-3334		Pre	served	(Code)_	/A/	$\angle$			
Project No.	0	Project ) Les	VClient: vullnee MarsL					ise ⁱ		//	//	//	///	PRESERVED CODES
Project Mar	ager/Con							die		/ /	/ /		///	A - NONE
Dist	Fish	1B.L	Stu fil	Total Number Of Containers	×		alyses A				//			B - HNO ₃ C - H ₂ SO ₄ D - NaOH
Lab No.	Yr <u>09</u> Date	Time	Sample Station ID	Total N	MATRIX	Ar	W. Care			//,		//c	omments:	E - HCI F - METHANOL G
010	12-10	13.00	BIE -0-2'	<u> </u>	Soil	*						407	z poly	
011			BiE-2-4"	1		X						1	, (	
012	1		BIE - 4-6'			x						]		
013			BIE-6-8,	1		メ						Ì		
014			BIE - 8-10'		1	×								
015			BIE-10-12'	1		X								
Ollo			BIE- 12-141	1		λ						1		
017	-		BIE-14-16			$\times$								
018			BIE-16-19'	}		X								
019	12-10	3:00	BIE-19-20'		Sil	$\lambda$						\ \ <	b	
SPECIAL II	STRUCT	IONS					-							
						1								
SAMPLER	Relinquist	ied by (Sig. Ales کریم م	Date/Time Received by	(Sig.) Da	ite/Time_	] '	ARDS AS WITH SA ! Flamm	MPLES	T	ırn Aroui epoit Du	nd (circle	one)	Normal	Rush
Relinquishe	dby (Sig.		Date/Time Received by	(Sig.) / Da	ate/Time		Corros	sive				(Fo	or Lab Use Only	)
Relinquishe	d by (Sig.	, ,	Date/Time Received by	(Sig.) D. 12/15/0	ate/Time 9 855		-			Receipt T Temp Bla		N		Receipt pH (Wet/Metals)
Custody S	eal: Pre	sent/Absen	t Intact/Not Intact Seal #'s	0							<del>~ (</del>			<del></del>





## **CHAIN OF CUSTODY RECORD**

**Nº** 063508

744 Haartland Trail P.C	) Roy 8923	<ul> <li>Madison WI 53708 8923</li> </ul>	• Phone (608) 831-4444 • F	'AY (ANR)	831-3334				Yes/No)	N/	<u>/</u> ,		
		<u> </u>	- 110110 (000) 031 4444 - 1	T (000)	1	ļ		rved (Co	<u> </u>	<u>/ /</u>		///	
Project No.	Project Le	ourse Marsh						,ed/	//.	//	//		PRESERVED CODES
Project Manager/Cor				-			a chi	83/	//	//	//		A - NONE B - HNO ₃
Dick Fish 1	1 BOS ST	an fir K		Total Number Of Containers	×		Redi		//,		//		C - H ₂ SO ₄ D - NaOH
Lab No. Yr. 09 Date	Time	Sample	Station ID	Total N Of Con	MATRIX	Aria		//				Comments:	E - HC! F - METHANOL G
020 12-16	13:00	B2A-0-2*		1	50:1	$\times$		-			L	for poly	
021		B2A-2-41		1		Y						1	
022		BZA - 4-61				$\mathcal{X}$							
023		132A - 6-8'				$ \mathcal{X} $			***************************************				
024		BZA - 8-10'		1		$ \mathcal{X} $							
025		132A -10-12'		i	İ	χ						j	
026 1		B2A -12-141		1									
27 1		B2A-14-151				$\lambda$							
028 L		B28 - O-2				X						1	
10201 12-10	13:00	B2B - 2-4			Sail	X						XI	
SPECIAL INSTRUC	TIONS			,   <del></del>		معاملات مستورا		<u> </u>	······				
			-										
SAMPLER Relinquis	Alex (	Socroun D-14-09	Received by (Stg.)	Da 2 <i> {15 </i>	te/Time {	HAZAR WI	DS ASSO TH SAMP Flammab	LES	Turn Ar	ound (ci	rcle one)	Normal	Rush
Relinquished by (819		Date/Time	Received by (Sig.)	7. 16 _a	te/Time		Corrosive	2			· · · · · · · · · · · · · · · · · · ·	(For Lab Use Only	у)
Relinquished by (Sig	) //	Date/Time 12/15/09 855	Received by (Sig.)	Da 12/15/1	te/Time / // //SSS	1	Other (list		· · · · ·	ot Temp: Blank (	_	1	Receipt pH (Wet/Metals)
Custody Seal: Pro	esent/Absent	7	eal #'s	· <u>~/</u> ~	· · · · · · · · · · · · · · · · · · ·	. 1				KU	1		<u> </u>

63848

# RMT.

				adison, WI 53717-193							Fil	tered (	Yes/N	ol /1	V/			//	$\overline{Z}$	
Phone 608/	831-	4444	• Fax 60	8/831-3334 • www.rml	inc.com					Pr	reserv	ed (Co	de) /	<u> 14/</u>		<u> </u>	<u>/_/</u>	<u> </u>	<u>/_/</u>	<u> </u>
Project No.			Ken	t/Client: Occuree MarsL							ند	36)/	//	//	/	//	//		//	PRESERVED CODES
Project Ma	nage	r/Co	ntact Perso	an;								7,	/ /	/ /	/ ,	/ ,	/ /			A — NONE B — HNO3
Dick	F	s L	/ B	sb Stanforth		Total Number of Containers	≥	<u>≼</u>	;	alyses of	ر موالي مراكبان	//	//	//	//	//	//	//		C — H ₂ SO ₄ D — NoOH
Lab No.	Yr. ⊆ Do	- 1	Time	Somp	ole Station ID	Total N of Con	VIGTAAA	A A	Ari		]		//		/	/		mmenls:		E — HCI F — METHANOL G
030	12-	10	13:00	B2B-4-6'		P	500	.'}	<u>ر</u> الا		,	Í				,		2 00/4	 1	
081			Ì	B2B-6-81		1			א								}	1		
122				1320-3-101		3			$\bowtie$											
033				1328-10-12		1			$\lambda$											
634				B2B - 12-15	. 1	Ĭ.			χ											
035	•			13213-15-1	۲ ^۱	1			X											
026				B2B - 19-29	>'	1			$\chi$											
037	ļ			B2(-0-2					X											
038	8	_	<b>V</b>	BSC - 7-1		}	Ţ	/	X											
0391	12-	. <b>\</b> 0	13:00	132c-4-6	\	1	ىچ	(:	X						j		4	1		
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SAMPLER R	<u>J.</u>	<u>S</u>	Alea G	12-14-69	Received by (Signature)  Received by (Signature)	1146	e/Tim //3 e/Tim	4Ś	٧	ARDS A VITH SA Flomm	AMPLE			n <b>A</b> rou ort Du		ircle c	one)	Normal	) Ru	ush
Relinquishe	- - -	noign	17	Date/Time	received by folgodiones	Dan	<b>5/</b> 1 (11)	IC		Corro Highly							(For	Lab Use Or	ıly)	
Relinquished	d by (	Sign	<del></del>	, Date/Time		,	e/Tim			Other				ceipt T np Bla			N			ceipt pH et/Metals)
	al		<u> </u>		pappoviselitz	144	998	755					_	•	0	7			. ,	NA
Custody Se	al:	Prese	ent/Absen	Intact/Not Intact	Seal #s 🔑									<i>j</i>			_			<del></del>





			Madison, WI 53717-1934				Fil	tered (	Yes/No}	M	//		
Phone 608/	831-444		18/831-3334 • www.rmtinc.com	········   ·················	·	.	Preserv	·	<del></del>	<del>}</del>	<u>_</u> ,		///
Project No		Projec	ct/Client:					8	//	//			MESTRAFO CODES
7,201,10 Project Ma	nagor/Co	ntact Pare	wante Mask	_			,e	<i>\$</i>	//	//	/		PRESERVED CODES A — NONE
							20°	//		//	/ /	////	B — HNO ₃
Dick	1-ish	Bol	, Stanfall	Total Number of Containers	×	Andha		/ /	//	//	Ζ.		C H ₂ SO <u>4</u> D NoOH
	Yr. 09	_		T Z Š	MATRIX	Andre	&) <b>Y</b>		//	//			E — HCI
lab No.	7r. Oate	Time	Sample Station ID	ફ ટ્રે	≥				//	//	//		F — METHANOL
			,	<u> </u>			$\leftarrow$	<del>-                                    </del>			_	Comments:	G
040	1)-10	13:00	B2C-6-8'	1 1	55.	X						402 poly	
04	•	ŀ	B2C-8-10'	(	1	$ \mathcal{X} $						'	
042			B2C-10-17,			$ \mathcal{X} $							
043			B2C - 12-141	(		X						1	
044			B2C- 14-207	1		$\bowtie$						ļ ļ	
045			B2D - 0-21			$\mathcal{X}$						}	
046		1	132D-2-41,		1	$\chi$							
047		***	B2D-4-61			X						1	
048	$\downarrow$	<del></del>	B20-6-8'	1		Χ							
049	12-10	13:00	13219-8-10	1	5,1	X						4	
SPECIAL IN	STRUCTIO	ONS			-	-	-	-	•	•	•	•	
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ر علله ا	Safa (	Alexbuc	12-14-09 tanial	2)14/9	,1345	3 WITH	SAMPLE		1	-		one, Homos	NO3II
Relinquishe	d by (Sign	atur <del>k</del> )	Date/Time Received by (Signature)	7 77 7	te/Time				Kepor	t Due _			······································
	,, u	10	14/9 1700		•	☐ Cor						(For Lab Use Onl	y}
Relinquishe	hy (Sign	oture)	Date/Time Received by (Signature),	Dat	re/Time	☐ High			Rece	ipt Temp	): (A)		Receipt pH
l ' .	alta		12/15/09 855 MALLOVISelab		9855		er (list)		Temp	Blank >	(Y)	N	(Wet/Metals)
	0170 1		112107 D> 1 1/1X / ALU ( 40 40)	// <i>\</i>	<i>i</i> ク8ンフ				┨	RO	/	<del></del>	NA
Custody Se	al: Prese	ent/Absen	Intact/Not Intact Seal #s						1				· •

	M				Q.I.Z.	<b>.</b> .								<u> </u>	1026525
			•	ladison, WI 53717-193					Fi	ltered (	Yes/No	6/			
	Phone 608/	831-444		8/831-3334 • www.rm		_				ved (Co			//	ZZZ	
	Project No. 7201. ld		Projec	t/Client: vaunee Mars	1					راهي	//	//	//	///	PRESERVED CODES
	Project Mar		ontact Pers	on:					ئى	\$ \	//		//		A — NONE
	Dick	- 12	/ B.L	Stanfill		[] Total Number of Containers	×	<b> </b>	Se Sed	//	//,		//		B — HNO3 C — H ₂ 5O4 D — NdOH
	Lab No	Yr. <u>09</u> Date	Tme	Samj	ole Station ID	Total No	MATRIX	And		//		//		Comments:	E HCI F METHANOL G
50	MAN	12-10	13:00	B2D-10-1	Σ,	li	Soil	ÍXÍ		ĺĺ		ÍΤ	1.1	)zpolu	
5)	052	Ì	1	1320 - 12-1		}	)	$\frac{1}{\lambda}$				-		1	
52	053			B2D-14-1	۲,	1		$ \lambda $		-					
5	054			1350-12-				$\frac{1}{\lambda}$		-					`
<del>5</del> 4	255			13217- 17,5	- 20`	(		$\lambda$			······································				
35	090			13712 -50				X				-			
56	057			Ble - 0-2				X							
57	098			131E - 2-1		(		V							
9E	059		$\downarrow$	1324-4-	; \ 5	1	1	$\lambda$							
3	060	1200	13:00	132E-6	-8	1	(۱،۵	M						•	
,	SPECIAL IN	s ructio	ONS		<u> </u>					1					
-															
	SAMPLER R	LAI	er Goesal	1)7-10-09	Received by (Signature)	3/14/0	te/Time 1349	Wi	DS ASSOX TH SAMPL Flammable	ES	Turn Ard			Normal	Rush
	Relinquished	1 by (8igr	nature)	Oute/Time	Recei ed by (Signature)		te/T me	]H	Corrosive	:			•	or Lab Use Only	•
	Δ.	l by (Sign a Utc		Date/Time 12/15/09 855	Received by (Signature)	Do 19	te/Time    5/09		Other (list)		Receip Temp B	t Temp: Ilank	Ŷ N		Receipt pH (Wet/Metals)
89	Custody Sec	al: Prese	ent/Absent		Seal #s	1						<i>y</i> , <i>O j</i>			

## RMT.

## **CHAIN OF CUSTODY RECORD**

63851 4026525

				adison, WI 53717-193						Filtered	(Yes/No)	[v]	$\angle$		
	Phone 508/	831-444	4 • Fax 608	3/831-3334 • www.rm!	inc.com		1		Prese	erved (C	ode) /4		<u> </u>		///
	Project No. 7201.10		Ker	/Client:					14 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		///	//	//		PRESERVED CODES A — NONE
	Project Ma	nager/Co	ontact Perso	n:					م ود	X/ ,	//	//	/ /	////	B — HNO ₃
	Diele	Fisl	/ B.	5 Stanfork		umber	×		145		//	//	//		C H ₂ SO ₄ D NaOH
	Lab No.	Yr. <u>09</u> Date	Time	Somp	ole Station ID	Total Number of Containers	MATRIX	Ari			///	//	//	Comments:	E — HCI F — METHANOL G —
$\varnothing$	06/2	12-10	13:00	BZE- 8-10'		}	Soil			Ť		ĺ	<u></u>	,	
01	Non	<u> </u>	4	BZE - 10-13.	8,	1	1	X							
162		12-10	17:00	B2E-13,8-		Ti		X							
	004	1	1	B2E-JO-Z				$ \chi $							
1	065			B2E - 23 -				χ					-		
15	Odo			132F-0-2		1		k							
do	067			B2F - 2-4		1		ス							
607	068			132F-4-6				X							
(D)	069			B2F-6-8				$\sim$							
9	075	12-10	/2.∞∞	BZF -8-	10'		Soil	$\lambda$							
	SPECIAL IN	ISTRUCTIO	ONS	<u> </u>			L	'	"	"	"	-!!!!	II-		
					Δ						_				
	SAMPLER R	11_	CAlenG -	wse) 12-14-09	Received by (Signature)	1/24/	e/Time //34	\ \	RDS ASSO VITH SAM Flammab	PIES	Turn Ar			ne) Normal	Rush
	Relinquishe	d by-(Sign	- 17	Date/Time	Received by (Signature)	Date	e/Time	1	Corrosiv					(For Lab Use Onl	<b>y</b> )
	Relinquisher	<u>مــــــــــــــــــــــــــــــــــــ</u>		U/d //OC Date/Time	Received by (Signature) /	Dest	e/Time	1	Highly To		Receip	ot Temp:	_		Receipt pH
		#CO	12/	5/09 855	1 1 1//	1 1	9855		Other (lis	t)	Temp (	Blank (	_	N	(Wet/Metals)
20	Custody Se	al: Pres	ent/Absent		7(: ) // 3		····· <del>·</del>					<u></u> Λ.υ	′ (		_/U//T



## **CHAIN OF CUSTODY RECORD**

**63852** 4026525

	•			adison, WI 53717-193						Fil	tered	Yes/N	io) / /	\ \ 	$\angle$		//	
	Phone 608/	831-4444	Fax 608	8/831-3334 • www.гm	tinc.com				F	Preserv	red (Co	ode)	/A/				//	
	Project No. 7201,10	>	lew	1/Client: James Mash							sjed/	//	//	//	/		//	PRESERVED CODES A — NONE
	Project Mai	-									//	/ ,	/ /					B HNO ₃
	Diele	Fish	/12 <u>0 L</u>	, Stanfork		Total Number of Containers	×		X45.			//	//	//	//	///		C — H ₂ SO ₄ D — NaOH
	Lab No.	Yr. <u>09</u> Date	Time	Sam	ple Station ID	of Con	MATRIX	\ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \ \rangle \rangle \ \rangle \ \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangle \rangl			//	//	//	//	//			E — HCI F — METHANOL
	127				·	.		<u> </u>	<u>/</u>	<u>/</u>	<u>/</u>	<u> </u>	<u>/</u> ــــا		<u></u>	Comments:	····	G
$\cup$	MB	12-10	13:00	B2F-10-17	۲,	Ì	52.1	次								toz polu		
	maz	)		B2F-12-13	1.81		Soil	$ \mathcal{X} $								)		
2	. 1772	15:10	13,00	B2F-13.8		1	Soil	X								4		
سن						-		·			_					X		
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								-					. 1	***************************************				
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				<del></del>									<del></del>					
	SPECIAL IN	STRUCTIO	DNS					· · · · · · · · · · · · · · · · · · ·		·		,		<u> </u>				
	-	30 1		- 11-11/69	Received by (Signature)	<del>'                                    </del>	1345	HAZ	WITH S	ASSOC SAMPLE Imable	ES .	Tur	n Arou oort Du			ne) Normal	) Ru	ush
	Relinquished	L <del>by (</del> Sign	ature)	Date/Time 1700	Received by (Signature)	Dat	e/Time	1	Com							(For Lab Use (	Only}	
	Relinquished	<u> </u>	ature)	Date/ me	Received by (Signature)/	Dat	e/Time	1		y Toxic			eceipt î		<u>a</u>		Rec	eipt pH
	/ 4	04(3)	4.0101	12/15/09 855		2/15/09		_	Othe	r (list)		Те	mp Bla	nk (	Ý)	N	(We	et/Metals)
5			ent/Absent	Intact/Not intact		,,-,,-	´					1 -		<u> </u>		-		U pr

## 63853

### **CHAIN OF CUSTODY RECORD**



RMT Inc., 744 Heartland Trail, Madison, WI 53717-1934 Filtered (Yes/No) Phone 608/831-4444 • Fax 608/831-3334 • www.rrntinc.com Preserved (Code) Andyses Requested Project No. Proje t/Client: 7201.10 Kewayne Marsh PRESERVED CODES A - NONE Project Manager/Contact Person: B - HNO, Diche Fish / Bob Stanfarth Total Number of Contoiners C-H2SO4 MATRIX D-NaOH Yr. 09 F—HCI Lab No. F --- METHANOL Sample Station ID Date Time Comments: B2F-15-16 12-10 500 13:00 M2F ~ 16-20' 132F - 23-25 12F-25-30 B30-0-2, 133P -2-41 M30-4-6' B3D-6-8° B3D-8-10 X 133D-10-12' Soil 17-10 13:00 SPECIAL INSTRUCTIONS SAMPLER Relinquished by (Signature) Date/Time Date/Time Received by (Signature) HAZARDS ASSOCIATED Turn Around (circle one) / Normal Rush (Ale Goesa) WITH SAMPLES Report Due _ ☐ Flammable Relinquished by (Signature) Date/Time Received by (Signature) Date/Time 1700 □ Corrosive (For Lab Use Only) ☐ Highly Toxic Receipt Temp: Receipt pH Relinquished by (Signature) Date/Time Date/Time Received by (Signature) ☐ Other (list) Temp Blonk ("Y) (Wet/Metals) 12/15/09855 Intact/Not Intact Seal #s Custody Seal: Present/Absent

## RMT.

IV!	<b>/</b>		<b></b>							$\sqcup$ {	021525
			ladison, WI 53717-1934				Filtered	(Yes/No)	v/	7777	7//
Phone 608	/831 <del>-4</del> 44	4 • Fax 60	8/831-3334 • www.rmtinc.com				Preserved (C	Code) /A		////	
Project No	i. 'o	Projec Kec	t/Client: source MasL				, web	///	//		PRESERVED CODES
Project Mo	nager/Co						die?	//	//		A NONE
Diclo	- Fish	/B.	6 Stanfork	Total Number of Containers	<u></u>	74	Sedie Control		//		B — HNO ₃ C — H ₂ SO₄ D — NbOH
lab No.		Time	Sample Station ID	Total N	MATRIX	Arth				Comments:	E — HCI F — METHANOL G —
08份	12-10	13:00	B3D-12-141		Soil		***************************************		<u> </u>	40zpoly	
OS SE		}	B3D - 14-16'		1	X			<del></del>		***************************************
JUBN K			B3E-0-21	1		X					
087			B3E-2-41	1		$\overline{\chi}$					
087			133E-4-6'			X	······································	-			
089			B3E-6-81			X				***************************************	
090			B3F-8-16			X		·			
091			B3E-10-12			$ \lambda $					
092		4	B3E-12-14'		1	<u> </u>					
093	12-10	13:00	B3E-14-16°		1:2	X					
SPECIAL IN	ISTRUCTIO	ONS					" "				
			^								
SAMPLER F	Relinquishe	ed by (Sign (Alea)	244c) 12-14-05 D. Farmel	Da 12/14/19	ote/Time	TIM E	OS ASSOCIATEI H SAMPLES ammable	Turn Aro		e one) Normal	Rush
Relinquishe	d by 15igi	nature	Date/Time Received by (Signature)	Do	ate/Time		опозіче			(For Lab Use Onl	
	tin	1	12)14/9 1100 Received by (signature)			_	ghly Toxic	Receipt	Tome	(, c. 225 csc cm	
Relinquishe		at re}	Date/Time Received by (Signature)	// /	pte/Time		ther (list)		ank (Y	) и	Receipt pH (Wet/Metals)
	elta		12/15/09 855 Afformselet	z 1415/1	98 <u>5</u> 5			·	RDI	^	NA
Custody Se	eal: Pres	ent/ bsen	Intact/Not Intact Seal #\$						<del>"</del>	<del></del>	<del>, ,</del> ,

63803

### **CHAIN OF CUSTODY RECORD**

RMT.

RMT Inc., 744 Heartland Trail, Madison, WI 53717-1934 Filtered (Yes/No) Phone 608/831-4444 • Fax 608/831-3334 • www.rmtinc.com Preserved (Code) Andlyses Rectuested Project No. Project/Client. Kewaree Mas L 7201,10 PRESERVED CODES A -- NONE Project Manager/Contact Person: B --- HNO2 Diele Fist / Bob Stenfuth Total Number of Containers C-H₂SO₄ MATRIX D-NoOH ٧r.  $0^{\frac{1}{9}}$ E — HCI Lab No. F - METHANOL Sample Station ID Date Time Comments: 402 poly 12.10 B3E-16-20' 13:00 X B3E-20-251  $\mathcal{X}$ 0943 m20-0-21 χ M217-2-4 m1p-4.61 X M2D-6-8' M2D-8-10' M3D-0-2' M3D-1-41 M3n-4-6' X 13:00 SPECIAL INSTRUCTIONS SAMPLER Relinquished by (Signature) Received by (Signature) Date/Time Date/Time HAZARDS ASSOCIATED Turn Around (circle one) Normal Rush (Ales Gorgan) WITH SAMPLES 12-14-09 Report Due _ ☐ Flammable Date/Time Relinquished by (Signature) Received by (Signature) Date/Time □ Corrosive (For Lab Use Only) ☐ Highly Toxic Receipt Temp: Receipt pH Received by (Signature) Relinquished by (Signature) Date/Time Date/Time ☐ Other (list) Temp Blank (Wet/Metals) 11909855 Intact/Not Intact Seal #s Custody Seal: Present/Absent



## **CHAIN OF CUSTODY RECORD**

63804 402655

			ladison, WI 53717-1934					Filte	ered (	Yes/No)	/w/				
Phone 608	/831-4444	-	8/831-3334 • www.rmtinc.com					reserve		- /	7/	Z,	<u> </u>	77	
Project No	•	Ke	t/Client: wounce Mors L					.6	zed/	//	//	//	//		PRESERVED CODES
Project Mo	nager/Ca	ntas Pors	on.	1			_		7,	//		/,	//		A — NONE B — HNO3
1010	le Fi	sl/I	But Starforth	lumber toiners	×	And	74. 14.		//	//		/,	//		C — H ₂ SO ₄ D — N-OH
Lab No.	Yr. $\frac{\bigcirc^{\circ}}{}$	Time	Sample Station ID	Total Number of Contoiners	MATRIX	Arr		//	/		//	/	Gomr	nents:	E — HCI F — METHANOL G —
104/2	12-10	13:00	M3D-6-8,	1	Soil	$ \mathcal{X} $							402	poly	
1053			M3n-8-101		1	$\lambda$								1 )	
106 \$			m4D-0-5'	}		$\left[ \times \right]$									
107			m40-5-7'	\		$ \chi $									
108			M40-7-101			ک									
109			MSD-0-51	1		7									
110			M5D-5-7)	1		Ø							Í		
1//	12-15	13:00	m59-7-10'	1	Soil	X							7		
SPECIAL IN	ISTRUCTIO	DNS				· · · · · · · · · · · · · · · · · · ·	······································	,			سيسسيد ارس	.	I		
SAMPLER F	7		1211-01 - 10	14/9	,134	HAZA		AMPIES		Turn A Report			one) (	formal	Rush
Relinquishe	d by (Sign	at re	Date/Time Received by (Signature)	Dat	e/Time		Сопс	sive					(For La	ıb Use Only)	
	Ten	<u>~\//</u>	Date/Time   Persived by (Signature)				Highly	Toxic		Pacei	pt Temp	۸۰	•		aceint nH
Rélinquishe	214co	diore;	12/15/09 855 HAMDONSOLA	Dg1 12/15	09855		Other	(list)			Blank RO		Ν	Mero X	weipt pH  Weit/Metals)
Custody Se	eal: Prese	ent/Absen	i Intact/Not Intact Seal #s								,	`		_	_ (

## Face Analytical

### **Sample Condition Upon Receipt**

Client Name:	PINT	Pr	oject # 404525
Courier: Fed Ex TUPS TUSPS TO			Walter .
Tracking #:	Silent ) Commerc	ial ; Pace Other	<u> </u>
Custody Seal on Cooler/Box Present: \ \ yes	r no Seals	intact: Tyes T no	
	no Seals	intact: T yes T no	
\	ble Bags   Non	e Other	
Thermometer Used NA	Type of Ice: (Wet)	•	Samples on ice, cooling process has begun
Cooler Temperature ROI	Biological Tissue	is Frozen: Tyes	Γ
Temp Blank Present: yes pro no		no	Person examining contents:
Temp should be above freezing to 6°C for all sample exc Biota Samples should be received $\leq$ 0°C.	ept Biota.	Comments:	Initials:MeA
Chain of Custody Present:	Yes DNO DNA	1.	
Chain of Custody Filled Out:	VDves □No □N/A	2.	
Chain of Custody Relinquished:	THE DNO DNIA	3.	
Sampler Name & Signature on COC;	MYes □No □N/A	4.	
Samples Arrived within Hold Time:	Yes No N/A	5.	
Short Hold Time Analysis (<72hr):	UYes DNO □N/A	6.	
Rush Turn Around Time Requested:	□Yes □N/A	7.	
Sufficient Volume:	Øves □no □n/A	8.	
Correct Containers Used:	Maryes □No □N/A	9.	·
-Pace Containers Used:	ÉYes □No □N/A	·	
Containers Intact:	Yes □No □N/A	10. *	
Filtered volume received for Dissolved tests	□Yes □No CIN/A	11.	
Sample Labels match COC:	Myes Ono On/A	12.	
-Includes date/time/ID/Analysis Matrix:	<u> </u>		
All containers nee ding preservation have been checked.	□Yes EÌNO VĮN/A	13.	
All containers needing preservation are found to be in	☐Yes ☐No VŽÍN/A		
compliance with EPA recommendation.		Initial when	Lot # of added
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	□Yes □No	completed	preservative
Samples checked for dechlorination:	□Yes □No DANA	14.	
Headspace in VOA Vials ( >6mm);	□Yes □No YAN/A	15.	
Trip Blank Present:	□Yes □No PRIA	16.	
Trip Blank Custody Seals Present	Ciyes Cino DNA		
Pace Trip Blank Lot # (if purchased):	<u>.</u>		
Client Notification/ Resolution:  Person Contacted:	Date/	lime:	Field Data Required? Y / N
Comments/ Resolution:	Dater	· · · · · · · · · · · · · · · · · · ·	
	·····	············	
Project Manager Review:	TA)		Date: /2/15/09
Note: Whenever there is a discrepancy affecting North Garolina coincorrect preservative, out of temp, incorrect containers	ompliance samples, a copy	of this form will be sent to the No	orth Carolina DEHNR Certification Office (i.e. out of hold,



March 31, 2010

BOB STANFORTH RMT MADISON 744 Heartland Trail Madison, WI 537171934

RE: Project: 7201.15 KEWAUNEE MARSH

Pace Project No.: 4029654

#### Dear BOB STANFORTH:

Enclosed are the analytical results for sample(s) received by the laboratory on March 20, 2010. The results relate only to the samples included in this report. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

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

Sincerely,

Tod Noltemeyer

Too holteneya

tod.noltemeyer@pacelabs.com Project Manager

Enclosures

cc: ALEX GOERGEN, RMT - MADISON







#### **CERTIFICATIONS**

7201.15 KEWAUNEE MARSH Project:

Pace Project No.: 4029654

Green Bay Certification IDs California Certification #: 09268CA Florida/NELAP Certification # E87948 Illinois Certification #: 200050 Kentucky Certification #: 82 Louisiana Certification #: 04168 Minnesota Certification #: 055-999-334 New York Certification #: 11887

New York Certification #: 11888 North Carolina Certification #: 503 North Dakota Certification#: R-150 South Carolina Certification #: 83006001 Wisconsin Certification #: 405132750 Wisconsin DATCP Certification #: 105-444 1241 Bellevue Street Green Bay, WI 54302





#### **SAMPLE SUMMARY**

Project:

7201.15 KEWAUNEE MARSH

Pace Project No.: 4029654

Lab ID	Sample ID	Matrix	Date Collected	Date Received
4029654001	M2A 0-2.5'	Solid	03/17/10 00:00	03/20/10 08:43
4029654002	M2A 2.5-5.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654003	M2A 5.0-7.5'	Solid	03/17/10 00:00	03/20/10 08:43
4029654004	M2A 7.5-10.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654005	M2B 0-2.5'	Solid	03/17/10 00:00	03/20/10 08:43
4029654006	M2B 2.5-5.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654007	M2B 5.0-7.5'	Solid	03/17/10 00:00	03/20/10 08:43
4029654008	M2B 7.5-10.0°	Solid	03/17/10 00:00	03/20/10 08:43
4029654009	M2C 0-2.5'	Solid	03/17/10 00:00	03/20/10 08:43
4029654010	M2C 2.5-5.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654011	M2C 5.0-7.5'	Solid	03/17/10 00:00	03/20/10 08:43
4029654012	M2C 7.5-10.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654013	M2E 0-2.5'	Solid	03/17/10 00:00	03/20/10 08:43
4029654014	M2E 2.5-5.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654015	M2E 5.0-7.5'	Solid	03/17/10 00:00	03/20/10 08:43
4029654016	M2E 7.5-10.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654017	M2F 0-2.5'	Solid	03/17/10 00:00	03/20/10 08:43
4029654018	M2F 2.5-5.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654019	M2F 5.0-7.5'	Solid	03/17/10 00:00	03/20/10 08:43
4029654020	M2F 7.5-10.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654021	M5A 0-2.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654022	M5A 2-4.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654023	M5A 4-6.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654024	M5A 6-8.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654025	M5A 8-10.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654026	M5B 0-2.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654027	M5B 2.0-4.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654028	M5B 4.0-6.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654029	M5B 6.0-8.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654030	M5B 8.0-10.0°	Solid	03/17/10 00:00	03/20/10 08:43
4029654031	M5C 0-2.5'	Solid	03/17/1 0 00:00	03/20/10 08:43
4029654032	M5C 2.5-5.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654033	M5C 5.0-7.5'	Solid	03/17/10 00:00	03/20/10 08:43
4029654034	M5C 7.5-10.0°	Solid	03/17/10 00:00	03/20/10 08:43
4029654035	M5E 0-2.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654036	M5E 2.0-4.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654037	M5E 4.0-6.0'	Solid	03/17/10 00:00	03/20/10 08:43

#### REPORT OF LABORATORY ANALYSIS





#### **SAMPLE SUMMARY**

Project: 7201.15 KEWAUNEE MARSH

Pace Project No.: 4029654

Lab ID	Sample ID	Matrix	Date Collected	Date Received
4029654038	M5E 6.0-8.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654039	M5E 8.0-10.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654040	M5E 10.0-12.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654041	M5E 12-14'	Solid	03/17/10 00:00	03/20/10 08:43
4029654042	M5E 14-15'	Solid	03/17/10 00:00	03/20/10 08:43
4029654043	M5F 0-2.5'	Solid	03/17/10 00:00	03/20/10 08:43
4029654044	M5F 2.5-5.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654045	M5F 5.0-7.5'	Solid	03/17/10 00:00	03/20/10 08:43
4029654046	M5F 7.5-10.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654047	M6E 0-4.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654048	M6E 4-6.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654049	M6E 6-8.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654050	M7E 0-2.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654051	M7E 2-4.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654052	M7E 4-6.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654053	M7E 6-8.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654054	M8E 0-4.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654055	M8E 4-6.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654056	M8E 6-8.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654057	M9F 0-4.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654058	M9F 4.0-6.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654059	M9F 6.0-8.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654060	M10F 0-4.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654061	M10F 4-6'	Solid	03/17/10 00:00	03/20/10 08:43
4029654062	M10F 6-8.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654063	M11F 0-2.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654064	M11 F 2.0-4.0'	Solid	03/17/10 <b>0</b> 0:00	03/20/10 08:43
4029654065	M11 F 4.0-6.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654066	M11F 6.0-8.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654067	M11F 8.0-10.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654068	M11 F 10.0-12.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654069	M12F 0-4.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654070	M12F 4.0-6.0'	Solid	03/17/10 00:00	03/20/10 08:43
4029654071	M12F 6.0-8.0'	Solid	03/17/10 00:00	03/20/10 08:43

#### **REPORT OF LABORATORY ANALYSIS**





Project:

7201.15 KEWAUNEE MARSH

Pace Project No.: 4029654

Lab ID	Sample ID	Method	Analysts	Analytes Reported
4029654001	M2A 0-2.5'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654002	M2A 2.5-5.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654003	M2A 5.0-7.5'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654004	M2A 7.5-10.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654005	M2B 0-2.5'	EP <b>A</b> 6010	DLB	1
		ASTM D2974-87	AME	1
4029654006	M2B 2.5-5.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654007	M2B 5.0-7.5'	EPA6010	DLB	1
		ASTM D2974-87	AME	1
4029654008	M2B 7.5-10.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654009	M2C 0-2.5'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654010	M2C 2.5-5.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654011	M2C 5.0-7.5'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654012	M2C 7.5-10.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654013	M2E 0-2.5'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654014	M2E 2,5-5,0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654015	M2E 5.0-7.5'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654016	M2E 7.5-10.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654017	M2F 0-2.5'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654018	M2F 2.5-5.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654019	M2F 5.0-7.5'	EPA 6010	DLB	1

#### REPORT OF LABORATORY ANALYSIS

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Project:

7201.15 KEWAUNEE MARSH

Pace Project No.: 4029654

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		ASTM D2974-87	AME	1
4029654020	M2F 7.5-10.0'	EPA 6010	DLB	1
		ASTMD2974-87	AME	1
4029654021	M5A 0-2.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654022	M5A2-4.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654023	M5A 4-6.0'	EPA6010	DLB	1
		ASTM D2974-87	AME	1
4029654024	M5A 6-8.0'	EPA6010	DLB	1
		ASTM D2974-87	AME	1
4029654025	M5A 8-10.0'	EPA6010	DLB	1
		ASTM D2974-87	AME	1
4029654026	M5B 0-2.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654027	M5B 2.0-4.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654028	M5B 4.0-6.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654029	M5B 6.0-8.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654030	M5B 8.0-10.0'	EPA 6 0 1 0	DLB	1
		ASTM D2974-87	AME	1
4029654031	M5C 0-2.5'	EPA <b>6</b> 0 <b>1</b> 0	DLB	1
		ASTM D2974-87	AME	1
4029654032	M5C 2.5-5.0'	EPA6010	DLB	1
		ASTM D2974-87	AME	1
4029654033	M5C 5.0-7.5'	EPA6010	DLB	1
		ASTM D2974-87	AME	1
4029654034	M5C 7.5-10.0'	EPA6010	DLB	1
		ASTM D2974-87	AME	1
4029654035	M5E 0-2.0'	EPA6010	DLB	1
		ASTM D2974-87	AME	1
4029654036	M5E 2.0-4.0'	EPA6010	DLB	1
		ASTM D2974-87	AME	1
4029654037	M5E 4.0-6.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1

#### **REPORT OF LABORATORY ANALYSIS**

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Project:

7201.15 KEWAUNEE MARSH

Pace Project No.: 4029654

Lab ID	Sample ID	Method	Analysts	Analytes Reported
4029654038	M5E 6.0-8.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654039	M5E 8.0-10.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654040	M5E 10.0-12.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654041	M5E 12-14'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654042	M5E 14-15'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654043	M5F 0-2.5'	EPA 6010	DLB	1
		ASTM D297 <b>4</b> -87	AME	1
4029654044	M5F 2.5-5.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654045	M5F 5.0-7.5'	EPA 6010	DLB	1
		ASTM D297 <b>4</b> -87	AME	1
4029654046	M5F 7.5-10.0'	EPA6010	DLB	1
		ASTM D2974-87	AME	1
4029654047	M6E 0.4.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654048	M6E 4-6.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654049	M6E 6-8.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654050	M7E 0-2.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654051	M7E 2·4.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654052	M7E 4-6.0'	EPA6010	DLB	1
		ASTM D2974-87	AME	1
4029654053	M7E 6-8.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654054	M8E 0-4.0'	EPA 6010	DI_I3	1
		ASTM D2974-87	AME	1
4029654055	M8E 4-6.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654056	M8E 6-8.0'	EPA 6010	DLB	1

#### REPORT OF LABORATORY ANALYSIS

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Project:

7201.15 KEWAUNEE MARSH

Pace Project No.:

4029654

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		ASTM D2974-87	AME	1
4029654057	M9F 0-4.0'	EPA 6 0 1 0	DLB	1
		ASTM D2974-87	AME	1
4029654058	M9F 4.0-6.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654059	M9F 6.0-8.0"	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654060	M10F 0-4.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654061	M10F 4-6'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654062	M10F 6-8.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654063	M11F 0-2.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654064	M11F 2.0-4.0'	EPA 6010	DLB	1
		ASTM D2 <b>97</b> 4-87	AME	1
4029654065	M11F 4.0-6.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654066	M11F 6.0-8.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654067	M11F 8.0-10.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654068	M11F 10.0-12.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654069	M12F 0-4.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654070	M12F 4.0-6.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1
4029654071	M12F 6.0-8.0'	EPA 6010	DLB	1
		ASTM D2974-87	AME	1

#### REPORT OF LABORATORY ANALYSIS





Project: 7201.15 KEWAUNEE MARSH

Pace Project No.: 4029654

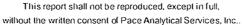
Sample: M2A 0-2.5' Lab ID: 4029654001 Collected: 03/17/10 00:00 Received: 03/20/10 08:43 Matrix: Solid

Results reported on a "dry-we		4029654001	Collecte	ea: 03/1//1	0 00:00	Received: U3	720/10 08:43 M	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method [.] EPA	6010 Prepa	ration Meth	nod: EP	A 3050			
Arsenic	13.6	mg/kg	3.5	0.20	1	03/23/10 11:40	03/23/10 17:50	7440-38-2	
Percent Moisture	Analytica	I Method: ASTM	и D2974-87						
Percent Moisture	43.9	%	0.10	0.10	1		03/25/10 08:15		
Sample: M2A 2.5-5.0' Results reported on a "dry-we		4029654002	Collecte	d: 03/17/1	0 00:00	Received: 03	/20/10 08:43 M	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	ıl Method [.] EPA		ration Meth	nod: EP/	A 3050			
Arsenic	107	mg/kg	5.0	0.29	1	03/23/10 11:40	03/23/10 17:54	7440-38-2	
Percent Moisture	Analytica	ıl Method [.] ASTN	и D2974-87						
Percent Moisture	63.1	%	0.10	0.10	1		03/25/10 08:15		
Sample: M2 A 5.0-7.5' Results reported on a "dry-we		4029654003	Collecte	d: 03/17/1	0 00:00	Received: 03/	/20/10 08:43 M	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA	6010 Prepa	ration Meth	od: EP	A 3050			
Arsenic	67.0	mg/kg	9.1	0.52	1	03/23/10 11:40	03/23/10 17:58	7440-38-2	
Percent Moisture	Analytica	II Method [.] ASTN	и D2974-87						
Percent Moisture	79.5	%	0.10	0.10	1		03/25/10 08:15		
Sample: M2A7.5-10.0' Results reported on a "dry-we		4029654004	Collecte	d: 03/17/1	0 00:00	Received: 03/	20/10 08:43 M	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	l Method: EPA	6010 Prepa	ration Meth	od: EPA	A 3050			
Arsenic	63.9 1	mg/kg	5.7	0.33	1	03/23/10 11:40	03/23/10 18:02	7440-38-2	
Percent Moisture	Analytica	l Melhod: ASTN	1 D2974-87						
Percent Moisture	66.5	%	0.10	0.10	1		03/25/10 08:15		

Date: 03/31/2010 02:49 PM

#### REPORT OF LABORATORY ANALYSIS

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Project:

7201.15 KEWAUNEE MARSH

Pace Project No.:

4029654

Sample: M2B 0-2.5'

Lab ID: 4029654005

Collected: 03/17/10 00:00 Received: 03/20/10 08:43 Matrix: Solid

Results reported on a "dry-we	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	ıl Method: EPA (	6010 Prepa	aration Meth	nod: EPA	A 3050			
Arsenic	4500 (	mg/kg	3.2	0.19	1	03/23/10 11:40	03/23/10 18:06	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	л D2974 <b>-</b> 87						
Percent Moisture	41.4	%	0.10	0.10	1		03/25/10 08:15		
Sample: M2B 2.5-5.0' Results reported on a "dry-we		4029654006	Collecte	ed: 03/17/1	0 00:00	Received: 03/	/20/10 08:43 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA	6010 Prepa	aration Meth	nod: EPA	₹ 3050			
Arsenic	13200 1	mg/kg	8.7	0.50	1	03/23/10 11:40	03/23/10 18:10	7440-38-2	
Percent Moisture	Analytica	II Method: ASTN	1 D29 <b>7</b> 4-87						
Percent Moisture	79.4	%	0.10	0.10	1		03/25/10 08:15		
Sample: M2B 5.0-7.5' Results reported on a "dry-wo		4029654007	Collecte	ed: 03/17/1	0 00:00	Received: 03/	/20/10 08:43 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	l Method: EPA 6	6010 Prepa	aration Meth	od: EPA	\3050			
Arsenic	834 1	mg/kg	3.5	0.20	1	03/23/10 11:40	03/23/10 18:14	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	1 D2974-87						
Percent Moisture	51.4 9	%	0.10	0.10	1		03/25/10 08:15		
Sample: M2B 7.5-10.0'	Lab ID:	4029654008	Collecte	ed: 03/17/10	0 00:00	Received: 03/	20/10 08:43 Ma	atrix: Solid	

Date: 03/31/2010 02:49PM

**6010 MET ICP** 

**Percent Moisture** 

Percent Moisture

Arsenic

Results reported on a "dry-weight" basis

Results

2100 mg/kg

22.8 %

Units

Analytical Method: ASTM D2974-87

LOQ

Analytical Method: EPA 6010 Preparation Method: EPA 3050

0.10

Parameters

#### REPORT OF LABORATORY ANALYSIS

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LOD

0.13

0.10

DF

Prepared

Analyzed

03/25/10 08:16

CAS No.

Qual



Project:

7201.15 KEWAUNEE MARSH

Pace Project No.:

4029654

Sample: M2C 0-2.5'

Lab ID: 4029654009

Collected: 03/17/10 00:00 Received: 03/20/10 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed -	CAS No.	Qual
6010 MET ICP	Analytica	Method: EPA	6010 Prepara	ation Meth	od: EP	A 3050			
Arsenic	<b>1510</b> r	ng/kg	3.2	0.19	1	03/23/10 11:40	03/23/10 18:22	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	л D2974-87						
Percent Moisture	47.0	%	0.10	0.10	1		03/25/10 08:16		
Sample: M2C 2.5-5.0'	Lab ID:	4029654010	Collected	: 03/17/1	0 00:00	Received: 03/	20/10 08:43 Ma	ıtrix: Solid	
Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	Method: EPA	6010 Pre <b>p</b> ara	ation Meth	od: EPA	A 3050			
Arsenic	<b>4510</b> r	ng/kg	2.9	0.17	1	03/23/10 11:40	03/23/10 18:26	7440-38-2	
Percent Moisture	Analytical	Method: ASTN	1 D2974-87						
Percent Moisture	38.4 %	<b>%</b>	0.10	0.10	1		03/25/10 08:16		
Sample: M2C 5,0-7.5' Results reported on a "dry-w		4029654011	Collected	: 03/17/1	0 00:00	Received: 03/	20/10 08:43 Ma	ıtrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	Method: EPA 6	3010 Prepara	ation Meth	od: EPA	A3050			
Arsenic	<b>11400</b> r	ng/kg	7.2	0.42	1	03/23/10 11:40	03/23/10 18:38	7440-38-2	
Percent Moisture	Analytical	Method: ASTN	1 D2974-87						
Percent Moisture	74.4 %	6	0.10	0.10	1		03/25/10 08:16		
Sample: M2C 7.5-10.0' Results reported on a "dry-wo		4029654012	Collected:	03/17/10	00:00	Received: 03/	20/10 08:43 Ma	trix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	Method: EPA 6	6010 Prepara	ntion Meth	od: EPA	3050			
Arsenic	9950 n	ng/kg	9.9	0.57	1	03/23/10 11:40	03/23/10 18:42	7440-38-2	

Date: 03/31/2010 02:49 PM

Percent Moisture

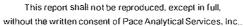
### REPORT OF LABORATORY ANALYSIS

0.10

0.10

82.3 %

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Project:

7201.15 KEWAUNEE MARSH

Pace Project No.: 4029654

Sample: M2E 0-2.5'

Lab ID: 4029654013

Collected: 03/17/10 00:00 Received: 03/20/10 08:43 Matrix: Solid

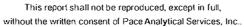
Results reported on a "dry-weight" basis

			1.00		D.F.			0.0.1	
Parameters	Results	Units		LOD	DF	Prepared	Analyzed 	CAS No.	Qual
6010 MET ICP	Analytica	Method: EPA	6010 Prepara	ation Meth	od: EPA	A 3050			
Arsenic	734 r	ng/kg	3.8	0.22	1	03/23/10 11:40	03/23/10 18:46	7440-38-2	
Percent Moisture	Analytica	Method: ASTN	1 D2974-87						
Percent Moisture	48.3 9	<b>%</b>	0.10	0.10	1		03/25/10 08:16		
Sample: M2E 2.5-5.0' Results reported on a "dry-wo		4029654014	Collected	: 03/17/1	0 00:00	Received: 03/	/20/10 08:43 Ma	atrix: Solid	
Parameters	Results	Units	LOQ _	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 METICP	Analytica	Method: EPA	6010 Prepara	ation Meth	od: EPA	\ 3050			
Arsenic	1720 r	ng/kg	4.5	0.26	1	03/23/10 11:40	03/23/10 18:50	7440-38-2	
Percent Moisture	Analytica	Method: ASTN	и D2974-87						
Percent Moisture	59.6 %	%	0.10	0.10	1		03/25/10 08:16		
Sample: M2E 5.0-7.5' Results reported on a "dry-we		4029654015	Collected	: 03/17/1	0 00:00	Received: 03/	20/10 08:43 Ma	ıtrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	Method: EPA 6	6010 Prepara	ation Meth	od: EPA	3050			
Arsenic	906 n	ng/kg	3.9	0.22	1	03/23/10 11:40	03/23/10 18:54	7440-38-2	
Percent Moisture	Analytical	Method: ASTN	1 D2974-87						
Percent Moisture	55.0 %	6	0.10	0.10	1		03/25/10 08:16		
Sample: M2E 7.5-10.0' Results reported on a "dry-we		4029654016	Collected	: 03/17/10	00:00	Received: 03/	20/10 08:43 Ma	trix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	Method: EPA 6	6010 Prepara	ation Meth	od: EPA	3050			
Arsenic	1400 n	ng/kg	8.2	0.48	1	03/23/10 11:40	03/23/10 18:58	7440-38-2	
Percent Moisture	Analytical	Method: ASTN	1 D2974-87						
Percent Moisture	77.4 %	6	0.10	0.10	1		03/25/10 08:16		

Date: 03/31/2010 02:49 PM

#### REPORT OF LABORATORY ANALYSIS

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Project-

7201.15 KEWAUNEE MARSH

Pace Project No.: 4029654

Sample: M2F 0-2.5'

Lab ID: 4029654017

Collected: 03/17/10 00:00 Received: 03/20/10 08:43 Matrix: Solid

Results reported on a "dry-we	eight" basis								
Parameters	Results	Units	LOQ _	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	l Method: EPA	6010 Prepara	ation Meth	nod: EPA	3050			
Arsenic	<b>109</b> r	mg/kg	4.3	0.25	1	03/23/10 15:15	03/25/10 00:48	7440-38-2	M0
Percent Moisture	Analytica	I Method: ASTN	M D2974-87						
Percent Moisture	53.6	%	0.10	0.10	1		03/25/10 08:16		
Sample: M2F 2.5-5.0'	Lab ID:	4029654018	Collected	: 03/17/1	0 00:00	Received: 03/	/20/10 08:43 Ma	atrix: Solid	
Results reported on a "dry-we	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	l Method: EPA	6010 Prepara	ation Meth	nod: EPA	A3050			
Arsenic	664 r	ng/kg	8.9	0.51	1	03/23/10 15:15	03/25/10 01:07	7440-38-2	
Percent Moisture	Analytical	Method: ASTN	M D2974-87						
Percent Moisture	78.7 9	%	0.10	0.10	1		03/25/10 08:16		
Sample: M2F 5.0-7.5' Results reported on a "dry-wa		4029654019	Collected	: 03/17/1	0 00:00	Received: 03/	/20/10 08:43 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA	6010 Prepara	ation Meth	nod: EP	\3050			
Arsenic	407 r	ng/kg	7.5	0.43	1	03/23/10 15:15	03/25/10 01:11	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	M D2974-87						
Percent Moisture	77.2 9	%	0.10	0.10	1		03/25/10 08:17		
Sample: M2F 7.5-10.0'	Lab ID:	4029654020	Collected	03/17/1	0 00:00	Received: 03/	/20/10 08:43 Ma	atrix: Solid	
Results reported on a "dry-we	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA	6010 Prepara	ation Meth	nod: <b>E</b> PA	A 3050			
Arsenic	<b>54.7</b> r	mg/kg	8.2	0.48	1	03/23/10 15:15	03/25/10 01:15	7440-38-2	
Percent Moisture	Analytica	I Method: AST	M D2974-87						

Date: 03/31/2010 02:49 PM

Percent Moisture

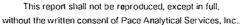
#### REPORT OF LABORATORY ANALYSIS

0.10

0.10

78.1 %

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Project:

7201.15 KEWAUNEE MARSH

Pace Project No.:

4029654

Sample: M5A 0-2.0'

Lab ID: 4029654021

76.4 %

Collected: 03/17/10 00:00 Received: 03/20/10 08:43 Matrix: Solid

Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	l Method: EPA	6010 Prepara	ation Meth	nod: EPA	A 3050			
Arsenic	20.8 1	ng/kg	3.4	0.19	1	03/23/10 15:15	03/25/10 01:19	7440-38-2	
Percent Moisture	Analytica	Method: ASTM	M D2974-87						
Percent Moisture	48.8	%	0.10	0.10	1		03/25/10 08:17		
Sample: M5A 2-4.0'		4029654022	Collected	: 03/17/1	0 00:00	Received: 03/	/20/10 08:43 Ma	atrix: Solid	
Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	l Method: EPA	6010 Prepara	ation Meth	nod: EP/	A3050			
Arsenic	1090 r	ng/kg	6.5	0.38	1	03/23/10 15:15	03/25/10 01:23	7440-38-2	
Percent Moisture	Analytica	l Method: ASTN	м D2974-87						
Percent Moisture	69.7	%	0.10	0.10	1		03/25/10 08:18		
Sample: M5A 4-6.0' Results reported on a "dry-w		4029654023	Collected	: 03/17/1	0 00:00	Received: 03/	/20/10 08:43 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	Method: EPA	6010 Prepara	ation Meth	nod: EP	A 3050			
Arsenic	3000 r		11.0	0.63	1		03/25/10 01:27	7440-38-2	
Percent Moisture		I Method: ASTN	м D2974-87						
Percent Moisture	82.5		0.10	0.10	1		03/25/10 08:18		
Sample: M5A 6-8.0'	Lab ID:	4029654024	Collected	03/17/1	0 00:00	Received: 03/	/20/10 08:43 Ma	atrix: Solid	
Results reported on a "dry-we	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	Method: EPA	—————— 6010 Prepara	ation Meth	nod: EPA	A 3050			
Arsenic	<b>590</b> r	ng/kg	8.4	0.48	1	03/23/10 15:15	03/25/10 01:31	7440-38-2	
Percent Moisture	Analytica	Method: ASTM	м D2974-87						
	70.4	.,	0.40	0.40			00/05/40 00 40		

Date: 03/31/2010 02:49 PM

Percent Moisture

#### REPORT OF LABORATORY ANALYSIS

0.10

0.10

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Project:

7201.15 KEWAUNEE MARSH

Pace Project No.:

4029654

Sample: M5A 8-10.0'

Lab ID: 4029654025

Collected: 03/17/10 00:00 Received: 03/20/10 08:43 Matrix: Solid

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA	6010 Prepara	ation Meth	od: EPA	A 3050			
Arsenic	<b>3.9J</b> r	ng/kg	5.0	0.29	1	03/23/10 15:15	03/25/10 01:35	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	л D2974-87						
Percent Moisture	61.9	%	0.10	0.10	1		03/25/10 08:18		
Sample: M5B 0-2.0'	Lab ID:	4029654026	Collected	: 03/17/1	0 00:00	Received: 03/	20/10 08:43 Ma	atrix: Solid	
Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	l Method: EPA6	6010 Prepara	ation Meth	od: EPA	N3050			
Arsenic	<b>1460</b> r	ng/kg	10	0.58	1	03/23/10 15:15	03/25/10 01:39	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	1 D2974-87						
Percent Moisture	82.0 %	%	0.10	<b>0</b> .10	1		03/25/10 08:18		
Sample: M5B 2.0-4.0' Results reported on a "dry-w		4029654027	Collected	: 03/17/1	0 00:00	Received: 03/	20/10 08:43 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	Method: EPA6	3010 Prepara	ation Meth	od: <b>E</b> PA	3050			
Arsenic	400 r	ng/kg	3.6	0.21	1	03/23/10 15:15	03/25/10 01:44	7440-38-2	
Percent Moisture	Analytica	Method: ASTN	1 D2974-87						
Percent Moisture	50.5	<b>%</b>	0.10	0.10	1		03/25/10 08:19		
Sample: M5B 4.0-6.0'	Lab ID:	4029654028	Collected	: 03/17/1	0 00:00	Received: 03/	20/10 08:43 Ma	atrix: Solid	
Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical	Method: EPA 6	6010 Prepara	ation Meth	od: EPA	 \3050			
Arsenic	<b>4350</b> r	ng/kg	10.1	0.58	1	03/23/10 15:15	03/25/10 01:55	7440-38-2	

Date: 03/31/2010 02:49 PM

Percent Moisture

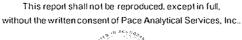
#### REPORT OF LABORATORY ANALYSIS

0.10

82.0 %

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03/25/10 08:19



0.10





Project:

7201.15 KEWAUNEE MARSH

Pace Project No.:

4029654

Sample: M5B 6.0-8.0

Lab ID: 4029654029

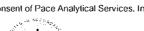
Collected: 03/17/10 00:00 Received: 03/20/10 08:43 Matrix: Solid

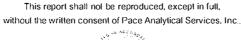
Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	l Method: EPA 6	6010 Prepara	ation Meth	od: EPA	43050			
Arsenic	4300 1	ng/kg	12.3	0.71	1	03/23/10 15:15	03/25/10 01:59	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	л D2974-87						
Percent Moisture	84.1	%	0.10	0.10	1		03/25/10 08:19		
Sample: M5B 8.0-10.0'	Lab ID:	4029654030	Collected	: 03/17/1	0 00:00	Received: 03/	/20/10 08:43 Ma	atrix: Solid	
Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	l Method: EPA (	6010 Prepara	ation Meth	od: EP <i>F</i>	A 3050			
Arsenic	91.6 r	mg/kg	5.5	0.32	1	03/23/10 15:15	03/25/10 02:03	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	л D2974-87						
Percent Moisture	67.5	%	0.10	0.10	1		03/25/10 08:19		
Sample: M5C 0-2.5' Results reported on a "dry-w		4029654031	Collected	: 03/17/1	00:00	Received: 03/	20/10 08:43 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	Method: EPA6	6010 Prepara	ation Meth	od: EPA	\3 <b>0</b> 50			
Arsenic	3070 r	ng/kg	8.0	0.46	1	03/23/10 15:15	03/25/10 02:07	7440-38-2	
Percent Moisture	Analytica	I Melhod: ASTN	и D2974-87						
Percent Moisture	75.2 9	<b>%</b>	0.10	0.10	1		03/25/10 08:19		
Sample: M5C 2,5-5,0'		4029654032	Collected	: 03/17/1	0 00:00	Received: 03/	20/10 08:43 Ma	atrix: Solid	
Results reported on a "dry-w	eigni basis								
Parameters	Results	Units	LOQ _	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	Method: EPA 6	6010 Prepara	ation Meth	od: EPA	3050			
Arsenic	5060 r	ng/kg	13.3	0.77	1	03/23/10 15:15	03/25/10 02:11	7440-38-2	
Percent Moisture	Analytica	Method: ASTM	1 D2974-87						
Percent Moisture	85.2 %	6	0.10	0.10	1		03/25/10 08:19		

Date: 03/31/2010 02:49 PM

#### REPORT OF LABORATORY ANALYSIS

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Project:

7201.15 KEWAUNEE MARSH

Pace Project No.:

4029654

Sample: M5C 5.0-7.5'

Lab ID: 4029654033

Collected: 03/17/10 00:00 Received: 03/20/10 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

Results reported on a dry-w	ergin basis									
Parameters	Results	Units	LOQ _	LOD	DF	Prepared	Analyzed	CAS No.	Qual	
6010 MET ICP	Analytica	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	4080 1	ng/kg	10.3	0.60	1	03/23/10 15:15	03/25/10 02:15	7440-38-2		
Percent Moisture	Analytica	l Method: ASTN	и D2974-87							
Percent Moisture	82.3	82.3 %		0.10	1		03/25/10 08:19			
Sample: M5C 7.5-10.0' Results reported on a "dry-w		4029654034	Collected	d: 03/17/1	0 00:00	Received: 03/	/20/10 08:43 Ma	atrix: Solid		
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual	
6010 MET ICP	Analytica	Analytical Method: EPA 6010 Preparation Method: EPA3050								
Arsenic	1780 mg/kg		8.7	0.50	1	03/23/10 15:1 <b>5</b>	03/25/10 02:19	7440-38-2		
Percent Moisture	Analytica	и D2974-87								
Percent Moisture	79.3	0.10	0.10	1		03/25/10 08:19				
Sample: M5E 0-2.0' Results reported on a "dry-wa		4029654035	Collected	d: 03/17/1	0 00:00	Received: 03/	/20/10 08:43 Ma	atrix: Solid		
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual	
6010 MET ICP	Analytica	I Method: EPA 6	6010 Prepar	ation Meth	od: EP	A 3050				
Arsenic	269 1	ng/kg	6.3	0.36	1	03/23/10 15:15	03/25/10 0 <b>2</b> :23	7440-38-2		
Percent Moisture	Analytica	I Method: ASTN	л D2974-87							
Percent Moisture	70.3	70.3 %		0.10	1		03/2 <b>5</b> /10 08:19			
Sample: M5E 2.0-4.0'	Lab ID:	4029654036	Collected: 03/17/10 00:00			Received: 03/	atrix: Solid			
Results reported on a "dry-we	eight" basis									
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual	
6010 MET ICP	Analytica	I Method: EPA 6	3010 Prepar	ation Meth	od: EPA	A 3050				
Arsenic	215 (	ng/kg	10.8	0.62	1	03/23/10 15:15	03/25/10 02:27	7440-38-2		
Percent Moisture	Analytica	I Method: ASTN	л D2974-87							
December 114			0.45			00/05/40 06 15				

Date: 03/31/2010 02:49 PM

Percent Moisture

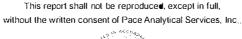
#### REPORT OF LABORATORY ANALYSIS

0.10

82.6 %

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03/25/10 08:19



0.10





Project: 7201.15 KEWAUNEE MARSH

Pace Project No.: 4029654

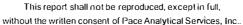
Sample: M5E 4.0-6.0' Lab ID: 4029654037 Collected: 03/17/10 00:00 Received: 03/20/10 08:43 Matrix: Solid

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual	
				-	- <u> </u>	- Midiyacu	C/10 140.	- —		
6010 MET ICP	•	3010 Prepara		od: EPA						
Arsenic	46.6 mg/kg		16.3	0.94	1	03/23/10 17:00	03/25/10 02:51	7440-38-2		
Percent Moisture	Analytica	и D2974-87								
Percent Moisture	87.9	0.10	0.10	1		03/25/10 08:19				
Sample: M5E 6.0-8.0' Results reported on a "dry-we		4029654038	Collected	: 03/17/1	0 00:00	Received: 03/	20/10 08:43 Ma	atrix: Solid		
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual	
6010 MET ICP	Analytica	Analytical Method: EPA6010 Preparation Method: EPA 3050								
Arsenic	<b>9.8J</b> mg/kg		10.5	0.61	1	03/23/10 17:00	03/25/10 03:02	7440-38-2		
Percent Moisture	Analytica	l Method: ASTN	1 D2974-87							
Percent Moisture	83.8	0.10	0.10	1		03/25/10 08:19				
Sample: M5E 8.0-10.0' Results reported on a "dry-we Parameters		4029654039 Units	Collected LOQ	: 03/17/10 LOD	0 00:00 DF	Received: 03/	20/10 08:43 Ma Analyzed	atrix: Solid  CAS No.	Qual	
6010 MET ICP	Analytica	I Method: EPA 6		ation Meth	od: EPA	 \3050				
Arsenic	2.7J ı		4.4	0.25	1		03/25/10 03:06	7440-38-2		
Percent Moisture	Analytica	l Method: ASTM	1 D2974-87							
Percent Moisture	60.7 % 0.10 0.10 1 03/25/10 08:19									
Sample: M5E 10.0-12.0' Results reported on a "dry-we		4029654040	Collected	03/17/10	00:00	Received: 03/	20/10 08:43 Ma	atrix: Solid		
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual	
6010 MET ICP	Analytica	l Method: EPA6	3010 Prepara	ition Meth	od: EPA	\3050				
Arsenic	40.3 r	ng/kg	4.3	0.25	1	03/23/10 17:00	03/25/10 03:10	7440-38-2		
Percent Moisture	Analytica	Method: ASTM	1 D2974-87							
	60.1 %									

Date: 03/31/2010 02:49 PM

#### REPORT OF LABORATORY ANALYSIS

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Project:

7201.15 KEWAUNEE MARSH

Pace Project No.:

4029654

Sample: M5E 12-14'

Lab ID: 4029654041

Collected: 03/17/10 00:00 Received: 03/20/10 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

Results reported on a "dry-we	eight" basis									
Parameters	Results	Units	LOQ _	LOD	DF	Prepared	Analyzed	CAS No.	Qual	
6010 MET ICP	Analytica	l Method: EPA	A 3050							
Arsenic	8.1 r	ng/kg	4.9	0.29	1	03/23/10 17:00	03/25/10 03:15	7440-38-2		
Percent Moisture	Analytica	M D2974-87								
Percent Moisture	64.1 %	0.10	0.10	1		03/25/10 08:21				
Sample: M5E 14-15'	Lab ID:	4029654042	Collected	: 03/17/1	0 00:00	Received: 03/	/20/10 08:43 Ma	atrix: Solid		
Results reported on a "dry-we	eight" basis									
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual	
6010 MET ICP	Analytical	Method: EPA	60 <b>1</b> 0 Prepara	ation Meth	nod: EP/	A3050				
Arsenic	3.1 r	mg/kg	2.2	0.12	1	03/23/10 17:00	03/25/10 03:19	7440-38-2		
Percent Moisture	Analytical Method: ASTM D2974-87									
Percent Moisture	20.1 %	%	0.10	0.10	1		03/2 <b>5/1</b> 0 08:21			
Sample: M5F 0-2.5' Results reported on a "dry-we		4029654043	Collected	: 03/17/1	0 00:00	Received: 03/	/20/10 08:43 Ma	atrix: Solid		
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual	
6010 MET ICP	Analytical	Method: EPA (	60 <b>1</b> 0 Prepara	ation Meth	nod: EP	A 3050				
Arsenic	98.2 r	ng/kg	3.6	0.21	1	03/23/10 17:00	03/25/10 03:30	7440-38-2		
Percent Moisture	Analytical	Method: ASTN	и D2974-87							
Percent Moisture	51.7 %	%	0.10	0.10	1		03/25/10 08:21			
Sample: M5F 2.5-5.0'	Lab ID:	4029654044	Collected	: 03/17/1	0 00:00	Received: 03/	/20/10 08:43 Ma	atrix: Solid		
Results reported on a "dry-we	eight" basis									
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050									
Arsenic	1300 n	ng/kg	8.6	0.50	1	03/23/10 17:00	03/25/10 03:34	7440-38-2		
Percent Moisture	Analytical Method: ASTM D2974-87									

Date: 03/31/2010 02:49 PM

Percent Moisture

#### **REPORT OF LABORATORY ANALYSIS**

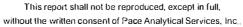
0.10

1

0.10

77.7 %

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Project:

7201.15 KEWAUNEE MARSH

Pace Project No.:

4029654

Sample: M5F 5.0-7.5'

Lab ID: 4029654045

Collected: 03/17/10 00:00 Received: 03/20/10 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

1260 mg Analytical M 86.0 %  Lab ID: 4 ht" basis	Units  Method: EPA 6  g/kg  Method: ASTM  4029654046  Units	12.5 1 D2974-87 0.10 Collected	0.72	1	03/23/10 17:00	Analyzed  03/25/10 03:38  03/25/10 08:21  20/10 08:43 Ma	CAS No. 7440-38-2 atrix: Solid	Qual	
1260 mg Analytical M 86.0 %  Lab ID: 4 ht" basis	g/kg Method: ASTM 4029654046	12.5 1 D2974-87 0.10 Collected	0.72	1	03/23/10 17:00	03/25/10 08:21			
Analytical N 86.0 %  Lab ID: 4  ht" basis  Results	Method: ASTM	0.10 Collected:	0.10	1		03/25/10 08:21			
86.0 %  Lab ID: 4  ht" basis  Results	4029654046	0.10 Collected:			Received: 03/		atrix: Solid		
Lab ID: 4 ht" basis Results		Collected			Received: 03/		atrix: Solid		
Results			03/17/10	00:00	Received: 03/	20/10 08:43 Ma	atrix: Solid		
Results	Units	100							
	Units	100							
Analytical N		LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual	
	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
<b>111</b> mg/kg		7.7	0.45	1	03/23/10 17:00	03/25/10 03:42	7440-38-2		
Analytical Method: ASTM D2974-87									
76.7 %		0.10	0.10	1		03/25/10 08:21			
	4029654047	Collected:	03/17/10	00:00	Received: 03/	20/10 08:43 Ma	trix: Solid		
Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual	
Analytical N	Method [,] EPA 6	3010 Prepara	ition Meth	od: EPA	3050				
<b>895</b> mg	g/kg	8.4	0.49	1	03/23/10 17:00	03/25/10 03:47	7440-38-2		
Analytical M	Method: ASTM	1 D29 <b>7</b> 4-87							
77.2 %		0.10	0.10	1		03/25/10 08:22			
Lab ID: 4	1029654048	Collected:	03/17/10	00:00	Received: 03/	20/10 08:43 Ma	trix: Solid		
ht" basis									
Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual	
Analytical M	Method: EPA 6	010 Prepara	tion Meth	od: EPA	\3050				
<b>1910</b> mg	g/kg	8.7	0.50	1	03/23/10 17:00	03/25/10 03:51	7440-38-2		
Analytical Method: ASTM D2974-87									
	Analytical M  Analytical M  Test ID: 4  Analytical M  Results  Analytical M  77.2 %  Lab ID: 4  Analytical M  Analytical M  This basis  Results  Analytical M  Analytical M  This basis	Analytical Method: EPA 6 111 mg/kg Analytical Method: ASTM 76.7 %  Lab ID: 4029654047  ht" basis  Results Units  Analytical Method: EPA 6 895 mg/kg Analytical Method: ASTM 77.2 %  Lab ID: 4029654048  ht" basis  Results Units  Analytical Method: EPA 6 1910 mg/kg	Analytical Method: EPA 6010 Prepara  111 mg/kg 7.7  Analytical Method: ASTM D2974-87  76.7 % 0.10  Lab ID: 4029654047 Collected:  ht" basis  Results Units LOQ  Analytical Method: EPA 6010 Prepara  895 mg/kg 8.4  Analytical Method: ASTM D2974-87  77.2 % 0.10  Lab ID: 4029654048 Collected:  ht" basis  Results Units LOQ  Analytical Method: EPA 6010 Prepara  4029654048 Collected:  ht" basis  Results Units LOQ  Analytical Method: EPA 6010 Prepara  1910 mg/kg 8.7	Analytical Method: EPA 6010 Preparation Method: ASTM D2974-87  76.7 % 0.10 0.10  Lab ID: 4029654047 Collected: 03/17/10  ht" basis  Results Units LOQ LOD  Analytical Method: EPA 6010 Preparation Method: 895 mg/kg 8.4 0.49  Analytical Method: ASTM D2974-87  77.2 % 0.10 0.10  Lab ID: 4029654048 Collected: 03/17/10  ht" basis  Results Units LOQ LOD  Analytical Method: ASTM D2974-87  77.2 % 0.10 0.10  Analytical Method: EPA 6010 Preparation Method: basis  Results Units LOQ LOD  Analytical Method: EPA 6010 Preparation Method: BASIM D2974-87  Analytical Method: EPA 6010 Preparation Method: BASIM D2974-87	Analytical Method: EPA 6010 Preparation Method: EPA  111 mg/kg 7.7 0.45 1  Analytical Method: ASTM D2974-87  76.7 % 0.10 0.10 1  Lab ID: 4029654047 Collected: 03/17/10 00:00  ht" basis  Results Units LOQ LOD DF  Analytical Method: EPA 6010 Preparation Method: EPA  895 mg/kg 8.4 0.49 1  Analytical Method: ASTM D2974-87  77.2 % 0.10 0.10 1  Lab ID: 4029654048 Collected: 03/17/10 00:00  ht" basis  Results Units LOQ LOD DF  Analytical Method: EPA 6010 Preparation Method: EPA  Analytical Method: EPA 6010 Preparation Method: EPA  895 mg/kg 8.4 0.49 1  Analytical Method: EPA 6010 Preparation Method: EPA  895 mg/kg 8.7 0.50 1	Analytical Method: EPA 6010 Preparation Method: EPA 3050  111 mg/kg 7.7 0.45 1 03/23/10 17:00  Analytical Method: ASTM D2974-87  76.7 % 0.10 0.10 1  Lab ID: 4029654047 Collected: 03/17/10 00:00 Received: 03/ht" basis  Results Units LOQ LOD DF Prepared  Analytical Method: EPA 6010 Preparation Method: EPA 3050  895 mg/kg 8.4 0.49 1 03/23/10 17:00  Analytical Method: ASTM D2974-87  77.2 % 0.10 0.10 1  Lab ID: 4029654048 Collected: 03/17/10 00:00 Received: 03/ht" basis  Results Units LOQ LOD DF Prepared  Analytical Method: EPA 6010 Preparation Method: EPA 3050  1910 mg/kg 8.7 0.50 1 03/23/10 17:00	Analytical Method: EPA 6010 Preparation Method: EPA 3050  111 mg/kg 7.7 0.45 1 03/23/10 17:00 03/25/10 03:42  Analytical Method: ASTM D2974-87  76.7 % 0.10 0.10 1 03/25/10 08:21  Lab ID: 4029654047 Collected: 03/17/10 00:00 Received: 03/20/10 08:43 Matht" basis  Results Units LOQ LOD DF Prepared Analyzed  Analytical Method: EPA 6010 Preparation Method: EPA 3050  895 mg/kg 8.4 0.49 1 03/23/10 17:00 03/25/10 03:47  Analytical Method: ASTM D2974-87  77.2 % 0.10 0.10 1 03/25/10 08:22  Lab ID: 4029654048 Collected: 03/17/10 00:00 Received: 03/20/10 08:43 Matht" basis  Results Units LOQ LOD DF Prepared Analyzed  Analytical Method: EPA 6010 Preparation Method: EPA 3050  403/25/10 08:22  Analytical Method: EPA 6010 Preparation Method: EPA 3050  Analytical Method: EPA 6010 Preparation Method: EPA 3050	Analytical Method: EPA 6010 Preparation Method: EPA 3050  111 mg/kg 7.7 0.45 1 03/23/10 17:00 03/25/10 03:42 7440-38-2  Analytical Method: ASTM D2974-87  76.7 % 0.10 0.10 1 03/25/10 08:21  Lab ID: 4029654047 Collected: 03/17/10 00:00 Received: 03/20/10 08:43 Matrix: Solid ht" basis  Results Units LOQ LOD DF Prepared Analyzed CAS No.  Analytical Method: EPA 6010 Preparation Method: EPA 3050  895 mg/kg 8.4 0.49 1 03/23/10 17:00 03/25/10 03:47 744/0-38-2  Analytical Method: ASTM D2974-87  77.2 % 0.10 0.10 1 03/25/10 08:22  Lab ID: 4029654048 Collected: 03/17/10 00:00 Received: 03/20/10 08:43 Matrix: Solid ht" basis  Results Units LOQ LOD DF Prepared Analyzed CAS No.  Analytical Method: EPA 6010 Preparation Method: EPA 3050  Analytical Method: EPA 6010 Preparation Method: EPA 3050  Analytical Method: EPA 6010 Preparation Method: EPA 3050  Analytical Method: EPA 6010 Preparation Method: EPA 3050  Analytical Method: EPA 6010 Preparation Method: EPA 3050  Analytical Method: EPA 6010 Preparation Method: EPA 3050  1910 mg/kg 8.7 0.50 1 03/23/10 17:00 03/25/10 03:51 7440-38-2	

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Percent Moisture

**REPORT OF LABORATORY ANALYSIS** 

0.10

0.10

78.2 %

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Project:

7201.15 KEWAUNEE MARSH

Pace Project No.:

4029654

Sample: M6E 6-8.0'

Lab ID: 4029654049

Collected: 03/17/10 00:00 Received: 03/20/10 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	l Method [.] EPA	6010 Prepara	ation Meth	od: EPA	A 3050			
Arsenic	2020 1	mg/kg	15.4	0.89	1	03/23/10 17:00	03/25/10 03:54	7440-38-2	
Percent Moisture	Analytica	Method: ASTM	л D2974-87						
Percent Moisture	88.2 %		0.10	0.10	1		03/25/10 08:22		
Sample: M7E 0-2.0'	Lab ID:	4029654050	Collected	: 03/17/1	0 00:00	Received: 03/	20/10 08:43 Ma	atrix: Solid	
Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	<b>15.1</b> mg/kg		3.0	0.18	1	03/23/10 17:00	03/ <b>2</b> 5/10 03:58	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	/ D2974-87						
Percent Moisture	42.0	0.10	0.10	1		03/25/10 08:22			
Sample: M7E 2-4.0' Results reported on a "dry-w		4029654051	Collected	03/17/1	0 00:00	Received: 03/	20/10 08:43 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA (	6010 Prepara	ation Meth	od: EP#	\ 3050			
Arsenic	277 ı	ng/kg	3.4	0.20	1	03/23/10 17:00	03/25/10 04:03	7440-38-2	
Percent Moisture	Analytica	l Method: ASTN	и D2974-87						
Percent Moisture	48.4	%	0.10	0.10	1		03/25/10 08:22		
Sample: M7E 4-6.0'	Lab ID:	4029654052	Collected	03/17/1	0 00:00	Received: 03/	20/10 08:43 Ma	atrix: Solid	
Results reported on a "dry-w	eight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Oual
6010 MET ICP	Analytica	l Method: EPA (	6010 Prepara	ition Meth	od: EPA	3050			
Arsenic	<b>1260</b> r	ng/kg	11.4	0.66	1	03/23/10 17:00	03/25/10 04:07	7440-38-2	

Date: 03/31/2010 02:49 PM

Percent Moisture

#### REPORT OF LABORATORY ANALYSIS

0.10

1

0.10

83.2 %

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Project:

7201.15 KEWAUNEE MARSH

Pace Project No.:

4029654

Sample: M7E 6-8.0'

Lab ID: 4029654053

Collected: 03/17/10 00:00 Received: 03/20/10 08:43 Matrix: Solid

Results reported on a "dry-w	eight" basis									
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual	
6010 MET ICP	Analytica	I Method: EPA	6010 Prepa	aration Meth	hod: EP	A3050				
Arsenic	478 1	14.0	0.81	1	03/23/10 17:00	03/25/10 04:18	7440-38-2			
Percent Moisture	Analytica	I Method: ASTM	и D2974-87							
Percent Moisture	86.8	0.10	0.10	1		03/25/10 08:22				
Sample: M8E 0-4.0' Results reported on a "dry-we		4029654054	Collecte	ed: 03/17/1	10 00:00	Received: 03/	/20/10 08:43 M	atrix: Solid		
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual	
6010 MET ICP	Analytica	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	<b>311</b> mg/kg		5.1	0.30	1	03/23/10 17:00	03/25/10 04:22	7440-38-2		
Percent Moisture	Analytical Method: ASTM D2974-87									
Percent Moisture	61.8 %		0.10	0.10	1		03/25/10 08:22			
Sample: M8E 4-6.0'	Lab ID:	4029654055	Collecte	ed: 03/17/1	0 00:00	Received: 03/	/20/10 08:43 M	atrix: Solid		
Results reported on a "dry-wo	eight" basis									
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual	
6010 MET ICP	Analytica	I Method: EPA	6010 Prepa	ration Meth	nod: EPA	A 3050				
Arsenic	<b>24.4</b> r	ng/kg	4.5	0.26	1	03/23/10 17:00	03/25/10 04:27	7440-38-2		
Percent Moisture	Analytica	I Method: ASTM	и D2974-87							
Percent Moisture	60.5	%	0.10	0.10	1		03/25/10 08:22			
Sample: M8E 6-8.0'	Lab ID:	4029654056	Collecte	ed: 03/17/1	0 00:00	Received: 03/	/20/10 08:43 M	atrix: Solid		
Results reported on a "dry-wo	eight" basis									
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual	
6010 MET ICP	Analytica	l Method: EPA (	6010 Prepa	ration Meth	nod: EP	43050				
Arsenic	<b>12.9J</b> n	ng/kg	15.1	0.88	1	03/23/10 17:00	03/25/10 04:30	7440-38-2		

Date: 03/31/2010 02:49 PM

**Percent Moisture** 

Percent Moisture

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0.10

0.10

Analytical Method: ASTM D2974-87

87.8 %

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Project:

7201.15 KEWAUNEE MARSH

Pace Project No.:

4029654

Sample: M9F 0-4.0'

Lab ID: 4029654057

Collected: 03/17/10 00:00 Received: 03/20/10 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

Results reported on a dry-w	reignt basis										
Parameters	Results Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual			
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050										
Arsenic	<b>348</b> mg/kg	5.9	0.34	1	03/24/10 11:35	03/25/10 17:55	7440-38-2				
Percent Moisture	Analytical Method: AST	M D2974-87									
Percent Moisture	70.0 %	0.10	0.10	1		03/25/10 08:22					
Sample: M9F 4.0-6.0'	Lab ID: 4029654058	Collected	1: 03/17/1	0 00:00	Received: 03/	/20/10 08:43 M	atrix: Solid				
Results reported on a "dry-w	eignt" basis										
Parameters	Results Units	LOQ _	LOD	DF	Prepared	Analyzed	CAS No.	Qual			
6010 MET ICP	Analytical Method: EPA	Analytical Method: EPA 6010 Preparation Method: EPA 3050									
Arsenic	<b>452</b> mg/kg	5.6	0.32	1	03/24/10 11:35	03/25/10 17:59	7440-38-2				
Percent Moisture	Analytical Method: AST	M D2974-87									
Percent Moisture	67.8 %	0.10	0.10	1		03/25/10 08:23					
Sample: M9F 6.0-8.0' Results reported on a "dry-w	Lab ID: 4029654059	Collected	1: 03/17/1	00:00	Received: 03/	/20/10 08:43 Ma	atrix: Solid				
Parameters	Results Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual			
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050										
Arsenic	8 <b>2.1</b> mg/kg	13.7	0.79	1	03/24/10 11:35	03/25/10 18:03	7440-38-2				
Percent Moisture	Analytical Method: ASTI	Analytical Method: ASTM D2974-87									
Percent Moisture	86.3 %										
Sample: M10F 0-4.0' Results reported on a "dry-water of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the suppor	Lab ID: 4029654060 eight" basis	Collected	l: 03/17/10	00:00	Received: 03/	20/10 08:43 Ma	atrix: Solid				
Parameters	Results Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual			
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050										
Arsenic	357 mg/kg	4.3	0.25	1	03/24/10 11:35	03/25/10 18:06	7440-38-2				
Percent Moisture	Analytical Method: ASTI	M D297 <b>4</b> -87									
Percent Moisture	59.3 %	0.10	0.10	1		03/25/10 08:23					

Date: 03/31/2010 02:49 PM

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#### ANALYTICAL RESULTS

Project:

7201.15 KEWAUNEE MARSH

Pace Project No .:

4029654

Sample: M10F 4-6'

Lab ID: 4029654061

Collected: 03/17/10 00:00 Received: 03/20/10 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters Units LOQ Results

589 mg/kg

69.3 %

5.9 0.34

LOD

DF

Analyzed

CAS No. Qual

Percent Moisture

Percent Moisture

6010 MET ICP

Arsenic

Analytical Method: ASTM D2974-87

0.10

Analytical Method: EPA 6010 Preparation Method: EPA 3050

Prepared

Sample: M10F 6-8.0'

Lab ID: 4029654062

03/25/10 08:23

Analyzed

Collected: 03/17/10 00:00 Received: 03/20/10 08:43

Results reported on a "dry-weight" basis

Parameters

Results Units

LOQ

LOD

0.10

Prepared

CAS No. Qual

6010 MET ICP

Analytical Method: EPA 6010 Preparation Method: EPA 3050

0.81 14.1

DF

**Percent Moisture** 

Percent Moisture

Arsenic

52.7 mg/kg Analytical Method: ASTM D2974-87

86.3 %

LOQ

0.10

0.10

03/25/10 08:24

Sample: M11F 0-2.0'

Lab ID: 4029654063

Collected: 03/17/10 00:00

Matrix: Solid

Results reported on a "dry-weight" basis

Results

Units

LOD

DF

Received: 03/20/10 08:43

CAS No.

Parameters

**6010 MET ICP** Analytical Method: EPA 6010 Preparation Method: EPA 3050

106 mg/kg

Prepared

Analyzed

Qual

Arsenic **Percent Moisture** 

Analytical Method: ASTM D2974-87

5.0 0.29

1

Percent Moisture

Sample: M11F 2.0-4.0'

Lab ID: 4029654064

60.7 %

0.10

03/25/10 08:24

Received: 03/20/10 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

0.10

Collected: 03/17/10 00:00

03/25/10 08:24

Parameters Results

Units

Analytical Method: ASTM D2974-87

LOQ

LOD

0.10

DF

Prepared

Analyzed

CAS No. Qual

6010 MET ICP

Analytical Method: EPA 6010 Preparation Method: EPA 3050

0.10

Arsenic

Percent Moisture

Percent Moisture

549 mg/kg

73.3 %

6.6 0.38

03/24/10 11:35 03/25/10 18:30 7440-38-2

Date: 03/31/2010 02:49 PM

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without the written consent of Pace Analytical Services, Inc..



#### **ANALYTICAL RESULTS**

Project:

7201.15 KEWAUNEE MARSH

Pace Project No.:

4029654

Sample: M11F 4.0-6.0'

Lab ID: 4029654065

**3.3J** mg/kg

75.3 %

Analytical Method: ASTM D2974-87

Collected: 03/17/10 00:00 Received: 03/20/10 08:43 Matrix: Solid

Results reported on a "dry-weight" basis

Results reported on a "dry-wei	ight" basis								
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	l Method: EPA	6010 Prepara	ation Meth	nod: EP	<b>A</b> 3050			
Arsenic	160 r	mg/kg	14.0	0.81	1	03/24/10 11:35	03/25/10 18:34	7440-38-2	
Percent Moisture	Analytica	I Method: ASTN	и D2974-87						
Percent Moisture	86.0	<b>%</b>	0.10	0.10	1		03/25/10 08:24		
Sample: M11F 6.0-8.0' Results reported on a "dry-wei		4029654066	Collected	: 03/17/1	0 00:00	Received: 03/	/20/10 08:43 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Melhod: EPA 6	6010 Prepara	ation Meth	nod: EP	N3050			
Arsenic	27.5 1	ng/kg	14.9	0.86	1	03/24/10 11:35	03/25/10 18:38	7440-38-2	
Percent Moisture	Analytica	l Method: ASTM	0 D2974-87						
Percent Moisture	87.7	%	0.10	0.10	1		03/25/10 08:24		
Sample: M11F 8.0-10.0' Results reported on a "dry-wei		4029654067	Collected	: 03/17/1	0 00:00	Received: 03/	/20/10 08:43 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA 6	6010 Prepara	ation Meth	nod: EP	A 3050	-		
Arsenic	<b>62.9</b> r	ng/kg	11.6	0.67	1	03/24/10 11:35	03/25/10 18:42	7440-38-2	
Percent Moisture	Analytica	I Method: ASTM	и D2974 <b>-8</b> 7						
Percent Moisture	84.5	%	0.10	0.10	1		03/25/10 08:24		
Sample: M11F 10.0-12.0' Results reported on a "dry-wei		4029654068	Collected	: 03/17/1	0 00:00	Received: 03/	/20/10 08:43 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	— ——— - Analytica	I Method: EPA 6		ation Meth	nod: EP	\3050			

Date: 03/31/2010 02;49 PM

Arsenic

**Percent Moisture** 

Percent Moisture

#### REPORT OF LABORATORY ANALYSIS

0.10

Page 25 of 36

03/25/10 08:24



0.44

0.10



#### **ANALYTICAL RESULTS**

Project:

7201.15 KEWAUNEE MARSH

Pace Project No.:

4029654

Sample: M12F 0-4.0'

Lab ID: 4029654069

74.9 %

Collected: 03/17/10 00:00 Received: 03/20/10 08:43 Matrix: Solid

03/25/10 08:25

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	l Method: EPA	6010 Prepar	ation Meth	od: EP/	A 3050			
Arsenic	204 ו	mg/kg	4.2	0.24	1	03/24/10 11:35	03/25/10 18:50	7440-38-2	
Percent Moisture	Analytica	l Method: ASTN	и D2974-87						
Percent Moisture	58.3	%	0.10	0.10	1		03/25/10 08:24		
Sample: M12F 4.0-6.0' Results reported on a "dry-w		4029654070	Collected	d: 03/17/1	0 00:00	Received: 03/	/20/10 08:43 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	l Method: EPA (	6010 Prepar	ation Meth	od: EP	A3050			
Arsenic	313 ו	mg/kg	11.9	0.69	1	03/25/10 10:00	03/26/10 15:24	7440-38-2	
Percent Moisture	Analytica	l Method: ASTN	л D2974-87						
Percent Moisture	84.7 9	%	0.10	0.10	1		03/25/10 08:25		
Sample: M12F 6.0-8.0' Results reported on a "dry-we		4029654071	Collected	d: 03/17/1	0 00:00	Received: 03/	/20/10 08:43 Ma	atrix: Solid	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytica	I Method: EPA 6	6010 Prepar	ation Meth	od: EPA	A 3050			
Arsenic	7.6 1	ng/kg	7.4	0.43	1	03/25/10 10:00	03/26/10 15:28	7440-38-2	
Percent Moisture	Analytica	l Method: ASTM	1 D2974-87						

0.10

0.10

1

Date: 03/31/2010 02:49 PM

Percent Moisture

**REPORT OF LABORATORY ANALYSIS** 

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Project:

7201.15 KEWAUNEE MARSH

Pace Project No.:

4029654

QC Batch:

MPRP/3799

Analysis Method:

EPA 6010

QC Batch Method

EPA3050

Analysis Description:

6010 MET

Associated Lab Samples:

4029654009, 4029654010, 4029654011, 4029654012, 4029654013, 4029654014, 4029654015, 4029654016

METHOD BLANK: 277796

Matrix: Solid

Associated Lab Samples:

4029654001, 4029654002, 4029654003, 4029654004, 4029654005, 4029654006, 4029654007, 4029654008, 4029654009, 4029654010, 4029654011, 4029654012, 4029654013, 4029654014, 4029654015, 4029654016

Blank

Reporting

Parameter

Units

Units

Result

Limit

Analyzed

Qualifiers

Arsenic

< 0.12

2.0 03/23/10 17:10

LABORATORY CONTROL SAMPLE:

Parameter

277797

mg/kg

Spike

LCS Result

LCS % Rec % Rec Limits

Arsenic

Parameter

Arsenic

mg/kg

Units

mg/kg

Conc 50

47.0

MSD

Result

53.6

80-120

Qualifiers

MATRIX SPIKE & MATRIX SPIKE DUPLICATE:

277798

Result

4.6

MSD

277799 MS

MS

94

MSD

% Rec

Max

4029572022

MS Spike Conc.

Spike Conc. 50.9 53

Result 54.6

% Rec

% Rec

Limits 75-125

RPD RPD Qual 20





Project:

7201.15 KEWAUNEE MARSH

Pace Project No.:

4029654

QC Batch:

MPRP/3800

Analysis Method:

EPA 6010

QC Batch Method:

EPA 3050

Analysis Description:

6010 MET

Associated Lab Samples:

4029654017, 4029654018, 4029654019, 4029654020, 4029654021, 4029654022, 4029654023, 4029654024,

4029654025, 4029654026, 4029654027, 4029654028, 4029654029, 4029654030, 4029654031, 4029654032,

4029654033, 4029654034, 4029654035, 4029654036

METHOD BLANK: 277880

Matrix: Solid

Associated Lab Samples:

4029654017, 4029654018, 4029654019, 4029654020, 4029654021, 4029654022, 4029654023, 4029654024, 4029654025, 4029654026, 4029654027, 4029654028, 4029654029, 4029654030, 4029654031, 4029654032,

4029654033, 4029654034, 4029654035, 4029654036

Blank

Reporting

Parameter

Units

Result

Limit Analyzed Qualifiers

mg/kg < 0.12 2.0 03/25/10 00:40

LABORATORY CONTROL SAMPLE:

277881

Units

mg/kg

Spike

LCS

LCS % Rec % Rec

Qualifiers

Units Conc Limits Parameter Result mg/kg 50 49.7 99 80-120

MATRIX SPIKE & MATRIX SPIKE DUPLICATE:

277882

Result

109

277883

MS

MSD

MS

MSD

% Rec

Max

Parameter

Arsenic

Arsenic

MSD Spike

104

106

% Rec

Limits

RPD RPD

Qual

Arsenic

4029654017

Spike Conc. Conc

MS Result 244

Result 250 % Rec 129 132

75-125

2

20 M0

Date: 03/31/2010 02:49 PM

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Project: 7201.15 KEWAUNEE MARSH

Pace Project No.: 4029654

QC Batch: MPRP/3805 Analysis Method: EPA 6010
QC Batch Method: EPA3050 Analysis Description: 6010 MET

Associated Lab Samples: 4029654037, 4029654038, 4029654039, 4029654040, 4029654041, 4029654042, 4029654043, 4029654044,

4029654045, 4029654046, 4029654047, 4029654048, 4029654049, 4029654050, 4029654051, 4029654052,

4029654053, 4029654054, 4029654055, 4029654056

METHOD BLANK: 278047 Matrix: Solid

Associated Lab Samples: 402965403'7, 4029654038, 4029654039, 4029654040, 4029654041, 4029654042, 4029654043, 4029654044,

4029654045, 4029654046, 4029654047, 4029654048, 4029654049, 4029654050, 4029654051, 4029654052,

 $4029654053,\,4029654054\,,4029654055,\,4029654056$ 

Blank Reporting

 Parameter
 Units
 Result
 Limit
 Analyzed
 Qualifiers

 mg/kg
 <0.12</td>
 2.0
 03/25/10 02:43

Arsenic mg/kg <0.12 2.0 03/25/10 02:4

LABORATORY CONTROL SAMPLE: 278048

LCS LCS Spike % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Arsenic 50 48.3 97 80-120 mg/k

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 278049 278050

MS MSD

4029654037 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Conc Conc. Result % Rec % Rec Limits RPD RPD Qual Result Result 46.6 404 75-125 .8 20 Arsenic mg/kg 401 453 449 101 100





Project:

7201.15 KEWAUNEE MARSH

Pace Project No .:

4029654

QC Batch:

MPRP/3807

Analysis Method:

EPA 6010

QC Batch Method:

EPA 3050

Analysis Description:

6010 MET

Associated Lab Samples:

4029654057, 4029654058, 4029654059, 4029654060, 4029654061, 4029654062, 4029654063, 4029654064, 4029654065, 4029654066, 4029654067, 4029654068, 4029654069

METHOD BLANK: 278216

Matrix: Solid

Associated Lab Samples:

4029654057, 4029654058, 4029654059, 4029654060, 4029654061, 4029654062, 4029654063, 4029654064,

4029654065, 4029654066, 4029654067, 4029654068, 4029654069

Blank

Reporting

Parameter

Units

Units

Result

Limit

Analyzed

Qualifiers

Arsenic

mg/kg

0.15J

2.0 03/25/10 17:03

LABORATORY CONTROL SAMPLE:

Parameter

Parameter

278217

Spike Conc.

LCS Result

LCS % Rec % Rec Limits

Qualifiers

Arsenic

mg/kg

mg/kg

50

47.7

278219

95

80-120

MATRIX SPIKE & MATRIX SPIKE DUPLICATE:

278218

7 7

MSD

Spike

MS

MSD Result

56.9

MSD % Rec % Rec

Max

RPD RPD

Arsenic

4029668002 Units Result

MS Spike

Conc. 56.2

Conc. Result 55.9

57.0

MS % Rec 88

Limits 75-125 88

Qual .03 20

Date: 03/31/2010 02:49 PM

REPORT OF LABORATORY ANALYSIS

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Project[,]

7201.15 KEWAUNEE MARSH

Pace Project No.:

4029654

QC Batch:

MPRP/3810

Analysis Method: Analysis Description: EPA 6010 6010 MET

Q C Batch Method:

Associated Lab Samples:

EPA 3050

4029654070, 4029654071

Matrix: Solid

Associated Lab Samples:

METHOD BLANK: 278614

4029654070, 4029654071

Blank

Reporting

Parameter

Units

Result

Limit

Qualifiers Analyzed

Arsenic

mg/kg

< 0.12

2.0 03/26/10 14:34

LABORATORY CONTROL SAMPLE:

Parameter

Parameter

Units

4029669005

Result

0.53J

Spike Conc.

LCS Result

LCS % Rec

% Rec Limits

Qualifiers

Arsenic

mg/kg

50

48.9

98

80-120

MATRIX SPIKE & MATRIX SPIKE DUPLICATE:

278616

278617

MS

MS Spike MSD Spike

MSD Result Result

MS % Rec

MSD % Rec % Rec Limits

Max RPD RPD Qual

Arsenic

mg/kg

Units

Conc

52.1

Conc. 51.9

50.0 50.3 95

75-125

.5 20







Project:

7201.15 KEWAUNEE MARSH

Pace Project No.:

4029654

QC Batch:

PMST/3750

Units

Analysis Method:

ASTM D2974-87

QC Batch Method:

ASTM D2974-87

Analysis Description:

Dry Weight/Percent Moisture

Associated Lab Samples:

4029654001, 4029654002, 4029654003, 4029654004, 4029654005, 4029654006, 4029654007, 4029654008, 4029654009, 4029654010, 4029654011, 4029654012, 4029654013, 4029654014, 4029654015, 4029654016,

4029654017, 4029654018, 4029654019, 4029654020

SAMPLE DUPLICATE: 278467

4029654001 Result

Dup Result

**RPD** 

Max RPD

Qualifiers

Parameter Percent Moisture

%

43.9

10







Project:

7201.15 KEWAUNEE MARSH

Pace Project No.:

4029654

QC Batch:

PMST/3751

Analysis Method:

ASTM D2974-87

QC Batch Method:

ASTM D2974-87

Analysis Description:

Dry Weight/Percent Moisture

Associated Lab Samples:

2

 $\frac{4029654029}{4029654030},\frac{4029654031}{4029654031},\frac{4029654032}{4029654033},\frac{4029654034}{4029654034},\frac{4029654035}{4029654036},\frac{4029654036}{4029654030},\frac{4029654039}{4029654030},\frac{4029654039}{4029654030},\frac{4029654033}{4029654030},\frac{4029654033}{4029654030},\frac{4029654033}{4029654030},\frac{4029654033}{4029654030},\frac{4029654033}{4029654030},\frac{4029654033}{4029654030},\frac{4029654033}{4029654030},\frac{4029654033}{4029654030},\frac{4029654033}{4029654030},\frac{4029654033}{4029654030},\frac{4029654033}{4029654030},\frac{4029654033}{4029654030},\frac{4029654033}{4029654030},\frac{4029654033}{4029654030},\frac{4029654033}{4029654030},\frac{4029654033}{4029654030},\frac{4029654033}{4029654030},\frac{4029654033}{4029654030},\frac{4029654033}{4029654030},\frac{4029654033}{4029654030},\frac{4029654033}{4029654030},\frac{4029654033}{4029654030},\frac{4029654039}{4029654030},\frac{4029654039}{4029654030},\frac{4029654039}{4029654030},\frac{4029654039}{4029654030},\frac{4029654039}{4029654030},\frac{4029654039}{4029654030},\frac{4029654039}{4029654030},\frac{4029654039}{4029654030},\frac{4029654039}{4029654030},\frac{4029654039}{4029654030},\frac{4029654039}{4029654030},\frac{4029654039}{4029654030},\frac{4029654039}{4029654030},\frac{4029654030}{4029654030},\frac{4029654030}{4029654030},\frac{4029654030}{4029654030},\frac{4029654030}{4029654030},\frac{4029654030}{4029654030},\frac{4029654030}{4029654030},\frac{4029654030}{4029654030},\frac{4029654030}{4029654030},\frac{4029654030}{4029654000},\frac{4029654030}{4029654000},\frac{4029654030}{4029654000},\frac{4029654000}{4029654000},\frac{4029654000}{4029654000},\frac{4029654000}{4029654000},\frac{4029654000}{4029654000},\frac{4029654000}{40296540000}$ 

SAMPLE DUPLICATE: 278523

Parameter

4029654021 Result

Dup Result

**RPD** 

Qualifiers

Percent Moisture

%

Units

48.8

49.5

10

Max RPD







Project:

7201.15 KEWAUNEE MARSH

Pace Project No.:

4029654

QC Batch:

PMST/3752

Analysis Method:

ASTM D2974-87

QC Batch Method:

ASTM D2974-87

Analysis Description:

Dry Weight/Percent Moisture

Associated Lab Samples:

4029654041, 4029654042, 4029654043, 4029654044, 4029654045, 4029654046, 4029654047, 4029654048,

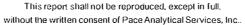
4029654057, 4029654058, 4029654059, 4029654060

SAMPLE DUPLICATE: 278539

		4029654041	Dup		Max	
Parameter	Units	Result	Result	RPD	RPD	Qualifiers
Percent Moisture	%	64.1	64.6	8.	10	

Date: 03/31/2010 02:49 PM

REPORT OF LABORATORY ANALYSIS









Project: 7201.15 KEWAUNEE MARSH

Pace Project No.: 4029654

QC Batch: PMST/3753 Analysis Method: ASTM D2974-87

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

Associated Lab Samples: 4029654061, 4029654062, 4029654063, 4029654064, 4029654065, 4029654066, 4029654067, 4029654068,

4029654069, 4029654070, 4029654071

SAMPLE DUPLICATE: 278559

		4029654061	Dup		Max	
Parameter	Units	Result	Result	RPD	RPD	Qualifiers
Percent Moisture	%	69.3	66.2	5	10	





#### **QUALIFIERS**

Project: 7201.15 KEWAUNEE MARSH

Pace Project No.: 4029654

#### **DEFINITIONS**

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

ND - Not Detected at or above adjusted reporting limit.

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

MDL - Adjusted Method Detection Limit.

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

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

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

#### **ANALYTE QUALIFIERS**

Date: 03/31/2010 02:49 PM

B Analyte was detected in the associated method blank.

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

REPORT OF LABORATORY ANALYSIS

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RMT.

## **CHAIN OF CUSTODY RECORD**

63813

			ladison, WI 53			K	·	F	iltered	(Yes/No	1/W	//	///	
Project No		Projec	t/Client:	www.rmtinc.com	$\neg$			Preser			<u>/4/</u>	//		
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Project Ma			_					Secri		//	//	/,	///	A — NONE B — HNO ₁
Diele	- F.JL	1 Bol	. Startert	4	Umber ainers	×	M		/,	//	//	//	///	C — H ₂ SO ₄ D — N ₂ OH
Lab No.	Yr. <u>lO</u> Date	Time		Sample Station ID	Total Number of Containers	MATRIX	Andr		//	//	//		Comment	E — HCI F — METHANOL •••
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000			MIS	7.5-5.0			X							
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608			142B	7.5-10.0	1		X							
D30			MZC	Ď-2. <i>5</i>	1	$\downarrow$	>							$\downarrow$
010/402	3/12		Mzc	2,5-5,0	1	50,1	X						Sant .h	20 lock bass
SPECIAL IN	ISTRUCTIO	ONS	Promoter of the state		U					· · · · · · · · · · · · · · · · · · ·				
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## **CHAIN OF CUSTODY RECORD**

-		-	ladison, WI 53								Yes/No)	/v/	$\angle$			
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Project No. 7201, 13		Projec	t/Client:	ars)		Ì		345 S		رکي		//	//	///		PRESERVED CODES
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Vick 1	-,56	/ LDo:	> Standa	74	Total Number of Contoiners	×		145°	150	/ /	///	//	//			C — H ₂ SO ₄ D — NoOH
Lab No. Y	r. 10				7 Z &	MATRIX	PZ	X	Ζ,	/,	//	/ ,	//			E — HCI
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01)	3/17	_	MZC	5,0-7.57	Ì	Soil	X			ĺ						2 plack bays
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017			M2F	0-2.5'	1		X									
018			MIF	7.5-5,•	}		χ									
619	$\downarrow$		MZF	5,0-7.51	1	1	X							V		
600	3/17		MJE	7,5-10,0	Ì	Soil	X							Sen't	2.	dock bugs
SPECIAL INS	TRUCTIO	ONS									-					
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SAMPLER Re	inquishe		ot re) Date 3/18/10/6:	e/Time Received by (Signature)	Da	te/Time D/CO	HAZ	ARDS A			Tom Are	ound (ci	ircle on	e) Norm	ا راه	Rush
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Dif	-			1	Com Highly					_	(For Lab Us	e Only)				
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CSLOOKS	tics	3/20	1843	_		1		lemp B	lank	Y (1	<b>'</b> )	(^	Vet/Metals}			
Custody Seal		ent/Absen	3120 (10 8 i\ Intact/Not	19 July July 11 Hotact Seal #s	<del>,</del>						<u> </u>					

			ladison, WI 537						Fil	tered (	Yes/No)	W	//	///	//	///
Phone 608/	['] 831-444	1 • Fax 60	8/831-3334 • w	ww.rmtinc.com				ī	reserv	ed (Co	ode) /1	/	/_	///		/ /
Project No. 7201 (15) Proj ct Mar	nager/Co	ntact Pers	it/Client: u au nee Mo on:  Stantar	•	Total Number of Containers	×	And	74.86.	gety	şto /						PRESERVED CODES A — NONE B — HNO ₃ C — H ₂ SO ₄ D — N <del>o</del> OH
Lab No.	Yr. 10 Dat	Time		Sample Station ID	Total N of Con	MATRIX	Ari		/v /	/	//	//	//	Comments	::	E — HCI F — METHANOL G —
02	3/17		m 512	0.7.0,	1	Soil	$\aleph$							Sent.	L 2.)	lack bass
-022			MSA	2-4.0`	1		$\chi$								1	
023	-		MSA	4-6,0			χ								1	
024			M 5A	6-80	1		X									
075			MSA	8-100,	}		k									
076	-		M 5 B	0-2,01			X									
	•		M5B	20-4.0,	\		$ \lambda $									
078			MSB	4.0-6.0	1		X									
529	$\downarrow$		MSB	6.0-8.D'	[		$\chi$							4	J	
630	3/17		M5B	8.0-10.0	1	Soil	$ \mathcal{X} $							Senf.	h Z.)p	lock bugs
SPECIAL IN	STRUCTIO	ONS					·							-		
Relinquished by (Signature) Date/Time   Received by (Signature)						e/Time	ν	VITH S	ASSOC SAMPLE mable	ES	Turn Ar			one) Narm	R	ush
D. ton 3/19/10/200					Dar	e/ nme		Com	osive y Toxic				AG	(For Lab Us	•	
Relinquish d by (Signature) Date/Time Received by (Signature)  Signature Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Supplies Su						e/Time U 10 845		Othe	-		Receip Temp (					c ipt pH (et/Metals)
	7.1		ntact/Not Ir											_		

# RMT.

RMT Inc., 744 Heartland Trail, Madison, WI 53717-1934				F	iltered (	Yes/No) /	W/	///	////
Phone 608/831-4444 • Fax 608/831-3334 • www.rmtinc.com				Preser	ved (Co	ode) //	/_/	///	
Project No. 7201.15  Project/Client: 1/201.15  Project Manager/Contact Person:  Dicle Gold / Bob Stanfort	ber iers		Prody.	s ed	Se Se S				PRESERVED CODES  A - NONE  B - HNO ₃ C - H ₂ SO ₄
P 200 1-32 / 1063 21-7010170	a in a	ž	1 74	/25°/	//	///		///	D-NoOH
Lab No. Yr. 10 Date Time Sample Station ID	Total Number of Containers	MATRIX	Pro		//	//		Comment	E HCI F METHANOL s: G
031 3/17 MSC 0-2.5°	١	Soil	X					Sent.	il ziblack bags
032 1 MSC 2.5-S,D'	(	1	X						
053   MSC 5,0-7,5	١		入						
034 MSC 7.5-10.0	Ì		Х						
035   MSE 0-2.01	1		X						
036 MSE 2.0-4.01	1		X						
037   MSE 4.0-6.0'	{		X						
058   MSE 6,0.80'	1		χ						
539 V MSE 8,0-10.0'	1	1	X		-				
640 3117 MEE 10,0-12.01	1	Soil	X					Sent.	Zipiloche bags
SPECIAL INSTRUCTIONS							•	•	
SAMPLER Relinquished by (Signature)  Date/Time Received by (Signature)  Relinquished by (Signature)  Date/Time Received by (Signature)		e/Time 0 200 e/Time	HAZARDS WITH	SAMPI	LES		ound (circ		Rush
D. Fennel 3)19/101700	- Dan	e, rane	☐ Co		ic		- 6	(For Lab Us	·
Relinquished by (Signature)  CG (00) SM15  3/20/10 845  HUM HWM	5,101	e/Time		•		Receipt	Temp: (G		Receipt pH (Wet/Metals)
Custody Seal: Present/Custody Seal #s									

# RMT.

	RMT Inc., 744 Heartland Trail, Madison, Wl 53717-1934 Phone 608/831-4444 • Fax 608/831-3334 • www.rmtinc.com										Yes/No)	W/	//		//	
Phone 608/	831-444	4 • Fax 60	8/831-3334 • www.r	munc.com	_					ed (Co			<u>/                                     </u>	<u>/ / /</u>	_/_/	/ /
Project No 7201. { Project Mo	5	Ke	t/Client: wauner Marsi on:	L	-			differ	AUE	sied/		//			//	PRESERVED CODES A — NONE
] '	•		ob Stanfarth		Total Number of Containers	RIX		dife?	\$\\ \$_\ \$\			//				B — HNO ₃ C — H ₂ SO ₄ D — NoOH
Lab No.	Yr. <u>iO</u> Date	Time	Sai	mple Station ID	Total N of Cor	MATRIX	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		//	//	//	//	//	Comments	s:	E — HCI F — METHANOL G —
041	3/17		MSE 12-14		1	Soil	$\bowtie$							Sen ,	7. Z.	lock bags
042	1		MSE 14-				ळ									
043	<u> </u>		A5F 0-		1 1		$\mathcal{X}$								<u> </u>	
644			MSF 2.		1 1		X								<u> </u>	
045			MSF 5		***		λ								<u> </u>	
046			MSF 7	.5-10.cl	(		λ							į	<u> </u>	
647			MLE O	-401			λ									
648			MGE 4		1		λ									
849			MLE 6-	8,0	} }	d	X								-	
620	3/17		M7E 0-	7.0'		Sail	X							Sentia	2.71	och Lags
SPECIAL IN	ISTRUCTI	ONS	-				-					-				
SAMPLER Relinquished by (Signature)  3/10/(o 1(:))  Relinquished by (Signature)  Date/Time Received by (Signature)  Received by (Signature)						e/Time	> HAZ	ARDS A MTH S. I Flamr	AMPLE		Turn A Report		circle c	one) Norm	gD R	ush 
D. Enu 3/19/10 1700								Corro Highly			D	ot Temp	.)	(For Lab Use	•	
Relinquished by (Signature)  One/Time Received by (Signature)  One/Time Received by (Signature)  One/Time Received by (Signature)  One/Time Received by (Signature)						Time  43		Other	r (list)		Temp	priemp Blank	Υ (			ceipt pH et/Metals}
<del></del>	<del>(</del>	ent/Absen	ntact/Not Intact			,	***************************************						_			

## RMT

## **CHAIN OF CUSTODY RECORD**

RMT Inc., 744 Heartland Trail, Madison, WI 53717-1934					Fil	ered (	Yes/No}	NI				///
Phone 608/831-4444 • Fax 608/831-3334 • www.rmtinc.com					reserv	_ •		4/	<u> </u>	/ /	//	//
Project No. 7201.15 Project Manager/Contact Person:  Project Manager/Contact Person:			Pr.		gy ^e	sied/	//		/	//		PRESERVED CODES A — NONE
Dich Fish / Bob Stafe H	Total Number of Containers	×		Wes.	21/	)/	//	//	//	//		B HNO ₃ C H ₂ SO ₄ D NoOH
Lab No. Yr. 10 Date Time Sample Station ID	Total N of Con	MATRIX	AC		2 r /	/	//	//	//	Com	ments:	E — HCI F — METHANOL G —
S/ 3/17   M7E 2-4.0	\	501	X							SQ.	G.5 -1. f	lock bags
052 M7E 4-6.0		1	X									
053 M7E 6-8.0			X									
054 M8E 0-40	1		18									:
055 M8E 4-6.0			$ \mathcal{X} $									
056 M8E 6-8.0			X								<u> </u>	
c57   M9F 0-4.0			1x									
058 M9F 4.0-6,0	<b> </b>											
059 J M9F 6.0-8.0			$ \chi $								<u>لــــــل</u>	
660 3/17 MIDF 0-4.0	1	50.4	$ \lambda $							5en:	f.2 2/p	lick bays
SPECIAL INSTRUCTIONS									•	<b>W</b>		,
							_		_	_		
SAMPLER Relinquished by (Signature)  3/13/10  Relinquished by (Signature)  Date/Time Received by (Signature)  Received by (Signature)	19/10	e/Time DO Q e/Time	HAZA V	ARDS A WTH S Flam	AMPLE			Due		one) (	Vormal	Rush
D- Enewy 3/19/10 1700	Dui	o, mio	_	Corre						(For Lo	ab Use Only)	
Relinquished by (Signature)  Date/Time Received by (Signature)	Dat	e/Time	1	Highly Other				ipt Temp			ſ	Receipt pH
C5601840 312011 843 Freethibrur	31201	(U 843		Отне	11121)		Temp	Blank	Y	( <u>L</u> )	,	Wet/Metals)
Custody Seal: Present/Absent Intact/Not Intact Seal #s										_	_	



•		•	ladison, WI 53717-1				, in the second		Fi	iltered (	(Yes/No)	/W/	/_		////
Phone 608/83	31-4444	• Fax 60	8/831-3334 • www.i	mtinc.com					Preser	ved (Co	ode)	M/			
Project No. 7201.15 Project Mana		le	t/Client: Waunee Ma	rsl	<u> </u>			andly se	.5	e jed	//	//	//		PRESERVED CODES A—NONE
_ '	•		_	. 1	م یا				Say		//	//	/ /		B-HNO ₃
1 Vick	-156	13	ob Stanfa	. H	Total Number of Containers			Se	ر براج	/	//	//	/	///	C — H ₂ SO ₄
<del></del>	<del></del>	<del></del>			ZZ	MATRIX	1.	COLLY.	¥/			//			D — NGOH E — HCI
Lab No. Y	r. <u>[ 0  </u>				P S S	≸	1		γ,	/ /	//	//	/ /		F — METHANOL
	Date	Time	Sa	mple Station ID				/	/	/.	//	//		Comments:	G
061 -	3/17		MIOF 4			<u>S</u> a.'	1 >							Senf, L	ziplockbag
062			MIOF 6	8.01	)	1	\	<i>-</i>							1
063			MILE O	-2.0'	11	-	\	- -							
064			MIT	2,0-4.0											
06.5	1	1		1,0-6.0	] [		1)	<u>.</u>						1	
066			MIF		1		Īχ								
067				8.0-10.0	1		1						İ	1	
068				120-12.0	1										
069	1			0-40°			X								/
070 3	3/17		MIZE	4.0-6.0'	1	50%	/ <i>\</i>	5						Sent in	z. plack bag
SPECIAL INST	RUCTIC	NS			· U			<u></u>	ı İ <del>paramanı</del>			I	<u> </u>		
	_			A											
SAMPLER Reli	1	*	Received by (Signature)	Dat	e/Time.	M HV	ZARDS WITH	SAMPL	ES	Turn /	Around ( rt Due _		one) Normal	Rush	
Relinquished L	Received by (Signature)	Dat	e/Time		□ Cor □ High	rosive					(For Lab Use C	Only)			
Relinquished b	y (Sign	ature)	/ Date/Time			e/Time	-	□ Othi	-			eipt Temp			Receipt pH
Co long	a legistics 3/20/10 843 Well which								,		temp	o Blank	Y	W	(Wet/Metals)
			t Intact/Not Intact												

			ladison, WI 53717-19						Filte	ered (	Yes/No	1/10		///	$\mathbb{Z}_{\mathbb{Z}}$	
Phone 608/	831-4444	• Fax 60	8/831-3334 • www.m	minc.com					Preserve			<u> </u>	$\angle$			/
Project Mai	5 nager/Co	n ac Pers	t/Client: wanter Mar on: Sh Stanforth		umber ainers	×		.\\\505	Secretary.						//	PRESERVED CODES  A — NONE  B — HNO3  C — H ₂ SO ₄ D — NoOH
Lab Na.	Yr.∫⊅ Date	Time	San	nple Station ID	Total Number of Containers	MATRIX	AC	9/6	<u> </u>	/	<u>/</u>	<u>//</u>	//	Comments		E — HCI F — METHANOL G —
071	3/17		M12F 6.	0-8.0	/	501)	p							Sent.L	2.}./	ech bag
	/				***											
		· · · · · · · · · · · · · · · · · · ·					-									
		···														
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					***************************************	}						+	+			
						<u> </u>				1						
SPECIAL IN	STRUCTIO	ONS			•	f						-				
SAMPLER Relinquished by (Signature)    Date/Time   Received by (Signature)						re/Time 6260 re/Time	HAZ		ASSOCI IAMPLES mable		1			one) Norm	ol R	Rush
kelinquisned by (Signature)  Date/ Time   Received by (Signature)						e/ IIme		Соп						(For Lab Us	e Only}	
Relinquished by (Signature)  Date/Time Received by (Signature)  Date/Time Received by (Signature)  Date/Time Received by (Signature)					Dat  } 3 (	e/Time W/(1543	∟ ا	Highly Other				ceipt Ter np Blanl				eceipt pH /et/Metals)
Custody Se	al: Prese	ent/Absen														

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

### Sample Condition Upon Receipt

PaceAnalytical Client Nam	e: RMT			Project#	4029654
Courier:   Fed Ex   UPS   USPS	Client Co	mmerc	ial Pace Ot	her	
Tracking #:		,,,,,,	, , , , , , , , , , , , , , , , , , , ,		
Custody Seal on Cooler/Box Present:	• •	Seals Non Wet	Blue Dry None	no	Optional: Proj. Due Bate: Proj. Name: ice, cooling process has begun
Cooler Temperature (LO)	Biological	lissue	is Frozen: yes	2	
Temp Blank Present: yes no	. 5: .		j 110	Person exa	mining contents: 20//0
Temp should be above freezing to $6^{\circ}$ % for all sample 6 Biota Samples should be received $\leq 0^{\circ}$ C.	ехсері віоіа.		Comments:	Initials:	
Chain of Custody Present:	∐Yes □No	□N/A	1.		
Chain of Custody Filled Out:	Óyes □No	[]]N/A	2.		
Chain of Custody Relinquished:	☐Yes ☐No	□n/a	3.		
Sampler Name & Signature on COC:	ZYes □No	□n/a	4.		
Samples Arrived within Hold Time:	ÚÝes □No	□n/a	5.		
Short Hold Time Analysis (<72hr):	□Yes □No	□N/A	6.		
Rush Turn Around Time Requested:	□Yes □No	□n/a	7.		
Sufficient Volume:	Yes DNo	[]N/A	8.		
Correct Containers Used:	Yes 🗆 No	□N/A	9.		
-Pace Containers Used:	∠ □yes ØNo	[]n/a			
Containers Intact:	∐Yes □No	□n/a	10.		
Filtered volume received for Dissolved tests	∐Yes □No	ØN/A	11.		
Sample Labels match COC:	Yes Z No	$I_{\square N/A}$	12045 Jabello	5.0.7.01	(06 ic 6.0-7.5.
-Includes date/time/ID/Analysis Matrix:	5		Date mutched. or		
All containers needing preservation have been checked.	□Yes ■No	DN/A		<del>-                                      </del>	· · · · · · · · · · · · · · · · · · ·
All containers needing preservation are found to be in compliance with EPA recommendation.	□Yes □No	JIN/A			
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	□Yes □No	1	Initial when completed	Lot # of adde preservative	
Samples checked for dechlorination:	□Yes □No	ØN/A	14.	<b>'</b>	
Headspace in VOA Viałs ( >6mm):	□Yes □No	[ZN/A	15.		
Trip Blank Present:	□Yes □No	ZIN/A	16.		
Trip Blank Custody Seals Present	□Yes □No	/ N/A			
Pace Trip Blank Lot # (if purchased):  Client Notification/ Resolution:  Person Contacted:  Comments/ Resolution:		_Date/	Fime:	Field Data F	Required? Y / N
Project Manager Review:	(V		<b>\{.</b>	Dati	e: 3/22/10

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