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March 16, 2011

Mr. David Brownlee, Unit Coordinator
Response and Remediation Program
Georgia Environmental Protection Division
2 Martin Luther King, Jr. Drive, SE
Suite 1462 East Floyd Tower
Atlanta, Georgia 30334-9000

Subject: **Addendum to Voluntary Remediation Program Application and Remediation Plan**
Pursuant to the Georgia Voluntary Remediation Program Act
Former Estech General Chemicals Site - Atlanta, Georgia
HSI Site No. 10196 Parcels 17-0191-LL0244 and 17-0191-LL0400
MACTEC Project 6122-08-0154

Dear Mr. Brownlee:

On behalf of BFEL Indemnitor, Inc (BFEL), MACTEC Engineering and Consulting, Inc. (MACTEC) respectfully submits this Addendum to the Voluntary Remediation Program Application and Remediation Plan to enroll this site under the Georgia Voluntary Remediation Program Act. This Voluntary Remediation Program Application is being submitted in lieu of a Corrective Action Plan (CAP).

The initial (incomplete) VRP Application was submitted to the Georgia Environmental Protection Division (EPD) on March 18, 2010. The schedule included in the initial VRP Application estimated that a complete VRP Application could be submitted by December 31, 2010. In correspondence dated July 23, 2010, the EPD issued comments to the initial VRP Application, but provisionally accepted the site into the VRP, contingent upon addressing the EPD comments and submitting a revised VRP Application by December 31, 2010. The July 23, 2010 EPD comments included a request for sampling and analysis of additional constituents (DDD, DDE, copper, zinc, nitrate, sulfate, 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene), for which little or no previous site data were available. Groundwater and surface water sampling, including these additional constituents, was subsequently conducted in September 2010. Based on the results of this sampling and analysis, copper, zinc, nitrate, and sulfate were found in groundwater and/or surface water at levels exceeding regulatory criteria and are not fully delineated in soil or groundwater. Therefore, additional investigation is now required to:

- complete the delineation
- further evaluate contaminant migration
- further evaluate contaminant fate and transport, including groundwater and surface water interactions
- provide data to assist in further evaluating potential remediation alternatives.

In a letter to EPD dated December 7, 2010, a 6-month extension was requested for the submittal of a completed VRP Application in order to conduct the additional investigation described above. In a letter dated January 20, 2011, EPD requested that the completed VRP Application be submitted on March 16, 2011.

Since the initial Application submittal (March 18, 2010), additional activities have been conducted to provide supplemental data for the VRP Application and to respond to EPD comments. These activities are summarized as follows and the data provided in the appendices listed below.

- Groundwater samples were collected in the BFEL property monitoring wells in July 2010 and analyzed for know and established site constituents organochlorine pesticides, arsenic and lead.

- Based on EPD's July 23, 2010 letter requesting additional constituents, additional groundwater samples were collected in the BFEL and CSX property wells and analyzed for the known site constituents organochlorine pesticides, arsenic and lead and the additional constituents of copper, zinc, nitrate, sulfate, 1,2,3-trichlorobenzene, and 1,2,4-trichlorobenzene.

- Water levels were measured in the site's 21 monitoring wells in September 2010 and potentiometric surface map was prepared from this data (Figure 4.7).

- Also at the request of EPD to investigate if the upgradient site M&J Solvents was impacting downgradient properties, monitoring wells MW-22, MW-104A, and MW-104D were sampled and analyzed for volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) associated with the M&J Solvents site. The analytical results indicated that the same constituents found in the M&J Solvents site groundwater were also present in groundwater samples in monitoring wells MW-104A and MW-104 D located on the CSX property. Appendix G of this Addendum provides the data for this sampling and analyses.

- A seepage study was conducted on the un-named stream located on the CSX railroad property that is the discharge boundary for the site groundwater. The seepage study consisted of a dye-trace study to assess the dry-weather base stream flow, travel time, and groundwater seepage inflows to the stream segment. Surface water samples were collected for the analysis of total organochlorine pesticides, total and dissolved metals (arsenic, copper, lead, and zinc), 1,2,3-trichlorobenzene, 1,2,4 –trichlorobenzene, total sulfate, and total nitrate. The resulting stream flow and chemical constituent concentrations were used to determine the instream mass flow of BHC-pesticides, arsenic, lead, copper, and zinc. The results of the seepage study are provided in Appendix E of this Addendum.

- The ecological risk screening tables were also updated with the 2010 surface water data.

- The Risk Reduction Standards were revised based EPD's July 23, 2010 letter and are included in Appendix B and discussed in Appendix D.

- The fate and transport model was updated with the 2010 groundwater and surface water data (Appendix C).

- A Conceptual Exposure Model was prepared to identify the complete or potentially complete exposure pathways for humans and ecological receptors. Upper Confidence Limits (UCLs) were calculated for use as the representative exposure point concentration (EPC) for the site's detected constituents per the Georgia VRP Act of 2009. This data is presented in Appendix D.

The attached Revised Voluntary Assessment and Remediation Plan present the approach for the further investigation of soil and groundwater and for the conceptual remediation plan for the site. The cost estimate and schedule for the further investigation and remediation are presented in the attached Plan. The documents listed below are included in this transmittal to document the above 2010 activities and to provide supporting documentation of the Plan and to complete the Voluntary Remediation Plan and Application.

APPENDIX A

- Updated VRP Checklist
- List of Abutting Property Owners with Tax Maps
- Proposed Uniform Environmental Covenant with Deeds, BFEL Title Report and Plats
- CSX Permission to Conduct Proposed Corrective Action on CSX property

APPENDIX B

- Response to EPD's July 23, 2010 Comment Letter
- Tables Updated with 2010 Data – see list below
- Figures Updated with 2010 Data – see list below
- Updated Risk Reduction Standards

APPENDIX B: LIST OF TABLES

APPENDIX B: LIST OF FIGURES

APPENDIX C: Groundwater Fate and Transport Model

APPENDIX D: Conceptual Exposure Model and Calculation of UCLs and EPCs and Groundwater and Surface Water Usage Map

APPENDIX E: Dye Tracer Stream Flow Study and Surface Water Sampling

APPENDIX F: Laboratory Reports for 2010 Groundwater and Surface Water Samples with Laboratory Certificates and Field Reports

APPENDIX G: Results of Sampling for M&J Solvents Site Constituents

The following VRP elements have already been submitted to EPD in the March 18, 2010 Application document and did not change based on the 2010 activities and are not being re-submitted with this transmittal.

- Applicants and PE/PG Certifications were submitted in the March 18, 2010 Application.
- Table 2.1 Legal Descriptions of Properties Impacted by Regulated Substances
- Table 3.1 Summary of Soil Boring Data
- Table 4.1 Summary of Soil Physical Testing Data
- Table 4.3 Summary of Hydraulic Conductivity Testing
- Table 4.4 Summary of Soil Results from Off-Site Locations
- Table 4.5 Summary of Analytical Results for Soil to Water Partition Coefficient Study
- Table 4.6 Summary of Arsenic and Lead Soil to Water Partition Coefficient Values
- Table 4.7 Fertilizer Source Investigation – Soil and Ground Water Results
- Table 4.8 Summary of Regulated Substances Detected in Surface Soil Samples
- Table 4.9 Summary of Regulated Substances Detected in Subsurface Soil Samples

- Table 5.1 Results of Ground-Water Usage Survey in a 3-mile Radius
- Figure 2.0 Site Location Map
- Figure 2.1 Site and Surrounding Area
- Figure 2.2 Site Layout Map
- Figure 2.4 Off-site Sediment and Surface Water Sampling Location Map
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- Figure 4.8a Distribution of Pesticides Detected in Surface Soil (0-2' bgs)
- Figure 4.8b Distribution of Arsenic and Lead Detected in Surface Soil (0-2' bgs)
- Figure 4.8c Distribution of PAHs Detected in Surface Soil (0-2' bgs)
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- Figure 4.10a Distribution of Pesticides Detected in Subsurface Soils (>10'bgs)
- Figure 4.10b Distribution of Arsenic and Lead Detected in Subsurface Soils (>10'bgs)
- Figure 4.11a Distribution and Delineation of Pesticides Detected in Ground Water
- Figure 4.11b Distribution and Delineation of Arsenic and Lead Detected in Groundwater
- Figure 6.1 Conceptual Site Model – Ecological Receptors
- Figure 6.2 Preliminary Risk Evaluation – Food Web Model

This submittal provides the remaining elements to complete the VRP Application for the Former Estech General Chemicals site in Atlanta, Fulton County, Georgia. We request EPD's acceptance of this complete Application in lieu of a HSRA CAP or other HSRA submittals and request full acceptance of this site into the Georgia VRP Program.

Please contact the undersigned if any questions arise.

Sincerely,

MACTEC Engineering and Consulting, Inc.

Gregory J. Wrenn

Rhonda N. Quinn, P.G.
Senior Geologist
Georgia Professional Geologist # 1031

Gregory J. Wrenn, P.E.
Principal Engineer/Project Manager
Georgia Professional Engineer # 025565

Enclosures

cc: Thomas McGowan, Esq. – McGrath, North, Mullin & Kratz, PC LLO
Kenneth Anderson – BFEL Indemnitor Inc.

REVISED VOLUNTARY INVESTIGATION AND REMEDIATION PLAN

FORMER ESTECH GENERAL CHEMICALS SITE
ATLANTA, GEORGIA
HSI 10196
Parcels 17-0191-LL0244 and 17-0191-LL0400

Prepared for:

BFEL INDEMNITOR, INC
Omaha, Nebraska

Prepared by:

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC

MACTEC Project No. 6122-08-0154

March 16, 2011

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1.0 INTRODUCTION AND BACKGROUND

Several investigations of the soil and groundwater have been conducted on the former Estech General Chemicals site and extended onto the surrounding CSX railroad property. Organochlorine pesticides, arsenic, and lead have been delineated horizontally and vertically in the soil and groundwater under HSRA delineation requirements. BFEL Indemnitor, Inc (BFEL) as owner of the former Estech General Chemicals site has applied to enter the site into the Georgia Voluntary Remediation Program (VRP). An incomplete VRP Application was submitted on March 18, 2010 to begin the application process. Subsequently, in March 2010, negotiations with CSX Transportation were initiated to obtain access to their property for sampling purposes and to obtain their cooperation with listing two CSX property parcels in the VRP for the Estech site. From March 2010 through March 11, 2011, correspondences were exchanged between BFEL and CSX and a site meeting was conducted on May 20, 2010 to provide information to CSX on the proposed remediation on the CSX properties and to obtain their permission to conduct additional sampling, remediation and restrictive covenants. On March 11, 2011, CSX provided written consent to allow remediation on their properties (Appendix A).

In correspondence dated July 23, 2010, the Georgia Environmental Protection Division (EPD) has provisionally accepted the site into the VRP and provided comments on the incomplete Application. One of the comments requested that additional constituents (DDD, DDE, copper, nitrate, sulfate, 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, and zinc) be analyzed in groundwater samples. DDD and DDE are already known and established site constituents that have been analyzed in soil and water samples for several years. Additional groundwater and surface water sampling conducted between July and September 2010 indicated the presence of copper and zinc in groundwater and surface water. The trichlorobenzenes were not detected. Ten of the monitoring wells (MW-22, MW-25, MW-113, MW-114, MW-116, MW-109, MW-110, MW-111, MW-108, and MW-115) had zinc concentrations above the HSRA target media concentration of 2 mg/L and five wells (MW-22, MW-113, MW-114, MW-115, MW-116) had copper concentrations greater than the HSRA target media concentration of 1.3 mg/L. These wells are located on the downgradient side of the Estech site and on CSX property. The surface water sampling and analysis was conducted in the unnamed stream located on the CSX property. The stream receives groundwater from the CSX property and from properties along the west side Marietta Boulevard. The surface water sampling was conducted as part of a stream seepage study (see Appendix E of the VRP Application Addendum) to evaluate flow and constituent concentrations in the stream. Copper and zinc, as well as the pesticides alpha-BHC, beta BHC, lindane, dieldrin, and DDD, were present at concentrations above In-stream Water Quality Criteria (ISWQC) in some of the surface water sampling stations. The seepage study indicated that the stream is the groundwater discharge boundary for groundwater beneath the site.

The data available at the time the initial incomplete VRP Application was submitted indicated that remediation of soil impacts via on-site consolidation and capping, in conjunction with institutional controls, would likely be sufficient to address site impacts and prevent exposure to contaminants. However, the recent data, which showed copper and zinc exceedances of ISWQC, necessitates additional investigation and remediation. These constituents will likely be the drivers of groundwater remediation at the site to limit discharge of impacted groundwater to the stream. Additionally, although some prior copper and zinc data in soil has been collected, much of it is old and did not indicate that soil remediation for these constituents was required. Therefore, additional investigation is needed to further evaluate whether a source of copper and zinc impacts to groundwater can be identified and, if necessary, included in the excavation/consolidation/capping remediation plan.

Investigations of the site conducted under the HSRA Rules have indicated some site soils exceed Types 3 and 4 Risk Reduction Standard (RRS) and require corrective action. Per the VRP statute, the use of exposure domains and area averaging techniques are being used to evaluate the constituents and media that may result in exposure to receptors through a specified exposure pathway. As described in Appendix D, the Pro-UCL computer software was used to calculate Upper Confidence Limits (UCLs) and Exposure Point Concentrations (EPCs) for on- and off-site soils to evaluate which soils may require corrective action under the VRP provisions. Upon completion of the additional investigation proposed herein, updated EPCs may need to be calculated.

2.0 INVESTIGATION ACTIVITIES

Additional investigation of the soil and groundwater is proposed to:

- Evaluate the source of the copper and zinc exceedances in the groundwater and surface water
- Obtain data for the final design of the proposed remediation plan

A description of the proposed investigation is described below and shown on Table 1 and Figure 1.

2.1 COPPER AND ZINC SOURCE IDENTIFICATION

Approximately 24 surface soil samples were collected and analyzed for copper and zinc in 1988. This soil data, along with the 2010 groundwater and surface water copper and zinc results, provides the basis for investigating the source of the copper and zinc impacts that appear to be contributing to the exceedances in the groundwater and surface water. The proposed approach for investigating the source of the water exceedances will be to investigate the uppermost groundwater in areas where copper and zinc soil concentrations are elevated and upgradient of monitoring wells with exceedances and thus use the groundwater results to direct where to investigate soils, if necessary.

The groundwater investigation will consist of the installation of 12 temporary monitoring wells using direct-push technology (DPT) and the installation of two permanent monitoring wells using hollow-stem auger and rock-coring drilling techniques. The wells will be installed at locations indicated on Figure 1. DPT drilling techniques will be used to install monitoring wells in locations inaccessible to conventional drilling equipment. The monitoring well construction is discussed as follows.

Direct-Push Technology Wells

The 12 DPT-type wells will be completed to approximately 10 to 12 feet into saturated soils. The wells will be constructed with pre-packed sand filter packs of at least 10 feet in length and will have well casing diameters of either 1-inch diameter or 2-inch diameter. Attempts will be made to drill a sufficient size borehole to the needed depth to install a 2-inch diameter well. However, subsurface drilling conditions (rubble and concrete fill) and drilling equipment down-force capability may limit the depth and diameter of the borehole such that a smaller diameter well may have to be installed. Additional sand will be added to the borehole and a bentonite-pellet seal will be placed from above the sand pack to the ground surface. A water-tight locking cap will be installed on the top of the well casing. The wells will be developed 24-hours or more after completion of well construction. The monitoring wells will be surveyed for horizontal location and elevations.

The 12 DPT-type wells will be purged using low flow/low stress methodology and sampled following Region 4 USEPA Science and Ecosystem Support Division (SESD) procedure SESDPROC-301-R1. The groundwater samples will be analyzed for the following:

- Organochlorine pesticides using USEPA Method 8081A
- Arsenic, Lead, Copper, and Zinc using USEPA Method 6020
  (total and dissolved analyses)
- Nitrate and Sulfate using USEPA Method 9056

Permanent Monitoring Well Installation

Two permanent monitoring wells are proposed for installation on the CSX property on the west side of the unnamed stream in the vicinity of the CSX Training Center. The purpose of these two wells will be to further evaluate the concentrations of copper and zinc in groundwater downgradient of the Estech site, whether the site is the source of the copper and zinc in the stream, and obtain data on the interaction of the hydraulic conditions between the groundwater in the soil, bedrock and surface water in the stream. Previously existing monitoring wells MW-103A (screening the uppermost groundwater) and wells MW-103D and MW-118 (screening the shallow fractured bedrock) were located in this vicinity and were abandoned by CSX in February 2008 for construction of the training center. The two new wells will replace these previous wells. One of the two new wells will be constructed to screen the uppermost groundwater (MW-119) and other well will screen the shallow fractured bedrock (MW-120).

The new wells will be drilled using hollow-stem augers and rock-coring drilling techniques. Monitoring well MW-119 (uppermost groundwater well) will be drilled and installed to a total depth of 40-45 feet, at least 10 feet into saturated soils, with 10 feet of screen installed. The well will be constructed with a 2-inch diameter PVC casing, sand filter pack, bentonite-pellet seal, and cement-bentonite seal. A water-tight locking cover will be constructed at the ground surface. The well will be constructed in general accordance with SESDGUID-101-R0.

Monitoring MW-120 (shallow fractured bedrock well) will be drilled and installed to a total depth of 50-75 feet, depending upon to the depth of bedrock and the presence of groundwater in the bedrock. The soil interval will be drilled using hollow-stem augers and the bedrock will be cored using HQ-size rock core. The well will be installed at least 15 feet into bedrock and constructed with 10 feet of well screen. The well will be constructed with a single 2-inch diameter PVC casing, sand filter pack, bentonite-pellet seal, and cement-bentonite seal. The bentonite or grout seal will extend into the bedrock. A water-tight locking cover will be constructed at the ground surface. The well will be constructed in general accordance with SESDGUID-101-R0. Investigation-derived waste generated from the installation of the monitoring wells will be contained in drums and removed from CSX property.

The wells will be developed and subsequently sampled with the other monitoring wells. The wells will also be surveyed for horizontal location and elevations. New wells MW-119 and MW-120 will be purged using low flow/low stress methodology and sampled following SESDPROC-301-R1 procedures. The groundwater samples will be analyzed for the following:

- Organochlorine pesticides using USEPA Method 8081A
- Arsenic, Lead, Copper, and Zinc using USEPA Method 6020 (total and dissolved)
- Nitrate and Sulfate using USEPA Method 9056

Depending upon the results of the groundwater investigation, investigation of the soils for the source of the copper and zinc exceedances may or may not be conducted.

Groundwater samples will be collected and analyzed in the 21 existing site monitoring wells in general accordance SESDPROC-301-R1 procedures. The groundwater samples will be analyzed for the following:

- Organochlorine pesticides using USEPA Method 8081A
- Arsenic, Lead, Copper, and Zinc using USEPA Method 6020 (total and dissolved)
- Nitrate and Sulfate using USEPA Method 9056

2.2 SOIL PRE-DESIGN INVESTIGATION

The proposed remediation plan for the Estech site includes excavation and/or capping of soils that exceed the EPC goals. Figure 1 presents the soil locations that exceed the EPC goals. The areas identified as requiring remediation were based on a comparison of RRS to EPCs calculated based on UCLs. The highest concentration soil samples were iteratively removed until the EPC fell below the applicable RRS. Most of the soil analytical results from the exceedance areas were collected in 1984 and 1988 and may not be representative of current subsurface conditions. To better define the horizontal and vertical extent of soils needing to be remediated, soil sampling and analysis is proposed in the areas of exceedances. The proposed sampling approach will be based on an area averaging technique. Each area of exceedance will be divided into 0.5 acre blocks. Five soil borings will be advanced in each 0.5-acre block, one boring in each corner and one boring in the middle. An area measuring in size of 0.5 acres or less will have five soil borings and a one-acre block will have 10 soil borings advanced in the block. The borings will be advanced to the depths indicated on Table 1 and will not extend into groundwater. Soil samples will be collected for laboratory analysis from each boring at the depths indicated on Table 1. Soil samples will be composited from the five borings based on depth, i.e. the five soil samples from the 0 to 2 feet interval will be composited into one sample, soil samples from the 8 to 10 feet interval will be composited into one sample and submitted to the laboratory for analysis. The laboratory analyses for each area's soil samples are presented on Table 1.

For isolated soil sample locations targeted for removal, four additional soil borings will be advanced around the location and soil samples collected for laboratory analyses as indicated on Table 1. Depending upon the soil and groundwater analytical results and subsurface conditions encountered during the investigation, additional soil investigation may be required and soils targeted for excavation may be adjusted.

Upon completion of the soil sampling, the borings will be filled with a cement-bentonite grout. Boring locations will be surveyed for horizontal location and ground surface elevation.

2.3 DATA EVALUATION

The data obtained from the groundwater investigation for the copper and zinc exceedances will be evaluated to determine the source of the copper and zinc exceedances in groundwater. Based upon those results, additional groundwater and soil investigation may be needed to obtain data to remediate the copper and zinc concentrations in the soil and groundwater.

The soil analytical results obtained from the investigation of the areas exceeding the EPC goals will be evaluated to determine the horizontal and vertical extent of the soils remediation. The analytical results will be used in the UCL and EPC calculations and remediation goals will be adjusted based upon the UCL and EPC goals.

3.0 PROPOSED REMEDIATION PLAN

The proposed remediation plan consists of a combination of institutional/engineering controls and active remedial measures to address present and future threats to human health and the environment.

3.1 PROPOSED CLEANUP STANDARDS

The proposed cleanup standards for the various impacted media are discussed below and are based on the exposure model developed in Appendix D of this VRP Application Addendum.

Surface Soil – representative Exposure Point Concentrations (EPCs) for surface soils on the Estech site will comply with Type 3 or 4 RRS and representative EPCs for surface soil on the CSX property will comply with Types 1-4 RRS.

Subsurface Soil - Site-specific Type 4 RRS with VRP-allowed controls will be applied to subsurface soils on the Estech site. This requires that no complete exposure pathways exist that will result in exceedance of regulatory standards at the point of exposure, which is the unnamed stream on CSX property. Therefore, because pesticides, copper, and zinc exceed ISWQC, subsurface soil concentrations protective of surface water will be calculated using fate and transport modeling to evaluate whether subsurface soils require remediation. This will be conducted after the additional investigation described in Section 2 above has been completed. Institutional controls (digging restrictions) will be used to maintain compliance with the site-specific Type 4 RRS. However, depending upon the volume of subsurface soils on the CSX property that require excavation, BFEL will also attempt to demonstrate compliance with Type 1 through 4 RRS on the CSX property to eliminate the need for a digging restriction on CSX property.

Groundwater - Site-specific Type 4 RRS with VRP-allowed controls will be applied to groundwater on the Estech and CSX property. Institutional controls (groundwater usage restrictions) will be used to maintain compliance. However, remedial actions will be required to address pesticide, copper, and zinc impacts in groundwater that are discharging to the un-named stream and resulting in exceedances of ISWQC.

3.2 PROPOSED REMEDIATION ACTIVITIES

3.2.1 Surface Soils

Surface soil impacts that result in a UCL-based EPC that exceeds Type 1-4 RRS will be excavated, consolidated, and/or maintained in place beneath an engineered low permeability cover system to limit leaching and to act as an exposure barrier to prevent direct contact with impacted soil. Tables D-1 (BFEL surface soil EPCs) and D-3 (CSX surface soil EPCs) in Appendix D of this Addendum show the surface soil samples targeted for removal/capping on the Estech and CSX property, respectively. Figure 1 shows the current estimated extent of the excavation areas, although they may be adjusted following additional investigation and re-calculation of EPCs. Surface soil samples that result in exceedances of RRS are shown on Figure 7.1 in Appendix B of this Addendum, although it should be noted that some of the surface soil exceedances were from samples collected in the 1980's and may not be representative of current site conditions. The excavated areas will be backfilled and compacted with a minimum of two feet of clean cover soils from an off-site source.

The covered area will be designated as compliant with the Type 5 RRS. The cover system will be designed in accordance with the requirements established in Guidance Document for Installation of the Final Cover for an Unlined Landfill (Georgia Rules of Solid Waste Management Chapter 391-3-4-.11) A restrictive covenant in conjunction with annual site inspections and maintenance will be used to protect the integrity of the cover system and maintain an incomplete exposure pathway.

Approximately 25,000 cubic yards of soil is estimated to require excavation and consolidation beneath the cover. The low permeability soil cover is estimated to cover approximately three acres. The cover system will be sloped appropriately to facilitate surface water runoff, while controlling erosion. Excavation confirmation samples will be collected from each area. A minimum of four confirmation samples will be collected from the sidewalls of each excavation, with additional samples collected at the rate of one per 20 linear feet. Base samples will be collected from the excavated area at a frequency of one per 400 square feet (20-ft by 20-ft grid) to evaluate compliance of subsurface soil at the base of the surface soil excavations with applicable criteria. A composite sample of excavated soils will be collected at a frequency of one per every 500 cubic yards for analysis of hazardous characteristics via the toxicity characteristic leaching procedure (TCLP) to evaluate whether the soils can be placed in the on-site cell. Soils that do not pass TCLP will either be amended with an agent to reduce the leaching potential or disposed off-site at a facility approved to accept the waste.

Surface debris at the site and debris uncovered during excavation activities will be segregated, decontaminated as necessary, sampled, and disposed of appropriately either on-site or at an off-site disposal facility approved to accept the waste.

As an additional means of controlling potential exposure, a fence will be maintained around the Estech property to limit unauthorized access, and a restrictive covenant will be placed on the property. The restrictive covenant will restrict activities that may expose or disturb impacted soils or compromise the integrity of the soil engineered soil cover and preclude use of the impacted groundwater. The covenant will also specify annual inspections and maintenance of the cover system and fence and certification by a Georgia-licensed professional engineer.

3.2.2 Subsurface Soils

Subsurface soil representative EPCs that exceed Type 1 through 4 RRS in individual samples have been reported in isolated and localized areas on Estech and CSX property. Tables D-2 (BFEL subsurface soil) and D-4 (CSX subsurface soil) show the subsurface soil samples that would require removal for the EPC to comply with RRS on the Estech and CSX property, respectively. However, the existing soil cover prevents direct exposure to the impacted subsurface soil, thus no complete exposure pathway to subsurface soil exists. Therefore, a site-specific Type 4 RRS with controls is allowable under the VRP. Should future construction work require excavation, the restrictive covenant will require that it be conducted using a health and safety plan prepared specifically for the proposed construction activity, and a minimum of two feet of clean soil cover will be required to be replaced. It should also be noted that much of the subsurface soil data was collected in the 1980’s and may not be representative of current subsurface conditions.

Contaminant fate and transport modeling conducted for pesticides (Appendix C of this VRP Application Addendum) indicates that removal of additional subsurface soil is not required for protection of the point of exposure (POE), the unnamed downgradient stream. However, upon completion of the additional investigation, updated fate and transport modeling will be conducted to incorporate copper and zinc to evaluate the maximum concentrations of these constituents that could remain untreated in soil and, if leached into groundwater, would not result in exceedances of ISWQC in surface water in the unnamed stream on the CSX property. The proposed remediation plan for subsurface soils may be modified to incorporate excavation, consolidation, and/or capping of deeper soils to control contaminant leaching to groundwater for those contaminants that exceed ISWQC in the unnamed stream.

3.2.3 Groundwater

The 2010 groundwater sampling results show exceedances of RRS for monitoring wells on the Estech and CSX property. Groundwater from the site flows in an easterly direction toward the unnamed small stream on the CSX property. The unnamed stream is the normal discharge boundary for groundwater migrating from the site. Therefore, the stream will be the designated point of exposure (POE) for groundwater from the site. A restrictive covenant will be placed on the BFEL property and the groundwater-impacted portion of the CSX property to preclude use of and prevent exposure to impacted groundwater. The covenant restricting such use will be in conformance with the Georgia Uniform Environmental Covenants Act. However, because stream concentrations exceed ISWQC for pesticides, copper, and zinc, remedial action is required to address impacted groundwater that discharges to the stream. The proposed soil remediation activities are expected to have a long-term beneficial effect on surface water concentrations by controlling contaminant leaching to groundwater and reducing the potential for contaminants in surface water runoff, but a remedy to address the discharge of impacted groundwater to the stream will also be required. The groundwater remedy may consist of pump-and-treat, an in-situ permeable reactive barrier (PRB) that treats impacted groundwater as it flows through the reactive media, and/or culvertizing the stream to limit exposure. Although the groundwater remedy has not been selected, for costing purposes, a 400-ft long PRB using the proprietary EHC-M product provided by Adventus is assumed. The EHC-M product has been shown to treat metals as well as pesticides. The PRB would be located up-gradient of the unnamed stream from the approximate 1200 feet marker to the 1600 feet marker from the seepage study, which is the zone where it appears the highest zinc, copper, and pesticides enter the stream. The conceptual PRB location is shown on Figure 1. The PRB treatment would likely not have an immediate effect on the stream concentrations, but the goal would be to achieve gradual instream improvements over time.

Monitoring wells MW-105, MW-106D, MW-107D, and the two new wells proposed on CSX property will be designated as point of demonstration (POD) wells under the VRP, and will be used to evaluate whether groundwater concentrations are protective of the POE.

3.2.4 Long-Term Monitoring

Groundwater

A full round of groundwater monitoring is proposed to be conducted semi-annually until such time as EPD approves cessation of monitoring or a reduced monitoring frequency. Wells will be sampled for arsenic, lead, copper, zinc, alpha-BHC, beta-BHC, delta-BHC, and gamma-BHC, chlordane, DDT, dieldrin, heptachlor, and toxaphene. All currently existing monitoring wells will be included in the semi-annual monitoring. Water level measurements will also be collected from all monitoring wells to evaluate groundwater flow direction. A reduction in the number of wells included in the sampling program, the sampling frequency, and/or the constituents analyzed will be recommended over time, as dictated by the data. The data collected during monitoring activities will be reported in semi-annual Progress Reports. All environmental sampling and any additional investigation activities will continue to be conducted under the direction of site-specific health and safety plans

Surface Water

The groundwater remedial actions in conjunction with the soil excavation, consolidation, and cover system should have a beneficial effect on surface water quality over time. A surface water monitoring program will be implemented in conjunction with the groundwater monitoring program described above (i.e., the same constituents and sampling frequency). Six surface water monitoring locations will be sampled, near previous sampling points (SW2010-5, SW2010-10, SW2010-11, SW2010-14, SW2010-15, and SW2010-17). Improvements in surface water quality are expected to be gradual. However, if surface water quality does not improve after five years of monitoring, additional remediation activities will be evaluated. This may include a combination of groundwater and/or surface water remediation, as appropriate.

Site Inspections

Site inspections will be conducted on an annual basis to verify that the soil cover remains in place and in good condition with adequate healthy vegetation sufficient to control erosion. The site inspections will also include monitoring ensure that at least two feet of soil meeting applicable RRS is maintained in areas where Type 4 RRS with exposure controls are employed. The extent of these areas will be finalized upon completion of the soil excavation. Monitoring and maintenance activities will be reported in semi-annual Progress Reports.

3.3 SCHEDULE

A schedule for implementation of the VRP is included as Figure 2.

3.4 COST ESTIMATE

Cost estimates for the investigation and remediation activities outlined herein are included as Tables 2 and 3. The cost may change depending upon the additional data collected. Financial assurance for implementing the VRP will be submitted to EPD upon issuance of the director's approval of the VRP Application and Remediation Plan.

TABLES

TABLE 1: SUMMARY OF SOIL SAMPLING AND ANALYSIS TO DELINEATE AREAS WHERE CONCENTRATIONS EXCEED EPC GOALS

AREA TO SAMPLE	CONSTITUENTS AND DEPTHS EXCEEDING EPC GOALS	NUMBER OF BORINGS PROPOSED FOR AREA	SAMPLE DEPTHS (FT, BGS)	ANALYSES
A - BFEL			0-2	
MW-21	Surface: Arsenic	6	3-5	Arsenic and Pesticides
SS-24	Surface: alpha-BHC, beta-BHC, Dieldrin, DDT		6-8	Copper and Zinc
MW-15	Subsurface: Arsenic (5 ft)		8-10	
SB-132	Subsurface: Arsenic (15 ft)		10-12	
Approximate Area: 0.6 acre			12-14	
			14-16	
B - BFEL				
MW-12	Surface: Arsenic Subsurface: Arsenic (10 ft)	7	0-2	Arsenic and Pesticides
SB-15	Surface: Arsenic Subsurface: Arsenic (6 ft)		3-5	Copper and Zinc
MW-23	Surface: alpha-beta-delta BHC Subsurface: Arsenic (5 ft)		6-8	
MW-22	Surface: Arsenic Subsurface: Arsenic (5 ft)		8-10	
SB-13	Subsurface: Arsenic (5 ft)		10-12	
Approximate Area: 0.7 acre				
C - CSX			0-2	
MW-24	Surface: Arsenic Subsurface: Arsenic (6 ft)	5	3-5	Arsenic and Pesticides
MW-25	Surface: Arsenic Subsurface: Arsenic (16 ft)		6-8	Copper and Zinc
SS-06 (nus)	Surface: Sb, Ba, Cu, Pb, Ni, Ag, Tl, Zn		8-10	
SS-10 (tmg)	Surface: Chlordane, DDE, DDT, Toxaphene		10-12	
Approximate Area: 0.4 acre			12-14	
			14-16	
			16-18	
D - BFEL				
SB-7	Subsurface: Arsenic (9.5 ft)	8	0-2	Arsenic and Pesticides
MW-4	Surface: DDT Subsurface: Arsenic (15 ft)		3-5	Copper and Zinc
SB-5	Surface: DDT Subsurface: alpha-beta-delta BHC and Lindane (20 ft bwt)		6-8	
MW-6	Surface: DDT Subsurface: Arsenic (20 ft bwt)		8-10	
SB-8	Surface: alpha-beta-delta BHC Subsurface: Arsenic (15 ft)		10-12	
MW-3	Subsurface: Arsenic (22.5 ft bwt)		12-14	
DW-2B	Surface: DDT Subsurface: alpha-beta-delta BHC and Lindane, Chlordane, DDT, Toxaphene (17.5 ft), Arsenic (22.5 ft bwt)		14-16	
SS-17	Surface: DDT			
Approximate Area: 0.8 acre				
E - BFEL				
MW-9	Surface: alpha-beta-delta BHC	5	0-2	Pesticide and 2,4-Dinitrotoluene
SS-14	Surface: 2,4-Dinitrotoluene		2-4	
Approximate Area: 0.09 acre				

TABLE 1: SUMMARY OF SOIL SAMPLING AND ANALYSIS TO DELINEATE AREAS WHERE CONCENTRATIONS EXCEED EPC GOALS

AREA TO SAMPLE	CONSTITUENTS AND DEPTHS EXCEEDING EPC GOALS	NUMBER OF BORINGS PROPOSED FOR AREA	SAMPLE DEPTHS (FT, BGS)	ANALYSES
F - BFEL				
SS-17	Surface: alpha-beta-delta BHC, Arsenic	5	0-2	Arsenic, Lead, and Pesticides
MW-13	Surface: alpha-beta-delta BHC, Arsenic		2-4	Copper and Zinc
MW-14	Surface: alpha-beta-delta BHC, Arsenic			
SS-20	Surface: Lead			
Approximate Area: 0.2 acre				
G - BFEL				
SB-173	Surface: Arsenic, Lead	5	0-2	Arsenic and Lead
SB-174	Subsurface: Arsenic (5 ft)		2-4	Copper and Zinc
HA-106			4-6	
Approximate Area: 0.1 acre				
H - BFEL				
SS-07 (nus)	Surface: Lead	5	0-2	Arsenic and Lead
MW-11	Subsurface: Arsenic (15 ft)		3-5	Copper and Zinc
Approximate Area: 0.11 acre			6-8	
			8-10	
			10-12	
			14-16	
SB-104 - CSX	Surface: DDD, DDT, Arsenic	4	0-2	Arsenic and Pesticides
			2-4	
SS-2 (tmg) - BFEL	Surface: alpha-beta-delta BHC, DDT	4	0-2	Pesticides
			2-4	
SS-3 (tmg) - BFEL	Surface: alpha-beta-delta BHC	4	0-2	Pesticides
			2-4	
MW-8	Subsurface: alpha-beta-delta BHC (12.5 ft bwt)	0	no sampling proposed because the exceedance is below the water table	
SB-156 - CSX	Surface: Arsenic	4	0-2	Arsenic
			2-4	Copper and Zinc
MW-101 - BFEL	Surface: Arsenic		0-2	Arsenic
			2-4	Copper and Zinc
HA-111 - BFEL	Subsurface: Arsenic, Lead (6 ft)	4	0-2	Arsenic and Lead
			2-4	Copper and Zinc

Notes:
Each area of exceedance will be divided into 0.5 acre blocks.
Five soil borings will be advanced in each 0.5-acre block, one boring in each corner and one boring in the middle.
An area measuring in size of 0.5 acres or less will have five soil borings. The borings will be advanced to the depths indicated on Table 1 and will not extend into groundwater.
Soil samples will be composited from the five borings based on depth, i.e. the five soil samples from the 0 to 2 feet interval will be composited into one sample and submitted to the laboratory for analysis.

BFEL = area located on Former Estech General Chemicals property
CSX = area located on CSX Transportation property
bgs = below ground surface
bwt = sample collected below the water table
ft = feet
nus = Sample collected by NUS Corporation in 1988
tmg = Sample collected by TM Gates & Associates in 1984
Sb = antimony, Ba = barium, Cu = copper, Pb = lead, Ni = nickel, Ag = silver, Tl = thallium, Zn = zinc

Subsurface: alpha-beta-delta BHC (12.5 ft bwt) = pesticides detected at maximum depth of 12.5 ft and below the water table.

Table 2: Investigation for Source of Copper and Zinc Exceedances in Water and Soil Pre-Design Investigation

Site: Former Estech General Chemicals Site - HSI 10196
Location: Atlanta, Georgia
Date: March 9, 2011

Description: Pre-design investigation of areas exceeding exposure point concentrations and further groundwater assessment of copper and zinc for the determination of possible sources.

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
INVESTIGATION COSTS					
PART I: SOURCE INVESTIGATION -COPPER AND ZINC EXCEEDANCES IN SOIL AND GROUNDWATER					
Site Prep					
Boring layout-presurvey	8	hr	$ 145	$ 1,160	MACTEC
Site clearing-Dozer operation (equipment and operator)	1	LS	$ 3,366	$ 3,366	33% time MACTEC
Surveying after installation 14 wells	16	hr	$ 145	$ 2,320	MACTEC
Utility Locate	1	LS	$ 1,100	$ 1,100	OneVision 10% mu
Drilling					
Direct Push	1	ea	$ 16,550	$ 16,550	GeoLab 10% mu
HSA/Rock Coring	1	ea	$ 10,557	$ 10,557	MACTEC
Drums and transport from CSX property	1	ea	$ 500	$ 500	5% mu
Part 1 Site Prep and Drilling Subtotal				**$ 35,553**	
Professional Services, Project Management, and Fees					
Project Management-Senior Principal	6	hr	$ 195	$ 1,170	
Project Management-Senior	20	hr	$ 120	$ 2,400	
Project Management-Project	8	hr	$ 95	$ 760	
Undefined scope and market allowance	0	of subtotal		$ -	
Project Management, and Fees Subtotal				**$ 4,330**	
PART I SITE PREPARATION, DRILLING, SURVEYING SUBTOTAL				**$ 39,883**	
INVESTIGATION LABOR					
Training updates (CSX related)					
Senior (2)	16	hr	$ 120	$ 1,920	
Project Geologist	8	hr	$ 95	$ 760	
Senior Technician II	8	hr	$ 75	$ 600	
Staff I	8	hr	$ 70	$ 560	
HASP Update					
Principal	4	hr	$ 195	$ 780	
Senior	16	hr	$ 120	$ 1,920	
Senior Technician II	4	hr	$ 75	$ 300	
Clerical	5	hr	$ 50	$ 250	
Field Preparation					
Senior	4	hr	$ 120	$ 480	
Project Geologist	8	hr	$ 95	$ 760	
Senior Technician II	8	hr	$ 75	$ 600	
Well Installation and Development (2 persons)					
Project Geologist	45	hr	$ 95	$ 4,275	
Senior Technician II	30	hr	$ 75	$ 2,250	
DPT Well Installation and Development (2 persons)					
Project Geologist	65	hr	$ 95	$ 6,175	
Senior Technician II	40	hr	$ 75	$ 3,000	
Groundwater Sampling Permanent (23) and Temporary Wells (12)					
Project Geologist	55	hr	$ 95	$ 5,225	
Senior Technician II	60	hr	$ 75	$ 4,500	
Staff I	60	hr	$ 70	$ 4,200	
Laboratory Analytical					
Groundwater-total As, Cu, Pb, Zn	50	ea	$ 36.00	$ 1,800	
Groundwater-dissolved As, Cu, Pb, Zn	50	ea	$ 36.00	$ 1,800	
Groundwater-Nitrates	50	ea	$ 14.00	$ 700	
Groundwater-Sulfates	50	ea	$ 14.00	$ 700	
Groundwater-Pesticides	50	ea	$ 70.00	$ 3,500	
Laboratory Subtotal				$ 9,350	10% mu
Expendibles and IDW Management					
Drums	6	ea	$ 65	$ 390	
Senior Technician II	8	hr	$ 75	$ 600	
Staff I	8	hr	$ 70	$ 560	
Vehicles	33	days	$ 65	$ 2,145	
Sampling and Monitoring Equipment and Supplies	1	total	$ 20,700	$ 20,700	10% mu
Professional Services and Fees Subtotal				**$ 72,300**	
PART I INVESTIGATION (Copper and Zinc in Water Investigation) TOTAL				**$ 112,183**	
PART II: OBTAIN DATA-PRE-DESIGN OF THE PROPOSED REMEDIAL PLAN					
Site Prep					
Boring layout-presurvey	8	ea	$ 145	$ 1,160	MACTEC
Site clearing-Dozer operation (equipment and operator)	1	LS	$ 6,732	$ 6,732	66% Time
Surveying	24	ea	$ 145	$ 3,480	MACTEC

Table 2: Investigation for Source of Copper and Zinc Exceedances in Water and Soil Pre-Design Investigation

Site: Former Estech General Chemicals Site - HSI 10196
Location: Atlanta, Georgia
Date: March 9, 2011

Description: Pre-design investigation of areas exceeding exposure point concentrations and further groundwater assessment of copper and zinc for the determination of possible sources.

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
Utility Locate	1	LS	$ 2,200	$ 2,200	OneVision 10% mu
Drilling					
Direct Push	1	ea	$ 19,200	$ 21,120	GeoLab 10% mu
Part 2 Site Prep and Drilling Subtotal				**$ 34,692**	
Professional Services, Project Management, and Fees					
Project management-Senior Principal	6	hr	$ 195	$ 1,170	
Project management-Senior	24	hr	$ 120	$ 2,880	
Project management-Project	8	hr	$ 95	$ 760	
Undefined scope and market allowance	0	of subtotal		$ -	
Project Management, and Fees Subtotal				**$ 4,810**	
PART II SITE PREPARATION SUBTOTAL				**$ 39,502**	
INVESTIGATION LABOR					
Field Preparation					
Senior	8	hr	$ 120	$ 960	
Project Geologist	8	hr	$ 95	$ 760	
Staff I	16	hr	$ 70	$ 1,120	
Soil Sampling (4 persons)					
Project Geologist	120	hr	$ 95	$ 11,400	
Senior Technician II (2 techs)	240	hr	$ 75	$ 18,000	
Staff I	120	hr	$ 70	$ 8,400	
Laboratory Analytical					
Soil-Arsenic	65	ea	$ 9.00	$ 585	
Soil-Copper	65	ea	$ 9.00	$ 585	
Soil-Lead	65	ea	$ 9.00	$ 585	
Soil-Zinc	65	ea	$ 9.00	$ 585	
Soil-Pesticides	65	ea	$ 70.00	$ 4,550	
Soil-SVOCs	4	ea	$ 130.00	$ 520	
Water-total As, Cu, Pb, Zn	3	ea	$ 36.00	$ 108	Soil eq blanks
Water-Nitrates	3	ea	$ 14.00	$ 42	Soil eq blanks
Water-Sulfates	3	ea	$ 14.00	$ 42	Soil eq blanks
Water-Pesticides	3	ea	$ 70.00	$ 210	Soil eq blanks
Water-SVOCs	3	ea	$ 130.00	$ 390	Soil eq blanks
Laboratory Subtotal				$ 9,022	10% mu
Vehicles	60	ea	$ 65	$ 3,900	
Sampling and Monitoring Equipment and Supplies	1	ea	$ 8,225	$ 9,048	10% mu
Professional Services and Fees Subtotal				**$ 62,610**	
Professional Services, Project Management, and Fees					
Project Management	5%	of subtotal		$ 1,975	
Undefined scope and market allowance	15%	of subtotal		$ 9,391	
Professional Services, Project Management, and Fees Subtotal				**$ 11,367**	
PART II INVESTIGATION (Pre-Design Investigation) TOTAL				**$ 113,478**	
INVESTIGATION COSTS SUBTOTAL				**$ 225,661**	
DATA EVALUATION, REPORTING AND EXPENSES					
Groundwater/Surface Water Sampling					
Data Evaluation					
Senior Principal	16	hr	$ 195	$ 3,120	
Senior Engineer	24	hr	$ 120	$ 2,880	
Senior Geologist	40	hr	$ 120	$ 4,800	
Project Geologist	50	hr	$ 95	$ 4,750	
CADD/Draftsperson	30	hr	$ 73	$ 2,190	
Investigation Summary Reporting	1	ea	$ 15,000	$ 15,000	
Professional Services and Fees Subtotal				**$ 32,740**	
DATA EVALUATION, REPORTING AND EXPENSES SUBTOTAL				**$ 32,740**	
ESTIMATED GRAND TOTAL				**$ 258,401**	

Table 3: Excavate and Consolidate Beneath Engineered Soil Cover, Inject EHC-M as PRB for Groundwat

Site: Former Estech General Chemicals Site - HSI 10196
Location: Atlanta, Georgia
Date: March 3, 2011

Description:
Soil excavation and relocation to western portion of Site and placement under engineered soil cover. Backfill of excavated areas. No off site disposal.
EHC-M PRB 400 ft long, 20-ft spacing of injection points

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
CAPITAL COSTS					
SITE PREPARATION					
Site Prep					
Plans and Specifications for Implementation	1	LS	$ 35,000	$ 35,000	
Erosion Control Plan Development & Submittals	1	LS	$ 25,000	$ 25,000	
Site Survey/Utility Locate	14	acres	$ 1,900	$ 26,600	
Access Road construction, 8"gravel depth	3,000	SY	$ 15	$ 45,000	
RA Contractor Mobilization/Demobilization	1	LS	$ 35,000	$ 35,000	
Establish Soil Erosion and Sediment Control	1	LS	$ 65,000	$ 65,000	
Heavy Tree Removal, Cut & Chip, Grub, Remove	7	acres	$ 9,500	$ 66,500	
City of Atlanta Tree Fee	7	acres	$ 10,000	$ 70,000	
Clear Brush	14	acres	$ 750	$ 10,500	
Temporary Facilities and Utilities	1	LS	$ 25,000	$ 25,000	
Tankage Building, Former Fert. Bldg Foundation Demolition	1	LS	$ 200,000.00	$ 200,000	
Concrete Crushing and On-Site Stockpiling	4,000	CY	$ 16.60	$ 66,400	
Site Prep Subtotal				**$ 670,000**	
Professional Services, Project Management, and Fees					
Project management	5%	of subtotal		$ 33,500	
Construction/program management	6%	of subtotal		$ 40,200	
Undefined scope and market allowance	15%	of subtotal		$ 100,500	
Professional Services, Project Management, and Fees Subtotal				**$ 174,200**	
SITE PREPARATION SUBTOTAL				**$ 844,200**	
EXCAVATION, RELOCATION, PLACEMENT, COVER					
Soil Staging Areas					
20-mil LDPE liners for top and bottom of each stockpile (2)	20,000	SF	$ 1	$ 20,000	
Decontamination					
Decontamination Pad	1	ea	$ 10,000	$ 10,000	
Air Monitoring					
PM Monitoring Station	1	LS	$ 10,000	$ 10,000	
Excavate and Haul to Cover Area					
Excavate, Relocate and place Soil in Cover area	37,500	tons	$ 10.00	$ 375,000	Approx. 25,000 CY
Add Portland Cement to Reduce Leaching	7,500	tons	$ 25.00	$ 187,500	Assume 20% of total
Backfill Excavations					
Furnishing, Placement, and Compaction of Clean Soil (off-site borrow)	37,500	tons	$ 13.00	$ 487,500	
Water Management					
Frac tank mobilization	1	ea	$ 1,400	$ 1,400	
Mobile Treatment Unit (carbon/greensand)	1	ea	$ 20,000	$ 20,000	
Retention Pond/Stormwater Structures	1	allowance	$ 75,000	$ 75,000	
Frac tank and pumps rental (21K-gal)	3	mo	$ 3,000	$ 9,000	
Waste Characterization/Confirmation Sampling					
Floor and sidewall samples	150	ea	$ 400	$ 60,000	
TCLP Analyses	50	ea	$ 450	$ 22,500	
Sampling supplies	1	LS	$ 2,500	$ 2,500	
Site Grading & Compacted Clay Cover					
Fine grade area to be capped	15,000	SY	$ 1.25	$ 18,750	
Retaining wall along North side	20,000	SF	$ 18	$ 360,000	
Clay 10^{-7}, 6" lifts, off-site source, 18"	7,000	CY	$ 18.00	$ 126,000	
Top soil layer (0.5 ft)	2,500	CY	$ 18	$ 45,000	
Seed and mulch	3.0	acres	$ 4,000	$ 12,000	
Cover Subtotal				$ 561,750	
Subtotal				**$ 1,842,150**	
Professional Services, Project Management, and Fees					
Project Management	5%	of subtotal		$ 92,108	
Construction/program management	6%	of subtotal		$ 110,529	
Undefined scope and market allowance	15%	of subtotal		$ 276,323	
Professional Services, Project Management, and Fees Subtotal				**$ 478,959**	
EXCAVATION & COVER SUBTOTAL				**$ 2,321,109**	

Table 3: Excavate and Consolidate Beneath Engineered Soil Cover, Inject EHC-M as PRB for Groundwate

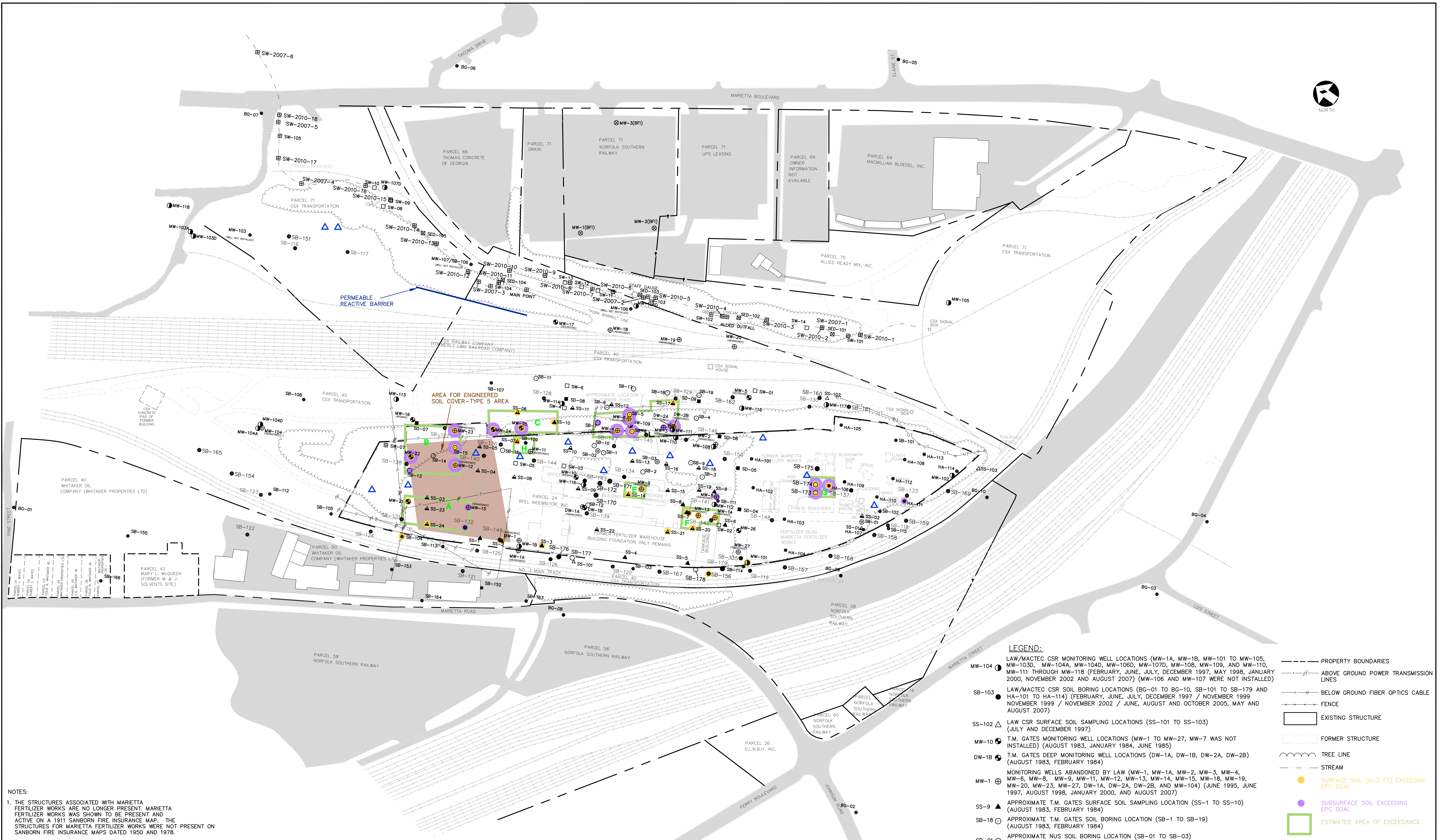
Site: Former Estech General Chemicals Site - HSI 10196
Location: Atlanta, Georgia
Date: March 3, 2011

Description:
Soil excavation and relocation to western portion of Site and placement under engineered soil cover. Backfill of excavated areas. No off site disposal.
EHC-M PRB 400 ft long, 20-ft spacing of injection points

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
GROUNDWATER TREATMENT					
Plans for Implementation	100	hr	$ 100	$ 10,000	SAP, QAPP, H&S
Design and Permitting					
Preliminary design layout and drawings	45	hr	$ 95	$ 4,275	
	120	hr	$ 120	$ 14,400	
Design Review	16	hr	$ 155	$ 2,480	
UIC Permit Submittals	1	ea	$ 5,500	$ 5,500	
Pilot Testing	1	LS	$ 65,000	$ 65,000	
Direct Push Injection					
Mobilization/Demobilization	1	ea	$ 6,300	$ 6,300	
DPT Contractor - Field Installation of Injection Points	20	days	$ 5,500	$ 110,000	Injection of EHC-M to address metals and pesticides; 2 rows of 20 injection points - spacing of 20 ft. between injection points; 2 injections (avg.) per day. 566 gallons of 23% slurry injected per point at 3-7 gpm
Chemical Cost	50,000	lb	$ 2.25	$ 112,500	0.25% iron product:soil mass
Miscellaneous Equipment/Expenses	1	ea	$ 5,000	$ 5,000	
Labor (supervising geologist)	200	hr	$ 95	$ 19,000	
Saturated Soil Sample Analyses	40	ea	$ 275	$ 11,000	Pesticides (8081), Metals (6010)
Performance Monitoring Wells - Labor	32	hr	$ 95	$ 3,040	Assumes 4 wells - installation oversight and development
Performance Monitoring Wells - Subcontractor	4	ea	$ 2,500	$ 10,000	Assumes 4 additional monitoring wells, 3/4-inch PVC microwell/pre-pack
Subtotal				**$ 378,495**	
Professional Services, Project Management, and Fees Subtotal					
Project Management	5%	of subtotal		$ 18,925	
Construction/Program Management	6%	of subtotal		$ 22,710	
Undefined Scope and Market Allowance	15%	of subtotal		$ 56,774	
Professional Services, Project Management, and Fees Subtotal				**$ 98,409**	
GROUNDWATER TREATMENT SUBTOTAL				**$ 476,904**	
CAPITAL COST TOTAL				**$ 3,642,213**	
OPERATIONS AND MONITORING					
Groundwater/Surface Water Sampling & Cover Maintenance					
Labor (semi-annual monitoring)	80	hr	$ 150	$ 12,000	(25 mntrg points; 4 days/event; crew of 2)
Laboratory Analytical	25	ea	$ 275	$ 6,875	Pesticides (8081), Metals (6010)
Rental Equipment	5	days	$ 400	$ 2,000	
Mobilization/Demobilization/Supplies	2	ea	$ 200	$ 400	
Cover Inspections/Maintenance	1	allowance	$ 25,000	$ 25,000	
Technical Support & Project Management	20%	of O&M		$ 9,255	
Semi-Annual Corrective Action Progress Reports	1	ea	$ 15,000	$ 15,000	
O&M, SAMPLING, & REPORTING SUBTOTAL (per year)				**$ 70,530**	
OPERATIONS AND MONITORING TOTAL (assume 30 years)				**$ 2,115,900**	
ESTIMATED GRAND TOTAL				**$ 5,758,113**	

Prepared by: LAM 03/02/11
Checked by: GJW 03/04/11

FIGURES



LEGEND:

MW–104	◐	LAW/MACTEC CSR MONITORING WELL LOCATIONS (MW–1A, MW–1B, MW–101 TO MW–105, MW–103D, MW–104A, MW–104D, MW–106D, MW–107D, MW–108, MW–109, AND MW–110, MW–111 THROUGH MW–118 (FEBRUARY, JUNE, JULY, DECEMBER 1997, MAY 1998, JANUARY 2000, NOVEMBER 2002 AND AUGUST 2007) (MW–106 AND MW–107 WERE NOT INSTALLED)
SB–103	●	LAW/MACTEC CSR SOIL BORING LOCATIONS (BG–01 TO BG–10, SB–101 TO SB–179 AND HA–101 TO HA–114) (FEBRUARY, JUNE, JULY, DECEMBER 1997 / NOVEMBER 1999 NOVEMBER 1999 / NOVEMBER 2002 / JUNE, AUGUST AND OCTOBER 2005, MAY AND AUGUST 2007)
SS–102	△	LAW CSR SURFACE SOIL SAMPLING LOCATIONS (SS–101 TO SS–103) (JULY AND DECEMBER 1997)
MW–10	◕	T.M. GATES MONITORING WELL LOCATIONS (MW–1 TO MW–27, MW–7 WAS NOT INSTALLED) (AUGUST 1983, JANUARY 1984, JUNE 1985)
DW–1B	◕	T.M. GATES DEEP MONITORING WELL LOCATIONS (DW–1A, DW–1B, DW–2A, DW–2B) (AUGUST 1983, FEBRUARY 1984)
MW–1	⊕	MONITORING WELLS ABANDONED BY LAW (MW–1, MW–1A, MW–2, MW–3, MW–4, MW–6, MW–8, MW–9, MW–11, MW–12, MW–13, MW–14, MW–15, MW–18, MW–19, MW–20, MW–23, MW–27, DW–1A, DW–2A, DW–2B, AND MW–104) (JUNE 1995, JUNE 1997, AUGUST 1998, JANUARY 2000, AND AUGUST 2007)
SS–9	▲	APPROXIMATE T.M. GATES SURFACE SOIL SAMPLING LOCATION (SS–1 TO SS–10) (AUGUST 1983, FEBRUARY 1984)
SB–18	⊙	APPROXIMATE T.M. GATES SOIL BORING LOCATION (SB–1 TO SB–19) (AUGUST 1983, FEBRUARY 1984)
SB–01	◎	APPROXIMATE NUS SOIL BORING LOCATION (SB–01 TO SB–03) (FEBRUARY 1988)
SS–4	△	APPROXIMATE NUS SURFACE SOIL SAMPLING LOCATION (SS–01 TO SS–24) (FEBRUARY 1988)
SD–4	■	APPROXIMATE NUS SEDIMENT SAMPLING LOCATION (SD–01 TO SD–03 OFF–SITE, SD–04 TO SD–09 ON–SITE) (FEBRUARY 1988)
SW–4	□	APPROXIMATE T.M. GATES SURFACE WATER SAMPLING LOCATION (SW–01 TO SW–14 ON–SITE, SW–15 TO SW–17 OFF–SITE) (APRIL 1985)
	○	STAFF GAUGE
SED–101	☒	MACTEC SEDIMENT SAMPLING LOCATION (SED–101 TO SED–105 AND APPROXIMATE LOCATION OF MAIN POINT) (JANUARY 2000 AND MAY 2004)
SW–2007–1	⊞	MACTEC SURFACE WATER SAMPLING LOCATION (SW–101 TO SW–105 (NOVEMBER 2002), (MAIN POINT AND ALLIED OUTFALL MAY 2004), (SW–2007–1 TO SW–2007–6 AUGUST 2007), AND (SW–2010–1 TO SW–2010–18 SEPTEMBER 2010).
MW–1(BFI)	⊗	APPROXIMATE LOCATION OF 1993 MONITORING WELLS INSTALLED BY BFI FOR PHASE II INVESTIGATION.

— — — —	PROPERTY BOUNDARIES
—P—∂—	ABOVE GROUND POWER TRANSMISSION LINES
—UT—⊖—	BELOW GROUND FIBER OPTICS CABLE
—×—×—×—	FENCE
▭	EXISTING STRUCTURE
▭	FORMER STRUCTURE
⌒⌒⌒⌒	TREE LINE
—··—··—	STREAM
●	SURFACE SOIL (0–2 FT) EXCEEDING EPC GOAL
●	SUBSURFACE SOIL EXCEEDING EPC GOAL
🟩	ESTIMATED AREA OF EXCEEDANCE
A	EXCEEDANCE AREA
△	PROPOSED MONITORING WELL LOCATION

SEE TABLE 1 FOR DESCRIPTION OF SOIL SAMPLING PROGRAM

SCALE IN FEET
0 100 200

NOTES:

1. THE STRUCTURES ASSOCIATED WITH MARIETTA FERTILIZER WORKS ARE NO LONGER PRESENT. MARIETTA FERTILIZER WORKS WAS SHOWN TO BE PRESENT AND ACTIVE ON A 1911 SANBORN FIRE INSURANCE MAP. THE STRUCTURES FOR MARIETTA FERTILIZER WORKS WERE NOT PRESENT ON SANBORN FIRE INSURANCE MAPS DATED 1950 AND 1978.
2. SURVEYORS SURVEYED 4 CORNERS OF TANKAGE BUILDING AS REFERENCE TO TIE THE SITE PLAN IN W/ SURVEYED POINTS
3. ALL SOIL BORINGS AND MONITORING WELLS NEAR ACTIVE RAILROAD TRACKS MUST BE MORE THAN 25 FEET AWAY FROM THE TRACKS.

SOURCES:

1. T.M. GATES REPORTS 1986
2. NUS CORPORATION SITE INVESTIGATION REPORT, AUGUST 1988.
3. TOPOGRAPHIC SURVEY MAP PREPARED FOR BFEL BY TRAVIS PRUITT AND ASSOCIATES, DECEMBER 19, 1989.
4. AERIAL PHOTOGRAPH AND COMPOSITE PLAT BY BLUE RIDGE ENGINEERING, DECEMBER 10, 1996.
5. BOUNDARY SURVEY BY W.L. JORDEN AND COMPANY, APRIL 2, 1997. LAW CSR SOIL BORINGS AND MONITORING WELLS SURVEYED BY W.L. JORDEN IN 1997, 1998, 1999, AND 2000.
6. MARIETTA FERTILIZER WORKS STRUCTURES FROM SANBORN FIRE INSURANCE MAP 1911.
7. MACTEC/LAW CSR SOIL BORINGS AND MONITORING WELLS (2002–2007) AND SURFACE WATER LOCATIONS SURVEYED BY MACTEC ENGINEERING AND CONSULTING INC.
8. PROPERTY OWNERS SHOWN ARE BASED ON 1996 FULTON COUNTY TAX RECORDS
9. WHITAKER AND MARY L. McQUEEN PROPERTY BOUNDARIES WERE REVISED AND ARE APPROXIMATE AND ARE BASED ON FULTON COUNTY BOARD OF ASSESSORS RECORDS 2004–2005 AT www.fultonassessor.org

CADD NOTE: DRAWING XREFS ROTATED @ 0,0; 55° FROM SURVEY FILE COORDINATE POSITION.

J:\BFEL ATLANTA\SEPT 2010\PROPOSED SOIL AND GW SAMP LOC.dwg – Layout1 03/14/2011 2:47pm tgladsto

REV	DATE	BY	SUB	APP	DESCRIPTION	REV	DATE	BY	SUB	APP	DESCRIPTION

DESIGNED R. QUINN
DRAWN T. GLADSTONE
CHECKED G. WRENN
IN CHARGE L NEAL
DATE 3/7/2011

FORMER ESTECH GENERAL CHEMICALS SITE
ATLANTA,GEORGIA

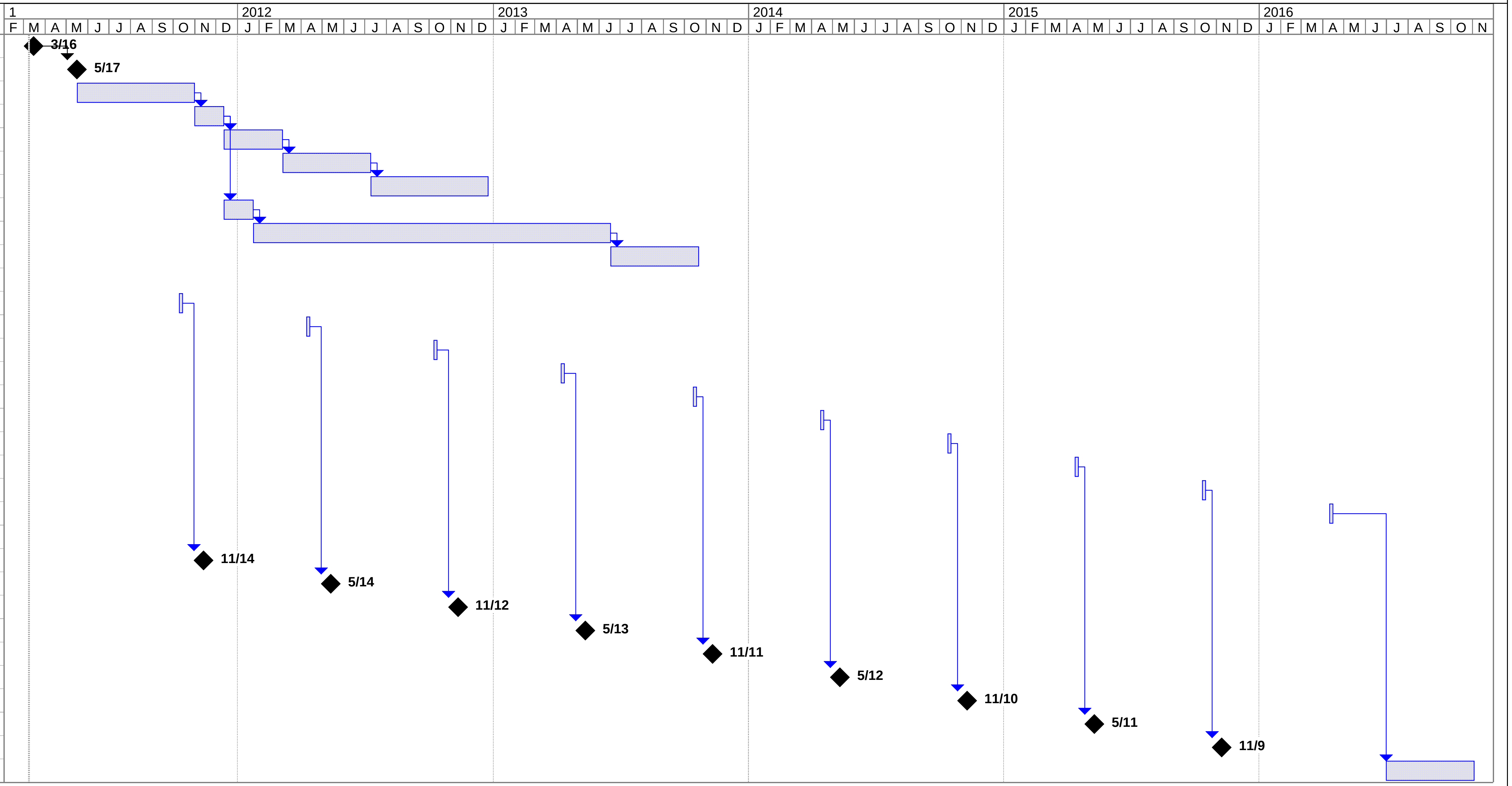
MACTEC Engineering and Consulting, Inc.
3200 TOWN POINT DRIVE, SUITE 100
KENNESAW, GEORGIA 30144 (770) 421–3400

PROPOSED SOIL AND GROUNDWATER SAMPLING LOCATIONS

SCALE AS SHOWN
CONTRACT 6122–08–0154
DWG. NO. 1
REV 0
PAGE NO

FIGURE 2 - SCHEDULE FOR IMPLEMENTATION OF VOLUNTARY REMEDIATON PLAN
FORMER ESTECH, ATLANTA, GA

ID	Task Name
1	Submit VRP Addendum
2	EPD approves VRP Application and Remediation Plan
3	Additional Delineation
4	Update Fate & Transport Modeling
5	Finalize Excavation Plan
6	Site Preparation/Permitting
7	Soil Excavation/Consolidation/Capping
8	Groundwater EHC-M Pilot Test
9	Pilot Test Performance Monitoring
10	Full Scale EHC-M Application
11	**Semi-Annual GW/SW Sampling**
12	Semi-Annual Sampling Event 1
13	Semi-Annual Sampling Event 2
14	Semi-Annual Sampling Event 3
15	Semi-Annual Sampling Event 4
16	Semi-Annual Sampling Event 5
17	Semi-Annual Sampling Event 6
18	Semi-Annual Sampling Event 7
19	Semi-Annual Sampling Event 8
20	Semi-Annual Sampling Event 9
21	Semi-Annual Sampling Event 10
22	**Submit Semi-Annual Status Report**
23	Submit Semi-Annual Status Report 1
24	Submit Semi-Annual Status Report 2
25	Submit Semi-Annual Status Report 3
26	Submit Semi-Annual Status Report 4
27	Submit Semi-Annual Status Report 5
28	Submit Semi-Annual Status Report 6
29	Submit Semi-Annual Status Report 7
30	Submit Semi-Annual Status Report 8
31	Submit Semi-Annual Status Report 9
32	Preparation and Submittal of Post-Remediation CSR



Project: BFEL Atlanta Voluntary Reme
Date: Tue 3/8/11

Task	▭	Progress	▬	Summary	▬	External Tasks	▭	Deadline	⇩
Split	┈	Milestone	◆	Project Summary	▬	External Milestone	◆		

APPENDIX A

VOLUNTARY REMEDIATION PLAN APPLICATION CHECKLIST, ABUTTING PROPERTY OWNERS INFORMATION, PROPOSED ENVIRONMENTAL COVENANT WITH WARRANTY DEEDS, BFEL TITLE REPORT AND PROPERTY MAPS AND CSX PERMISSION

Voluntary Remediation Plan Application Form and Checklist

VRP APPLICANT INFORMATION

COMPANY NAME	BFEL Indemnitor, Inc.				
CONTACT PERSON/TITLE	Kenneth F. Anderson/Authorized Representative				
ADDRESS	P.O. Box 3010, St. Charles, IL 60174				
PHONE	(630) 857-1453	**FAX**	(630)857-1472	**E-MAIL**	

GEORGIA CERTIFIED PROFESSIONAL GEOLOGIST OR PROFESSIONAL ENGINEER OVERSEEING CLEANUP

NAME	Gregory J. Wrenn			**GA PE/PG NUMBER**	PE025565
COMPANY	MACTEC Engineering and Consulting, Inc				
ADDRESS	3200 Town Point Drive				
PHONE	770-421-3472	**FAX**	770-421-3486	**E-MAIL**	gjwrenn@mactec.com

APPLICANT'S CERTIFICATION

In order to be considered a qualifying property for the VRP:

(1) The property must have a release of regulated substances into the environment;
(2) The property shall not be:
  (A) Listed on the federal National Priorities List pursuant to the federal Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. Section 9601.
  (B) Currently undergoing response activities required by an order of the regional administrator of the federal Environmental Protection Agency; or
  (C) A facility required to have a permit under Code Section 12-8-66.
(3) Qualifying the property under this part would not violate the terms and conditions under which the division operates and administers remedial programs by delegation or similar authorization from the United States Environmental Protection Agency.
(4) Any lien filed under subsection (e) of Code Section 12-8-96 or subsection (b) of Code Section 12-13-12 against the property shall be satisfied or settled and released by the director pursuant to Code Section 12-8-94 or Code Section 12-13-6.

In order to be considered a participant under the VRP:
  (1) The participant must be the property owner of the voluntary remediation property or have express permission to enter another's property to perform corrective action.
  (2) The participant must not be in violation of any order, judgment, statute, rule, or regulation subject to the enforcement authority of the director.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I also certify that this property is eligible for the Voluntary Remediation Program (VRP) as defined in Code Section 12-8-105 and I am eligible as a participant as defined in Code Section 12-8-106.

APPLICANT'S SIGNATURE	Kenneth F. Anderson		
APPLICANT'S NAME/TITLE (PRINT)	Kenneth F. Anderson/Authorized Representative	**DATE**	3/15/2010

Mail completed Voluntary Remediation Plan Application Form and Checklist, Voluntary Remediation Plan, and $5,000 Application Fee to:

Georgia Hazardous Sites Response Program
VRP Coordinator, Suite 1462
2 Martin Luther King Jr. Drive, SE
Atlanta, GA 30334

QUALIFYING PROPERTY INFORMATION –PROPERTY #1

TAX PARCEL ID	17-0191-LL0244	PROPERTY SIZE (ACRES)	18.36
PROPERTY ADDRESS	1551 Marietta Road at Inman Railyard		
CITY	Atlanta	COUNTY	Fulton
LATITUDE	33° 47’ 27” North	LONGITUDE	84° 26’ 7” West
PROPERTY OWNER(S)	BFEL Indemnitor, Inc.	PHONE #	(630) 857 1453
MAILING ADDRESS	P.O. Box 3010.		
CITY	St. Charles	STATE/ZIP	Illinois 60174

QUALIFYING PROPERTY INFORMATION –PROPERTY #2

TAX PARCEL ID	17-0191-LL0400	PROPERTY SIZE (ACRES)	See attached tax map
PROPERTY ADDRESS	0 W & A RR at Inman Railyard		
CITY	Atlanta	COUNTY	Fulton
LATITUDE	33° 47’ 35.47” North	LONGITUDE	84° 26’ 03.22” West
PROPERTY OWNER(S)	L & N RR CO	PHONE #	
MAILING ADDRESS	500 Waters Street		
CITY	Jacksonville	STATE/ZIP	Florida 32202

QUALIFYING PROPERTY INFORMATION –PROPERTY #3

TAX PARCEL ID		PROPERTY SIZE (ACRES)	
PROPERTY ADDRESS			
CITY		COUNTY	
LATITUDE		LONGITUDE	
PROPERTY OWNER(S)		PHONE #	
MAILING ADDRESS			
CITY		STATE/ZIP	

QUALIFYING PROPERTY INFORMATION –PROPERTY #4

TAX PARCEL ID		PROPERTY SIZE (ACRES)	
PROPERTY ADDRESS			
CITY		COUNTY	
LATITUDE		LONGITUDE	
PROPERTY OWNER(S)		PHONE #	
MAILING ADDRESS			
CITY		STATE/ZIP	

Please add additional sheets as necessary to include all qualifying properties.

ITEM #	DESCRIPTION OF REQUIREMENT	Location in VRP (i.e. pg., Table #, Figure #, etc.)	For EPD Comment Only (leave Blank)
1	**$5,000 APPLICATION FEE** IN THE FORM OF A CHECK PAYABLE TO THE GEORGIA DEPARTMENT OF NATURAL RESOURCES.	**Submitted in the March 18, 2010 Application**	
2	**WARRANTY DEED(S)** FOR EACH QUALIFYING PROPERTY(IES).	**Submitted in the March 18, 2010 Application and in Appendix A of the Addendum Application**	
3	**TAX PLAT** OR OTHER FIGURE INCLUDING QUALIFYING PROPERTY(IES) BOUNDARIES, ABUTTING PROPERTIES, AND TAX PARCEL IDENTIFICATION NUMBERS.	**Submitted in the March 18, 2010 Application and in Appendix A of the Addendum Application**	
4	**ONE (1) PAPER COPY AND TWO (2) COMPACT DISC (CD) COPIES** OF THE VOLUNTARY REMEDIATION PLAN IN A SEARCHABLE PORTABLE DOCUMENT FORMAT (PDF).	**Attached**	
a	**TABLE OF REGULATED SUBSTANCES RELEASED** AT THE QUALIFYING PROPERTY.	**On Tables 4.8 and 4.9 in Appendix A of March 18, 2010 Application and on Table 4.10 in Appendix B of Addendum Application**	
b	**TABLE OF SITE DELINEATION CONCENTRATION** FOR EACH REGULATED SUBSTANCE ALONG WITH A REFERENCE TO THE SPECIFIC DELINEATION CRITERIA USED [i.e. 12-8-108(1)(A), 12-8-108(1)(B), 12-8-108(1)(C), 12-8-108(1)(D), OR 12-8-108(1)(E) FOR EACH REGULATED SUBSTANCE. CALCULATIONS FOR 12-8-108(1)(E) MUST BE INCLUDED TO DEMONSTRATE OTHER CRITERIA DO NOT EXCEED 12-8-108(1)(E)].	**On Tables 4.8, 4.9, CSR-Appendix C, in Appendix A and in paragraphs 2 and 3 of Section 2.3 of March 18, 2010 Application. Also on Table 4.10 in Appendix B of**	

ITEM #	DESCRIPTION OF REQUIREMENT	Location in VRP (i.e. pg., Table #, Figure #, etc.)	For EPD Comment Only (leave Blank)
		Addendum Application.	
i	**SITE DELINEATION MAP** OF MINIMUM SCALE OF 1”= 200’ AND VERTICAL CROSS-SECTIONS SHOWING DELINEATION OF REGULATED SUBSTANCES TO SITE DELINEATION CONCENTRATIONS HORIZONTALLY AND VERTICALLY, INCLUDING PROPERTY BOUNDARIES. SITE DELINEATION MAY NOT BE EXTRAPOLATED.	**Soil delineation maps are on Figures 4.8a, 4.8b, 4.8c, 4.9a, 4.9b, 4.10a, 4.10b in Appendix A of March 18, 2010 Application. Groundwater delineation maps are on Figures 4.2, 4.3, 4.4, 4.5, 4.6, 4.11a, 4.11b, and 4.11c in Appendix B of Addendum Application.**	
c	**TABLE OF CLEANUP STANDARDS** FOR EACH REGULATED SUBSTANCE AND EACH MEDIA LISTED BELOW ALONG WITH A REFERENCE TO THE SPECIFIC CLEANUP STANDARD USED [i.e. DEFAULT TYPE 1 RRS, SITE SPECIFIC TYPE 2 RRS, DEFAULT TYPE 3 RRS, SITE SPECIFIC TYPE 4 RRS, OR TYPE 5 RRS]. COMPLETE CALCULATIONS MUST BE PROVIDED FOR EACH REGULATED SUBSTANCE IN EACH MEDIA.	**Described in the Revised Voluntary Investigation and Remediation Plan dated March 16, 2011 and on Tables D-1 to D-4 in Appendix D of the Application Addendum**	
i	**SOURCE**	**See Section 2.3 of March 18, 2010 Application.**	
ii	**SOIL** (SOIL HORIZONS MUST BE SPECIFIED WHERE DEPTH-SPECIFIC SOIL CRITERIA ARE APPLIED)	**See Site Hydrogeology (Section 2.2) and Figures 4.1**	

ITEM #	DESCRIPTION OF REQUIREMENT	Location in VRP (i.e. pg., Table #, Figure #, etc.)	For EPD Comment Only (leave Blank)
		through 4.6 in Appendix A of March 18, 2010 Application.	
iii	**GROUNDWATER** IF THE APPLICANT IS REQUESTING REMOVAL FROM THE HAZARDOUS SITE INVENTORY PURSUANT TO 12-8-107(g)(2), A NOTATION TO THAT EFFECT MUST BE INCLUDED IN THE TABLE.	**Not applicable to this site**	
iv	**VAPOR INTRUSION** (PLEASE REFER TO THE FOLLOWING LINK: http://www.epa.gov/epawaste/hazard/correctiveaction/eis/vapor/complete.pdf)	**Vapor Intrusion is not applicable to this site because there are no buildings currently on the site and there are no plans to construct buildings on the site.**	
v	**SURFACE WATER** (INCLUDING ECOLOGICAL RISK ASSESSMENT (http://www.gaepd.org/Documents/hsraguideCSRRRS.html - Ecological))	**See Section 2.4 of March 18, 2010 Application and Table 4.12 and Tables 6.1 through 6.17 in Appendix B and Appendix E of the Application Addendum**	
d	**CURRENT STATUS** OF QUALIFYING PROPERTY(IES)	**See Sections 1.0 and 2.1 of March 18, 2010 Application**	

i	**NARRATIVE AND TABULAR SUMMARY** OF ALL PERTINENT FIELD DATA AND THE RESULTS OF ALL FINAL LAB ANALYSES THAT ARE SUPPORTED BY SUFFICIENT QA/QC CONTROL DATA TO VALIDATE THE RESULTS. (NOTE: MOST RECENT GROUNDWATER DATA MUST HAVE BEEN COLLECTED WITHIN 6 MONTHS OF RECEIPT OF APPLICATION.)	**Existing field and laboratory results are summarized on Tables 3.1 through 6.17 in Appendix A of the March 18, 2010 Application. Tables containing the July and September 2010 groundwater and surface water data are on Tables 3.2, 3.3, 4.2, 4.10, 4.11, 4.12, 6.1 to 6.17, 7.1a, 7.1b, 7.2 and Appendices F and G of the Application Addendum.**	
ii	**MAPS AND VERTICAL CROSS-SECTIONS** OF APPROPRIATE SCALE DEPICTING CONCENTRATIONS FOR ALL REGULATED SUBSTANCES SUPERIMPOSED UPON SITE STRATIGRAPHIC FEATURES AND MONITORING WELLS. POINT OF DEMONSTRATION (POD) WELL MUST BE INCLUDED, IF APPLICABLE.	**Soil delineation maps are on Figures 4.8a, 4.8b, 4.8c, 4.9a, 4.9b, 4.10a, 4.10b in Appendix A of March 18, 2010 Application. Groundwater delineation maps are on Figures 4.2, 4.3, 4.4, 4.5, 4.6, 4.11a, 4.11b, and 4.11c in Appendix B of Addendum Application.**	
iii	**DESCRIPTION OF ANY HUMAN OR ENVIRONMENTAL RECEPTORS** WHO MAY HAVE BEEN OR COULD POTENTIALLY BE EXPOSED TO A RELEASE AT THE SITE.	**See Section 2.4 of March 18, 2010**	

		Application.	
e	**MAP** (MINIMUM SCALE OF 1" = 200') OR LESS DEPICTING THE POTENTIOMETRIC SURFACE OF GROUNDWATER. POD WELL MUST BE INCLUDED, IF APPLICABLE.	**See Figure 4.7 in Appendix B of Addendum Application.**	
f	**FIGURE OF GROUNDWATER USAGE** (DRINKING, IRRIGATION, ETC.) **AND SURFACE WATER** (RECREATIONAL, FISHING, ETC.) WITHIN THE AREA OF THE RELEASE AND 1,000' DOWNGRADIENT.	**See Figure D-2 in Appendix D of Addendum Application**	
g	**ENUMERATE AND DESCRIBE ACTIONS** PLANNED TO BRING THE QUALIFYING PROPERTY(IES) INTO COMPLIANCE WITH THE CLEANUP STANDARDS SPECIFIED IN 4.c. ABOVE. **IF UTILIZING REPRESENTATIVE CONCENTRATIONS,** DOCUMENTATION REGARDING THE EXPOSURE UNIT, EXPOSURE DURATION, EXPOSURE POINT CONCENTRATION, ETC. MUST BE INCLUDED.	**See Revised Voluntary Investigation and Remediation Plan at the front of the Addendum Application.**	
h	**MODEL** FOR POINT OF EXPOSURE: APPLICANT MUST EITHER PROVIDE A COPY OF THE MODEL OR LICENSE FOR USE, OR PURCHASING INFORMATION (PURCHASE OF A MODEL WILL BE BILLED TO THE APPLICANT BY EPD) ALONG WITH A TABLE OF ALL INPUT AND OUTPUT PARAMETERS AND SUPPORTING DOCUMENTATION. A SENSITIVITY ANALYSIS MUST ALSO BE INCLUDED.	**See Appendix C of the Addendum Application.**	
i	**MILESTONE SCHEDULE** INLCUDING SEMI-ANNUAL REPORTING AND SUBMITTAL OF A FINAL COMPLIANCE STATUS REPORT. GANTT CHART FORMAT PREFERRED.	**See Figure 2 in Revised Voluntary Investigation and Remediation Plan at the front of the Addendum Application.**	
j	**COST ESTIMATE** FOR IMPLEMENTING THE CORRECTIVE ACTION AND ANY CONTINUING ACTIONS SPECIFED IN THE VOLUNTARY REMEDIATION PLAN.	**See Tables 2 and 3 in Revised Voluntary Investigation and Remediation Plan at the front of the Addendum Application.**	

j	**COST ESTIMATE** FOR IMPLEMENTING THE CORRECTIVE ACTION AND ANY CONTINUING ACTIONS SPECIFED IN THE VOLUNTARY REMEDIATION PLAN.	**See Section 4.0**	
k	**SIGNED AND SEALED PE/PG CERTIFICATION** AND SUPPORTING DOCUMENTATION: "I certify under penalty of law that this report and all attachments were prepared by me or under my direct supervision in accordance with the Voluntary Remediation Program Act (O.C.G.A. Section 12-8-101, et seq.). I am a professional engineer/professional geologist who is registered with the Georgia State Board of Registration for Professional Engineers and Land Surveyors/Georgia State Board of Registration for Professional Geologists and I have the necessary experience and am in charge of the investigation and remediation of this release of regulated substances. Furthermore, to document my direct oversight of the Voluntary Remediation Plan development, implementation of corrective action, and long term monitoring, I have attached a monthly summary of hours invoiced and description of services provided by me to the Voluntary Remediation Program participant since the previous submittal to the Georgia Environmental Protection Division. The information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations." Gregory J. Wrenn PE #25565 Printed Name and GA PE/PG Number March 18, 2010 Date Gregory J. Wrenn Signature and Stamp		

No. 025565

GREGORY J. WRENN

INFORMATION ON PROPERTIES ABUTTING FORMER ESTECH GENERAL CHEMCIALS SITE

Property Parcel Identification	**Parcel Owner and Contact Information**
Parcel 24 (18.36 acres) Subject Property Parcel ID: 17-0191-LL0244 Location: 1551 Marietta Road Atlanta, GA 30318	BFEL Indemnitor, Inc c/o Mr. Kenneth Anderson One ConAgra Drive, CC-355 Omaha, NE 68102-5001
Parcel 40 (immediately bounds BFEL property Parcel 24) Parcel ID: 17-0191-LL0400 Parcel 40 Old Western & Atlantic Railroad Location: Marietta Road Atlanta, GA 30318	CSX Transportation, Inc. CSX Real Property, Inc. 301 West Bay Street Suite 800 Jacksonville, FL 32202 Environmental Concerns Associated with this Property: Kevin Boland, P.G. Environmental Consultant CSX Transportation, Inc. 500 Water Street, J-275 Jacksonville, FL 32202 904-359-1462
Parcel 76 (property where stream is located and formerly labeled as Parcel 71) Parcel ID: 17-0191-LL076-4 Parcel 76 Location: 1590 Marietta Blvd NW Atlanta, GA 30318	CSX Transportation, Inc. CSX Real Property, Inc. 301 West Bay Street Suite 800 Jacksonville, FL 32202 Environmental Concerns Associated with this Property: Kevin Boland, P.G. Environmental Consultant CSX Transportation, Inc. 500 Water Street, J-275 Jacksonville, FL 32202 904-359-1462

PROPOSED ENVIRONMENTAL COVENANT WITH WARRANTY DEEDS, BFEL TITLE REPORT AND PROPERTY MAPS

After Recording Return to:

Georgia Environmental Protection Division
Response and Remediation Program
2 Martin Luther King, Jr. Drive, SE
Suite 1462 East
Atlanta, Georgia 30334

Environmental Covenant

This instrument is an Environmental Covenant executed pursuant to the Georgia Uniform Environmental Covenants Act, OCGA § 44-16-1, *et seq.* This Environmental Covenant subjects the Property identified below to the activity and/or use limitations specified in this document. The effective date of this Environmental Covenant shall be the date upon which the fully executed Environmental Covenant has been recorded in accordance with OCGA § 44-16-8(a).

Fee Owner of Property/Grantor:

<BFEL Indemnitor, Inc.>
<P.O> Box 3010
St. Charles, IL 60174>

CSX Transportation, Inc.
CSX Real Property, Inc.
301 West Bay Street
Suite 800
Jacksonville, FL 32202

Grantee/Holder:

< BFEL Indemnitor, Inc.>
<P.O> Box 3010
St. Charles, IL 60174>

Grantee/Entity with express power to enforce:

State of Georgia
Department of Natural Resources
Environmental Protection Division
2 Martin Luther King Jr. Drive, SE
Suite 1152 East Tower
Atlanta, GA 30334

Parties with interest in the Property:

< CSX Transportation, Inc.>
<301 West Bay Street
Jacksonville, FL 32202

Property:

The property subject to this Environmental Covenant is the < **BFEL Indemnitor, Inc. (Former Estech General Chemicals Site**)> and **CSX Transportation Parcels 17-0191-LL0400 and 17-0191-LL076-4**(hereinafter "Property"), located on <**1551 Marietta Road at Inman Railyard> and Old Western & Atlantic Railroad at Inman Railyard in <Atlanta>, <Fulton**> County, Georgia. This tract of land was conveyed on **11/1/1988 from Estech, Inc to BFEL Indemnitor, Inc.** recorded in Deed

Book **12010**, Page **143**, <**Fulton**> County Records. The area is located in Land Lot **191** of the **17**th District of < **Fulton** > County, Georgia. <**18.36 acres**> A complete legal description of the area is attached as Exhibit A and a map of the area is attached as Exhibit B.

Tax Parcel Number(s):

<**17-0191-LL0244**> of < **Fulton** > County, Georgia
17-0191-LL0400 and 17-0191-LL076-4 of Fulton County, Georgia
Name and Location of Administrative Records:

The corrective action at the Property that is the subject of this Environmental Covenant is described in the following document[s]:

- <Addendum to the Voluntary Remediation Program Application, dated March 16, 2011 and Voluntary Remediation Program Application , dated March 18, 2010>

These documents are available at the following locations:

Georgia Environmental Protection Division
Response and Remediation Program
2 MLK Jr. Drive, SE, Suite 1462 East Tower
Atlanta, GA 30334
M-F 8:00 AM to 4:30 PM excluding state holidays

<list additional locations>

Description of Contamination and Corrective Action:

This Property has been listed on the state's hazardous site inventory and has been designated as needing corrective action due to the presence of hazardous wastes, hazardous constituents, or hazardous substances regulated under state law. Contact the property owner or the Georgia Environmental Protection Division for further information concerning this Property. This notice is provided in compliance with the Georgia Hazardous Site Response Act.

This Declaration of Covenant is made pursuant to the Georgia Uniform Environmental Covenants Act, O.C.G.A. § 44-16-1 *et seq*. by < **BFEL Indemnitor, Inc.**>, its successors and assigns, < **BFEL Indemnitor, Inc.**>, and the State of Georgia, Department of Natural Resources, Environmental Protection Division (hereinafter "EPD"), its successors and assigns. This Environmental Covenant is required because a release of <**arsenic, lead, copper, zinc, BHC isomers, chlordane, DDD, DDE, DDT**, **dieldrin**, **heptachlor, and toxaphene** > occurred on the Property. < **arsenic, lead, copper, zinc, BHC isomers, chlordane, DDD, DDE, DDT**, **dieldrin**, **heptachlor, and toxaphene** > are "regulated substances" as defined under the Georgia Hazardous Site Response Act, O.C.G.A. § 12-8-90 *et seq.*, and the rules promulgated thereunder (hereinafter "HSRA" and "Rules", respectively). The Corrective Action consists of the installation and maintenance of engineering controls (<Surface soils exceeding risk-based criteria will be excavated, consolidated, and/or maintained in place beneath an engineered low permeability cover system to limit leaching and to act as an exposure barrier to prevent direct contact with impacted soil. Subsurface soils will be left in place. The groundwater remedy may consist of pump-and-treat, an in-situ permeable reactive barrier (PRB) that treats impacted groundwater as it flows through the reactive media, and/or culvertizing the stream to limit exposure.>) and institutional controls (<**A restrictive covenant will be placed on the BFEL property and the groundwater-impacted portion of the CSX property to preclude use of and prevent exposure to groundwater. A restrictive covenant will be in place on the BFEL property to**

preclude use of and prevent exposure to soil exceeding risk-based cleanup criteria>) to protect human health and the environment.

Grantor, < **BFEL Indemnitor, Inc.**> (hereinafter "<**BFEL Indemnitor, Inc.**>"), hereby binds Grantor, its successors and assigns to the activity and use restriction(s) for the Property identified herein and grants such other rights under this Environmental Covenant in favor of the < **BFEL Indemnitor, Inc.**> and EPD. EPD shall have full right of enforcement of the rights conveyed under this Environmental Covenant pursuant to HSRA, O.C.G.A. § 12-8-90 *et seq*., and the rules promulgated thereunder. Failure to timely enforce compliance with this Environmental Covenant or the use or activity limitations contained herein by any person shall not bar subsequent enforcement by such person and shall not be deemed a waiver of the person's right to take action to enforce any non-compliance. Nothing in this Environmental Covenant shall restrict EPD from excising any authority under applicable law.

< **BFEL Indemnitor, Inc.**> makes the following declaration as to limitations, restrictions, and uses to which the Property may be put and specifies that such declarations shall constitute covenants to run with the land, pursuant to O.C.G.A. § 44-16-5(a); is perpetual, unless modified or terminated pursuant to the terms of this Covenant pursuant to O.C.G.A. § 44-16-9; and shall be binding on all parties and all persons claiming under them, including all current and future owners of any portion of or interest in the Property (hereinafter "Owner"). Should a transfer or sale of the Property occur before such time as this Environmental Covenant has been amended or revoked then said Environmental Covenant shall be binding on the transferee(s) or purchaser(s).

The Environmental Covenant shall inure to the benefit of < **BFEL Indemnitor, Inc.**>, EPD, < **BFEL Indemnitor, Inc.**> and their respective successors and assigns and shall be enforceable by the Director or his agents or assigns, < **BFEL Indemnitor, Inc.**> or its successors and assigns, < **BFEL Indemnitor, Inc.**> or its successors and assigns, and other party(ies) as provided for in O.C.G.A. § 44-16-11 in a court of competent jurisdiction.

Activity and/or Use Limitation(s)

1. Registry. Pursuant to O.C.G.A. § 44-16-12, this Environmental Covenant and any amendment or termination thereof, may be contained in EPD's registry for environmental covenants.

2. Notice. The Owner of the Property must give thirty (30) day advance written notice to EPD of the Owner's intent to convey any interest in the Property. No conveyance of title, easement, lease, or other interest in the Property shall be consummated by the Owner without adequate and complete provision for continued monitoring, operation, and maintenance of the Corrective Action. The Owner of the Property must also give thirty (30) day advance written notice to EPD of the Owner's intent to change the use of the Property, apply for building permit(s), or propose any site work that would affect the Property.

3. Notice of Limitation in Future Conveyances. Each instrument hereafter conveying an interest in the Property subject to this Environmental Covenant shall contain a notice of the activity and use limitations set forth in this Environmental Covenant and shall provide the recorded location of the Environmental Covenant.

4. Monitoring. <Groundwater and Surface water monitoring will be conducted as described in the **Revised Voluntary Investigation and Remediation Plan** <**March 16, 2011**> must be implemented to ensure <**effectiveness of the corrective action** >>.

5. Periodic Reporting. Annually, by no later than <**December 31**> following the effective date of this Environmental Covenant, the Owner shall submit to EPD an Annual Report as specified in the < **Revised Voluntary Investigation and Remediation Plan. The report may include groundwater detection-monitoring report results, maintenance and inspection activities, certification of non-residential use of the Property, and documentation stating whether or not the activity and use limitations in this Environmental Covenant are being complied with**>.

6. Activity and Use Limitation(s). The Property shall be used only for non-residential uses, as defined in Section 391-3-19-.02 of the Rules and defined in and allowed under the <**Fulton**> County's zoning regulations as of the date of this Environmental Covenant. Any residential use on the Property shall be prohibited. Any activity on the Property that may result in the release or exposure to the regulated substances that were contained as part of the Corrective Action, or create a new exposure pathway, is prohibited. With the exception of work necessary for the maintenance, repair, or replacement of engineering controls, activities that are prohibited < **in the capped areas include, but are not limited to the following: drilling, digging, placement of any objects or use of any equipment which deforms or stresses the surface beyond its load bearing capability, piercing the surface with a rod, spike or similar item, bulldozing or earthwork**>.

7. Groundwater Limitation. The use or extraction of groundwater beneath the Property for drinking water or for any other non-remedial purposes shall be prohibited.

8. Permanent Markers. Permanent markers on each side of the Property shall be installed and maintained that delineate the restricted area as specified in Section 391-3-19-.07(10) of the Rules. Disturbance or removal of such markers is prohibited.

9. Right of Access. In addition to any rights already possessed by EPD and/or the < **BFEL Indemnitor, Inc.**>, the Owner shall allow authorized representatives of EPD and/or < **BFEL Indemnitor, Inc.**> the right to enter the Property at reasonable times for the purpose of evaluating the Corrective Action; to take samples, to inspect the Corrective Action conducted at the Property, to determine compliance with this Environmental Covenant, and to inspect records that are related to the Corrective Action.

10. Recording of Environmental Covenant and Proof of Notification. Within thirty (30) days after the date of the Director's signature, the Owner shall file this Environmental Covenant with the Recorders of Deeds for each County in which the Property is located, and send a file stamped copy of this Environmental Covenant to EPD within thirty (30) days of recording. Within that time period, the Owner shall also send a file-stamped copy to each of the following: (1) < **BFEL Indemnitor, Inc.**>, (2) each person holding a recorded interest in the Property subject to the covenant, (3) each person in possession of the real property subject to the covenant, (4) each municipality, county, consolidated government, or other unit of local government in which real property subject to the covenant is located, and (5) each owner in fee simple whose property abuts the property subject to the Environmental Covenant.

11. Termination or Modification. The Environmental Covenant shall remain in full force and effect in accordance with O.C.G.A. § 44-5-60, unless and until the Director determines that the Property is in compliance with the Type 1, 2, 3, or 4 Risk Reduction Standards, as defined in Georgia Rules of Hazardous Site Response (Rules) Section 391-3-19-.07 and removes the Property from the Hazardous Site Inventory, whereupon the Environmental Covenant may be amended or revoked in accordance with Section 391-3-19-08(7) of the Rules and O.C.G.A. § 44-16-1 *et seq*.

12. Severability. If any provision of this Environmental Covenant is found to be unenforceable in any respect, the validity, legality, and enforceability of the remaining provisions shall not in any way be affected or impaired.

13. No Property Interest Created in EPD. This Environmental Covenant does not in any way create any interest by EPD in the Property that is subject to the Environmental Covenant. Furthermore, the act

of approving this Environmental Covenant does not in any way create any interest by EPD in the Property in accordance with O.C.G.A. § 44-16-3(b).

Representations and Warranties.

Grantor hereby represents and warrants to the other signatories hereto:

a) That the Grantor has the power and authority to enter into this Environmental Covenant, to grant the rights and interests herein provided and to carry out all obligations hereunder;
b) That the Grantor is the sole owner of the Property and holds fee simple title which is free, clear and unencumbered;
c) That the Grantor has identified all other parties that hold any interest (e.g., encumbrance) in the Property and notified such parties of the Grantor's intention to enter into this Environmental Covenant;
d) That this Environmental Covenant will not materially violate, contravene, or constitute a material default under any other agreement, document or instrument to which Grantor is a party, by which Grantor may be bound or affected;
e) That the Grantor has served each of the people or entities referenced in Activity 10 above with an identical copy of this Environmental Covenant in accordance with O.C.G.A. § 44-16-4(d).
f) That this Environmental Covenant will not materially violate or contravene any zoning law or other law regulating use of the Property; and
g) That this Environmental Covenant does not authorize a use of the Property that is otherwise prohibited by a recorded instrument that has priority over the Environmental Covenant.

Notices.

Any document or communication required to be sent pursuant to the terms of this Environmental Covenant shall be sent to the following persons:

Georgia Environmental Protection Division
Branch Chief
Land Protection Branch
2 Martin Luther King Jr. Drive SE
Suite 1154 East Tower
Atlanta, GA 30334

<name and mailing address of Holder>

Grantor has caused this Environmental Covenant to be executed pursuant to The Georgia Uniform Environmental Covenants Act, on the _____ day of _____________, 20___.

<NAME OF GRANTOR>

____
[Name of Signatory]
[Title]

Dated: __________________

<NAME OF HOLDER>

____
[Name of Person Acknowledging Receipt]
[Title]

Dated: ___________________

STATE OF GEORGIA
ENVIRONMENTAL PROTECTION DIVISION

____
[Name of Person Acknowledging Receipt]
[Title]

Dated: ___________________

[INDIVIDUAL ACKNOWLEDGMENT]

STATE OF ____________________
COUNTY OF __________________

On this _____ day of _________________, 20__, I certify that _____________ personally appeared before me, and acknowledged that **he/she** is the individual described herein and who executed the within and foregoing instrument and signed the same at **his/her** free and voluntary act and deed for the uses and purposes therein mentioned.

____
Notary Public in and for the State of
Georgia, residing at ______________.
My appointment expires______________.

[CORPORATE ACKNOWLEDGMENT]

STATE OF ____________________
COUNTY OF __________________

On this _____ day of _________________, 20__, I certify that _____________ personally appeared before me, acknowledged that **he/she** is the ______________________ of the corporation that executed the within and foregoing instrument, and signed said instrument by free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that **he/she** was authorized to execute said instrument for said corporation.

____
Notary Public in and for the State of
Georgia, residing at _______________.
My appointment expires_______________.

[REPRESENTATIVE ACKNOWLEDGEMENT]

STATE OF ____________________
COUNTY OF __________________

On this _____ day of _________________, 20__, I certify that ___________________ personally appeared before me, acknowledged that **he/she** signed this instrument, on oath stated that **he/she** was authorized to execute this instrument, and acknowledged it as the ________________________ [type of authority] of ______________________ [name of party being represented] to be the free and voluntary act and deed of such party for the uses and purposes mentioned in the instrument.

____
Notary Public in and for the State of
Georgia, residing at _____________.
My appointment expires _____________.

Exhibit A
Legal Description

QUIT-CLAIM DEED

CHICAGO TITLE INSURANCE COMPANY

Georgia
Real Est.
Paid 30.00
Date 1988
BARBARA PRICE
Clerk Superior Court
By Deputy Clerk

STATE OF GEORGIA, Fulton County.

THIS INDENTURE, made this 1st day of November in the year of our Lord One Thousand Nine Hundred and Eighty-eight between Estech, Inc., a Delaware corporation** of the first part and BFEL Indemnitor, Inc., a Delaware corporation of the second part.

WITNESSETH: That the said party of the first part for and in consideration of the sum of Ten and 00/100 ($10.00)--- Dollars, and other good and valuable consideration, cash in hand paid, the receipt of which is hereby acknowledged, bargained, sold and does by these presents bargain, sell, remise, release, and forever quit-claim to the said party of the second part, its heirs and assigns, all the right, title, interest, claim or demand which the said party of the first part has or may have had in and to the real property located in the City of Atlanta, County of Fulton and State of Georgia, described as:

See Attached Exhibit A

GEORGIA, Fulton County, Clerk's Office Superior Court
Filed & Recorded NOV 0 1 1988 at 11:25
Barbara J. Price CLERK

** formerly BCI Estech, Inc., as successor by merger to Estech, Inc., formerly

with all the rights, members and appurtenances to the said described premises in anywise appertaining or belonging.

TO HAVE AND TO HOLD the said described premises unto the said party of the second part its heirs and assigns, so that neither the said party of the first part nor its heirs, or assigns, nor any other person or persons claiming under it shall at any time, claim or demand any right, title or interest to the aforesaid described premises or its appurtenances.

IN WITNESS WHEREOF, the said party of the first part has hereunto set its hand and affixed its seal the day and year above written.

Signed, sealed and delivered in presence of

(Notary Public)

"OFFICIAL SEAL"
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES 5/27/91

Estech, Inc., a Delaware corporation**

KMB By: Karl M. Bühr, V.P.

WPC William P. Carmichael, (Seal)

CORP SEAL

BOOK 12010 PG 143

(Seal)

EXHIBIT A

ALL THAT TRACT OR PARCEL OF LAND LYING AND BEING IN LAND LOT 191 OF THE 17TH DISTRICT OF FULTON COUNTY, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING ON THE NORTH SIDE OF THE RIGHT-OF-WAY OF THE WESTERN & ATLANTIC RAILROAD, AT THE DIVIDING LINE BETWEEN SAID PROPERTY AND THAT NOW OR FORMERLY OF THE ESTATE OF W. R. HILL, BEING THE NORTHWEST CORNER OF THE PROPERTY CONVEYED TO PARTY OF THE FIRST PART'S PRECEDESSOR IN INTEREST BY SWIFT FERTILIZER WORKS BY DEED DATED DECEMBER 31, 1913, AND RECORDED ON JANUARY 20, 1914, IN BOOK 396 ON PAGE 302 OF THE RECORD OF THE CLERK'S OFFICE, SUPERIOR COURT, FULTON COUNTY, GEORGIA; THENCE NORTH 84 DEGREES, 31 MINUTES, 00 SECONDS EAST 299.6 FEET TO AN IRON PIPE; THENCE SOUTH 36 DEGREES, 30 MINUTES, 00 SECONDS EAST 92.9 FEET TO AN IRON PIPE; THENCE NORTH 53 DEGREES, 30 MINUTES, 00 SECONDS EAST 50 FEET TO AN IRON PIPE; THENCE SOUTH 36 DEGREES, 30 MINUTES, 00 SECONDS EAST 285.0 FEET TO AN IRON PIPE; THENCE SOUTH 53 DEGREES, 30 MINUTES, 00 SECONDS WEST 50 FEET TO AN IRON PIPE; THENCE SOUTH 36 DEGREES, 30 MINUTES, 00 SECONDS EAST 565 FEET TO AN IRON PIPE; THENCE SOUTH 53 DEGREES, 30 MINUTES, 00 SECONDS WEST 25 FEET TO AN IRON PIPE; THENCE SOUTH 36 DEGREES, 30 MINUTES, 00 SECONDS EAST 496.2 FEET TO A POINT OF CURVE; THENCE ALONG A CURVE CONCAVE TO THE EAST WHOSE CHORD IS SOUTH 33 DEGREES, 20 MINUTES, 42 SECONDS EAST, AND WHOSE CHORD LENGTH IS 146.44 FEET, AN ARC LENGTH OF 147.3 FEET TO AN IRON PIPE; THENCE NORTH 59 DEGREES, 48 MINUTES, 36 SECONDS EAST 50 FEET TO AN IRON PIPE; THENCE ALONG A CURVE CONCAVE TO THE EAST WHOSE CHORD HAS A BEARING OF SOUTH 19 DEGREES, 23 MINUTES, 24 SECONDS EAST AND WHOSE CHORD LENGTH IS 522.3 FEET, AN ARC DISTANCE OF 525.8 FEET TO AN IRON PIPE; THENCE SOUTH 87 DEGREES, 52 MINUTES, 24 SECONDS WEST 97.8 FEET; THENCE NORTH 73 DEGREES, 41 MINUTES, 30 SECONDS WEST 39.9 FEET; THENCE ALONG A CURVE CONCAVE TO THE SOUTHWEST AND WHOSE ARC LENGTH IS 995.7 FEET AND WHOSE CHORDS HAVE THE FOLLOWING BEARINGS AND DISTANCES; NORTH 70 DEGREES, 02 MINUTES, 11 SECONDS WEST 98.8 FEET; NORTH 68 DEGREES, 3 MINUTES, 28 SECONDS WEST 99.4 FEET; NORTH 65 DEGREES, 35 MINUTES, 55 SECONDS WEST 99.1 FEET; NORTH 59 DEGREES, 47 MINUTES, 38 SECONDS WEST 98.5 FEET; NORTH 52 DEGREES, 22 MINUTES, 52 SECONDS WEST 98.1 FEET; NORTH 49 DEGREES, 48 MINUTES, 42 SECONDS WEST 98.8 FEET; NORTH 46 DEGREES, 59 MINUTES, 28 SECONDS, WEST 72.8 FEET; NORTH 39 DEGREES, 9 MINUTES, 47 SECONDS WEST 94.7 FEET; NORTH 32 DEGREES, 44 MINUTES, 9 SECONDS WEST 96.4 FEET; NORTH 26 DEGREES, 46 MINUTES, 59 SECONDS WEST 98.6 FEET; THENCE NORTH 28 DEGREES, 29 MINUTES, 24 SECONDS WEST 806.3 FEET; THENCE ALONG A CURVE CONCAVE TO THE SOUTHWEST AND WHOSE ARC LENGTH IS 478.5 FEET WHOSE CHORDS HAVE THE FOLLOWING BEARINGS AND DISTANCES: NORTH 26 DEGREES, 28 MINUTES, 44 SECONDS WEST 99.1 FEET; NORTH 25 DEGREES, 8 MINUTES, 55 SECONDS WEST 99 FEET; NORTH 23 DEGREES, 03 MINUTES, 49 SECONDS WEST 98.8 FEET; NORTH 20 DEGREES, 10 MINUTES, 32 SECONDS WEST 181.4 FEET TO AN IRON PIPE MARKING THE POINT OF BEGINNING.

State of Illinois,

Cook County. SS.

I, Robert M. Sweitzer, County Clerk of the County of Cook, Do hereby certify that I am the lawful custodian of the official records of Notaries Public of said County, and as such officer am duly authorized to issue certificates of magistracy, that Robert E. Fisher, whose name is subscribed to the proof of acknowledgment of the annexed instrument in writing, was, at the time of taking such proof of acknowledgment, a Notary Public in and for Cook County, duly commissioned, sworn and acting as such and authorized to take acknowledgment and proofs or conveyances of lands, tenements or hereditaments, in said State of Illinois, and to administer oaths; all of which appears from the records and files in my office; that I am well acquainted with the handwriting of said Notary and verily believe that the signature of the said proof of acknowledgment is genuine; and further, that the annexed instrument is executed and acknowledged according to the laws of the State of Illinois.

In Testimony Whereof, I have hereunto set my hand and affixed the seal of the County of Cook at my office in the City of Chicago, in the said County, this 6th day of January, 1914.

Robert M. Sewitzer,

County Clerk.

(Seal of the County of Cook Ill.)

Filed 9:10 A.M. Jan. 14-1914. Recorded Jan. 20-1914.

Arnold Broyles C. S. C.

No. 165913.

State of Illinois,

County Of Cook, SS.

This Indenture, made this 31st day of December, in the year of our Lord, one thousand Nine Hundred and thirteen, between Swift Fertilizer Works, of the first part., and Swift And Company, of the second part, both of said parties being corporations duly organized and doing business under and by virtue of the laws of the State of Illinois,

WITNESSETH:

That the said party of the first part, for and in consideration of the sum of One Dollar ($1.00) , and other good and valuable considerations, in hand paid at and before the sealing and delivery of these presents, the receipt whereof is hereby acknowledged, has granted, bargained, sold and conveyed, and by these presents does grant, bargain, sell and convey unto the said party of the second part, its successors and assigns, -

All that tract or parcel of land lying and being in the County of Fulton, State of Georgia:

Beginning on the North side of the right-of-way of the Western & Atlantic

Railroad, at the dividing line between said property and that of the EState of W.R. Hill, extending thence Southerly along said right-of-way fourteen hundred and forty-three (1443) feet to the Northwest corner of the property of the Marietta Guano Company; thence Northeast along the line of said Guano Company three hundred and ten (310) feet; thence South forty-six (46) degrees East, along the line of said Guano Company five hundred and sixty (560) feet; thence Southwest along the line of said Guano Company three hundred and ten (310) feet to the right-of-way of the Western & Atlantic R.R.; thence South-easterly along said right-of-way five hundred (500) feet to a branch dividing this property from that of J.H. Ellsworth; thence along the irregular meanderings of said branch Northerly twenty-three hundred and seventy-five (2375) feet, the run of said branch being the dividing line between this property and that of J.H. Ellsworth, to the line dividing this property from that of the estate of W.R. Hill, deceased; thence Westerly aalong said line seven hundred and ninety-five (795) feet to the beginning point, being part of land lot one hundred ad ninety-one (191) in the seventeenth (17th) District of said County, and containing twenty-six and one- one-hundredths (26.01) acres, together with all buildings and appurtenances thereunto, and all Chemical Works, Fertilizer Works, Laboratory and Fixtures, including gas plant, boiler plant and building, water plant, including pumping machinery, oil vitriol plant, including still, muriatic and nitric acid plant and storage building, and other houses, ore shed, bag house, track scales, and all other buildings, it being the intention hereby to include all structures, buildings, machinery, fixtures and appliances pertaining to the manufacture of acids, chemicals and fertilizers now on the premises.

Excepting herefrom a strip of land conveyed by the party of the first part to the Atlanta, Knoxville & Northern Railway Company, a corporation under the laws of the State of Georgia, by deed dated February 16-1905, described in said deed as follows to-wit:

" A strip of land situated in the County of Fulton State of Georgia, on the Northern and Eastern side of the Western & Atlantic Railroad, and being part of the tract on which is now situated the works, plant and building of the party of the first part, and being a part of Land Lot No. 191 in the 17th District of Fulton County; being a strip of land of the particular shape, form, dimensions, and location shown on the annexed map or plat thereof, which is made a part of this deed, and containing an area of six ad eleven hundredths (6.11) acres, said strip running along a center line from the Northern boundary of said tract South 31 degrees and 56 minutes East for most of the distance, and thence on a curved line to the Western & Atlantic Railroad, and varying in dimensions from about one hundred (100) feet wide to about one hundred and fifty (150) feet, wide, as particularly shown on said map annexed hereto."

This conveyance is subject to the right of the Atlanta, Knoxville & Northern Railway Company, granted in aid deed, to encroach with the toe of its embankment on the North side of said strip, adjacent to where the two branches join, as shown on said map, at the rate of one and one-half (1-$\frac{1}{2}$) feet of width to each foot of height on the embankment aforesaid after said embankment reaches the limits of the property conveyed by said deed to the Atlanta, Knoxville & Northern Railway Company, said encroachment not to exceed Fifty (50) Feet at any point.

The party of the first part hereby grants and conveys to said party of the second part all its right, title and interest in and to an under-pass crossing through the tract of land conveyed by said party of the first part to the Atlanta, Knoxville & Northern Railway Company, as hereinabove described, being the same rights granted and conveyed to said party of the first part by said Atlanta, Knoxville & Northern Railway Company by its certain indenture dated February 16-1905, and recorded in the Clerk's office of the Superior Court of Fulton Couby, Georgia , July 28-1911, in Book 317, page 212.

To have and to hold the said bargained premises, together with all and singular the rights, members and appurtenances thereof, to the same being, belonging or in anywise appertaining to the only proper use, benefit and behoof of it, the said party of the second part, its successors and assigns, forever, in Fee Simple.

And the said party of the first part, for itself, its successors and assigns, will warrant and forever defend the right and title of the above described property unto the said party of the second part , its successors and assigns, against the lawful claims of all persons whomsoever.

In witness whereof, the said party of the first part has caused these presents to be signed by its President, and its corporate seal, attested by its Secretary, to be affixed hereto upon the day and date first aforesaid.

Swift Fertilizer Works,
By Edward F. Swift,
President.
(Corp. SEAL.)

Attest:
F.S. Hayward
Secretary.
Signed, sealed and delivered
in the presence of:
C.F. Stephenson
Robert E. Fisher,
Notary Public, Cook County, Illinois.
My Commission October 17, 1917
(Seal of Robt. E. Fisher, N.P. Cook Co., ILL.)

State of Illinois,
County of Cook. SS

I, Robert E. Fisher, a Notary Public, in and for the said County and

Exhibit B
Map of the Area

Tax Parcel Map
for
FULTON COUNTY
GEORGIA

Fulton County

Board of Assessors
and
Department of Environment and
Community Development

141 Pryor Street
Atlanta, Georgia
30303

FULTON COUNTY
GEOGRAPHIC
INFORMATION
SYSTEM

LEGEND

LAND SURVEY FEATURES

STREAMS / LAKES	
MAPPING PAGE	
SUBDIVISION NAME	BELMONT
LANDLOT LINE	▪ ▪ ▪ ▪ ▪ ▪

TRANSPORTATION FEATURES

ROAD RIGHT-OF-WAY	US 70
RAILROAD RIGHT-OF-WAY	CONRAIL

PROPERTY FEATURES

PROPERTY LINE	
ACREAGE	5.27
PROPERTY DIMENSION	100
PROPERTY ADDRESS	*5238*
LOT NUMBER	7
BLOCK NUMBER	3
UNIT NUMBER	041

POLITICAL / CULTURAL FEATURES

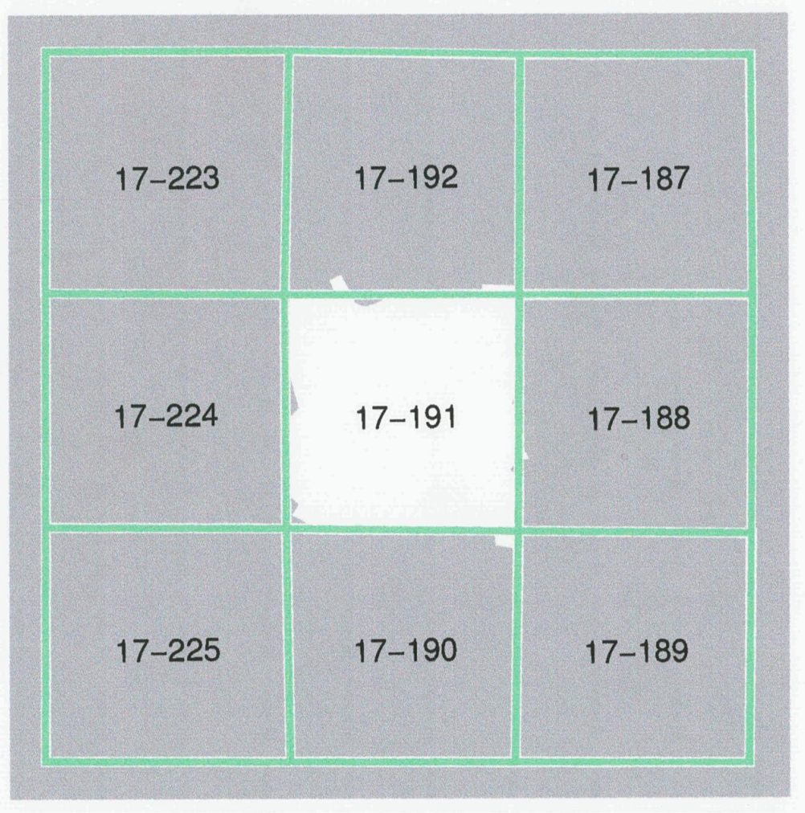
INCORPORATED AREA LIMITS	●—●—●
City Name	**City of Atlanta**

Errata Parcel	Condo & Townhome	Improvement Only
XXX	001	001

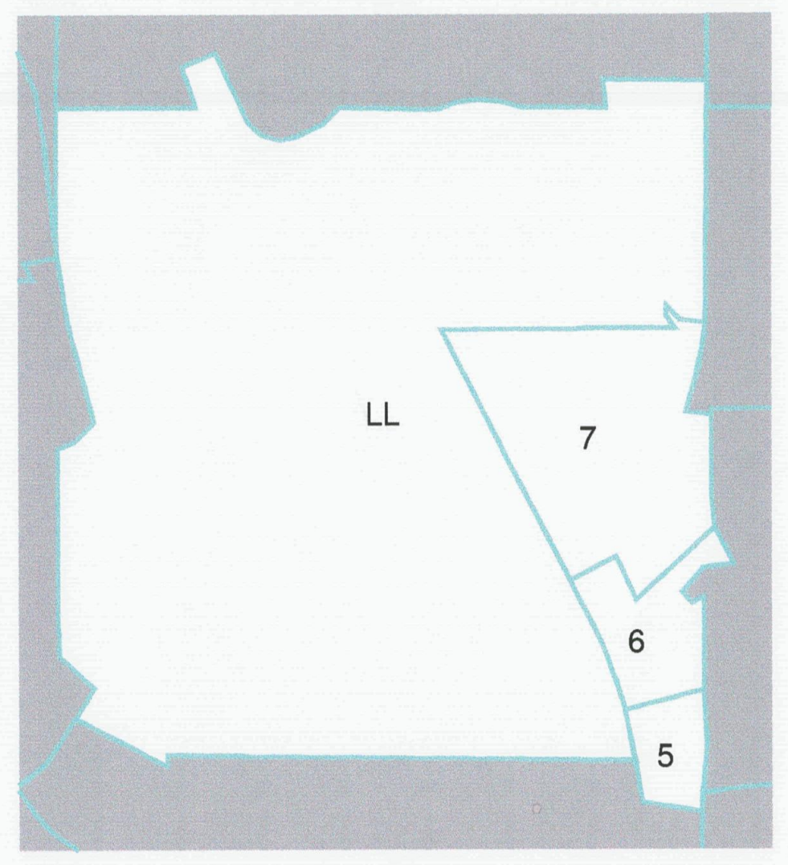
DIMENSIONS ARE IN FEET

THESE MAPS ARE THE PROPERTY OF THE FULTON COUNTY BOARD OF ASSESSORS. PROPERTY LINES AND ACREAGES ARE NOT GUARANTEED TO BE ACCURATE AND ARE USED FOR TAX PURPOSES ONLY.

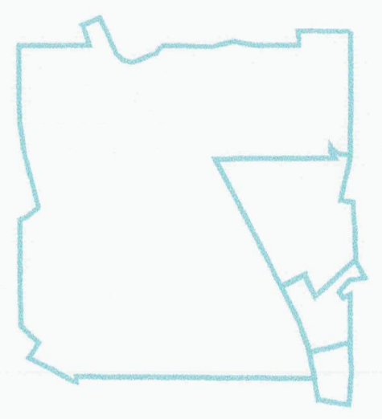
Landlot Key



Mapsheet Key



Municipality Key



0 110 220 330
FEET

DISTRICT 17
MAP 191

Plot Created on 19 Jan 06 at 6:31 PM

CSX PERMISSION

CONSENT AS QUALIFYING PROPERTY

BFEL Indemnitor, Inc. ("BFEL") is the owner of real estate located on approximately 18 acres at 1551 Marietta Road, Atlanta, Fulton County, Georgia. This real estate is located inside the Inman Railyards. CSX Transportation's Tilford Yard, within the Inman Railyards, completely surrounds the BFEL real estate.

On or about March 18, 2010, BFEL submitted a VRP application to Georgia EPD. On or about July 23, 2010, Georgia EPD responded with what additional submissions would be necessary to complete the VRP Application. In part, EPD's comments included the following:

- Permission from CSX Transportation to conduct the proposed corrective action on CSX property. Please note that if CSX does not consent to become a Qualifying Property, a CAP pursuant to Section 391-3-19-06 of the Rules must be submitted for this Parcel.

The CSX property, for which consent must be provided to become a Qualifying Property, is attached hereto as Exhibit "A" (Parcel 17-0191-LL076-4 and Parcel 17-0191-LL040-0 (Old Western & Atlantic Railroad)).

Representatives of CSX and BFEL met onsite, and discussed BFEL's proposed remediation plan. That plan, following additional mandated sampling, and as may be modified as a result of such sampling, would include:

1. SOILS - Surface and subsurface soils located on CSX property, which exceed risk-based cleanup criteria, shall be excavated, and transported to the BFEL property, where it will be consolidated and placed beneath an engineering soil cover as an exposure barrier, with a restrictive covenant on the BFEL property.

2. GROUNDWATER - Any groundwater beneath the CSX property which exceeds risk-based cleanup criteria, shall continue to be monitored and/or remediated (the specifics of which yet have to be determined and agreed upon) to be protective of the point of exposure (nearby stream) together with a restrictive covenant (to be as limited as possible) on the CSX property to preclude use of groundwater beneath the select portions of the CSX property. The covenant restricting such groundwater usage shall be as minimalistic as possible, and shall be in conformance with the Georgia Uniform Environmental Covenants Act.

BFEL acknowledges that all work performed on the CSX property is subject to, and will be performed in accordance with, the terms and conditions of CSX Transportation Environmental Right-of-Entry Agreement CSX047304.

The foregoing is acceptable to CSX Transportation, and it hereby consents that its property, as described herein, may become a Qualified Property pursuant to BFEL's VRP Application.

CSX Transportation, Inc.

By: ______________ MARIE A. MUSTEROT
DIRECTOR

Dated: 03/14/2011

Tax Parcel Map

for

FULTON COUNTY

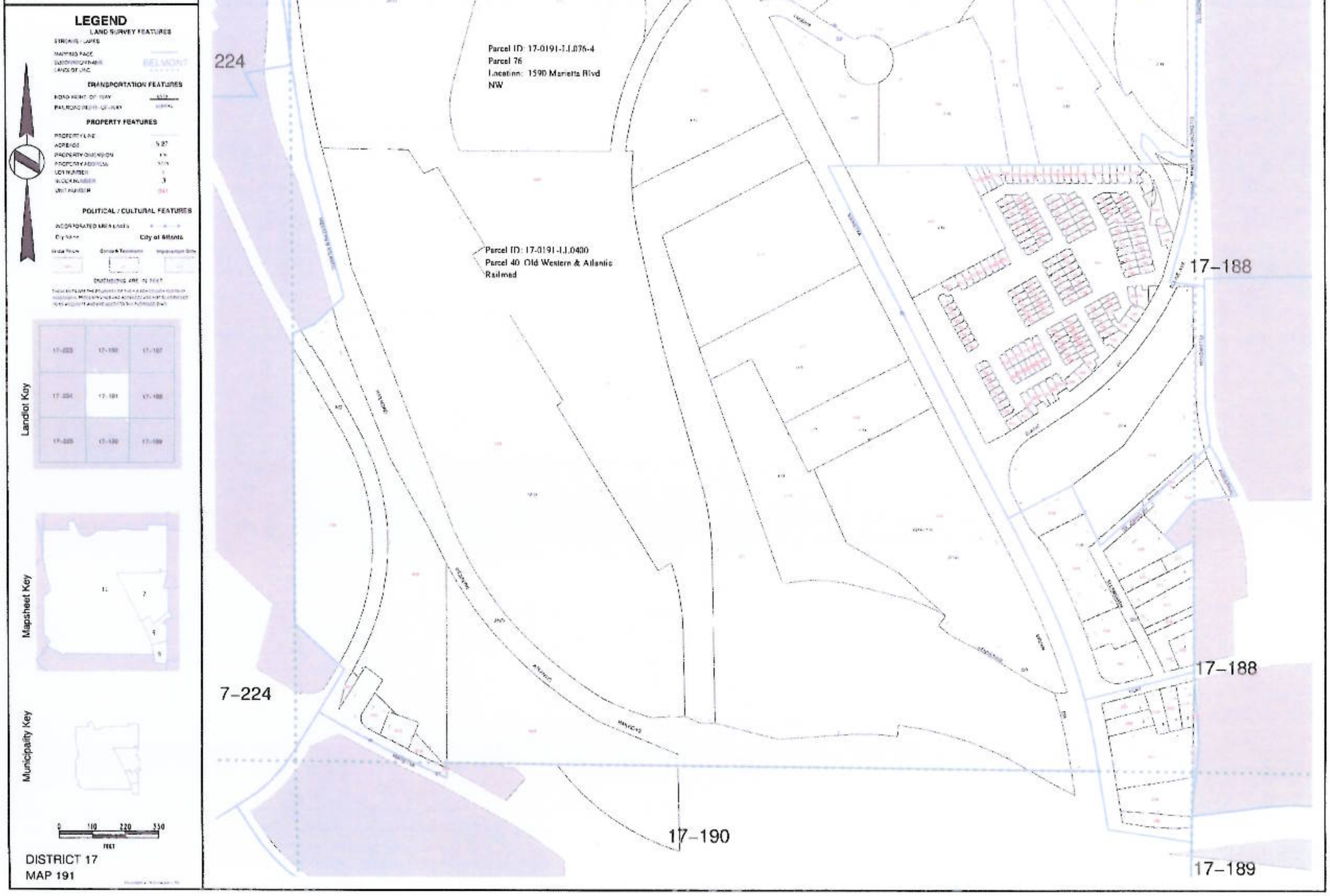
GEORGIA

FULTON COUNTY
GEOGRAPHIC
INFORMATION
SYSTEM

Fulton County

Board of Assessors
and
Department of Environment and
Community Development

141 Pryor Street
Atlanta, Georgia
30303



EXHIBIT

A

PENGAD 800-631-6989

APPENDIX B

RESPONSE TO EPD'S JULY 23, 2010 COMMENT LETTER, UPDATED TABLES AND FIGURES FOR GROUNDWATER AND SURFACE WATER DATA, RISK REDUCTION STANDARDS CALCULATIONS

RESPONSE TO EPD'S JULY 23, 2010 COMMENT LETTER

RESPONSE TO GEORGIA ENVIRONMENTAL PROTECTION DIVISION JULY 23, 2010 COMMENTS ON THE MARCH 18, 2010 VOLUNTARY REMEDIATION PROGRAM APPLICATION FOR ESTECH GENERAL CHEMICALS SITE ATLANTA, FULTON COUNTY, GEORGIA (HIS SITE 10196) TAX PARCELS 17-0191-LL0244 AND 17-0191-LL0400

General Comments:

1. *The Plan proposes to calculate average concentrations in soil across applicable exposure domains in order to determine the extent of surface soils that will be excavated and ultimately capped. The proposed domains and averaging methodology must be presented to EPD for approval and take into consideration the current and future land use at the properties. It should also be noted that the areas exceeding applicable risk reduction standards (RRS) have yet to be fully delineated in many areas on the qualifying properties and this would likely need to occur before any area averaging could be done.*

Response to Comment 1:

Representative soil concentrations for on-site and off-site soils were calculated in agreement with USEPA risk assessment guidance using USEPA's ProUCL software program (Version 4.00.05). Surface soil (0-2 feet) and subsurface soil (greater than 2 feet in depth) exposure point concentrations (EPCs) were calculated separately for each detected constituent. The EPC will be the maximum detected soil concentration if three or less positive data points are detected for a data set. Otherwise, the EPC will be an upper confidence limit of the arithmetic mean and selected per the recommendation provided by the ProUCL software. The soil EPCs will be compared to both residential and nonresidential RRS and points that contribute to an exceedance of RRS identified. Summaries of the calculated EPCs are provided Appendix D of this Addendum to the Application.

2. *Constituents of concern (COCs) that exceed residential standards for groundwater must be included in the groundwater monitoring program. Based on the groundwater data collected in 2007, the following COCs must be added: DDD, DDE, copper, nitrate, sulfate 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, and zinc. This list should be updated with the recent groundwater data expected to be collected in 2010. The trichlorobenzene compounds are degradation products of lindane according to 2006 USEPA document cited in the Plan. It should also be noted that copper, nitrate, sulfate, and zinc are not delineated yet in groundwater as stated in our November 18, 2008 letter.*

Response to Comment 2:

Groundwater samples were collected in July and September 2010 from the existing 21 site monitoring wells and analyzed for the site-specific list of organochlorine pesticides, including DDD and DDE, arsenic, and lead. At the request of EPD, copper, nitrate, sulfate 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, and zinc were also analyzed in the groundwater samples. The analytical results are summarized on Table 4.10. Potential Lindane degradation compounds 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene were not detected in the groundwater samples. Arsenic, Lead, Copper, and Zinc are delineated in groundwater to concentrations less than the Type 1 RRS (Figure 4.11B). Organochlorine pesticides are delineated to the groundwater discharge boundary (Figure 4.11A). Nitrate and Sulfate are not HSRA regulated substances, but were sampled and analyzed at the request of EPD. Nitrate is delineated to site background concentrations and Type 1 RRS shown in background wells MW-1B, MW-101 and MW-102. Sulfate is delineated to less than the secondary maximum contaminant level of 250 mg/L (there is no enforceable regulatory level for this substance) (Figure 4.11C).

3. *In the November 18, 2008 letter, EPD also requested the installation of several new monitoring wells to more fully characterize the groundwater plume. The Plan does not indicate whether these additional wells will be installed prior to the 2010 groundwater monitoring event. The Plan also does not specify any sentinel wells around the capped area.*

Response to Comment 3:

Additional monitoring wells are proposed for installation on the BFEL property and a pair of monitoring wells is proposed for installation on the west side of the un-named stream for further investigation of the source of copper and zinc detected in groundwater. The design specifications for the capped area will include sentinel wells.

4. *Surface water must meet in-stream water quality standards (ISWQS) for both aquatic toxicity and human health. Since ISWQs are set forth in the Rules for Water Quality Control, the Response and Remediation Program cannot grant variances or agree to less protective standards. In addition, EPD requires that if surface water continues to exceed ISWQs after 3 years of monitoring, then additional remedial measures must be implemented so that the qualifying properties can certify compliance within the requisite 5-year timeframe.*

Response to Comment 4:

Surface water will be monitored in the un-named stream as a part the remediation process. Table 4.12 has been revised to include both aquatic toxicity and human health Georgia Instream Water Quality Standards.

5. *Excavated soils will need to be tested to ensure that they are not characteristically hazardous before being consolidated under the impermeable cover. Soils that fail testing (e.g., TCLP) will need to be treated prior to consolidation or otherwise disposed of off-site at a permitted disposal*

facility. Base samples must be collected from the excavated areas on a 20x20 grid to ensure that the subsurface soil complies with the Type 4 criteria.

Response to Comment 5:

Excavated soils will be analyzed via TCLP at a frequency of one composite sample per 500 cubic yards prior to consolidation and placement beneath the cap. Soils that do not meet TCLP criteria will be treated on site or disposed at an off-site facility permitted to accept the waste. Base samples will be collected from the excavated areas at a frequency of one sample per 400 square feet (approximate 20 ft by 20 ft grid).

6. *According to the Hazardous Site Inventory, the M&J Solvents Site (HIS# 10096) exists immediately northwest and hydrologically up-gradient of this site. The M&J Solvents Site has a confirmed release of volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) to the groundwater, which could potentially be flowing in the direction of or onto the referenced site. Therefore, in order to confirm that the qualifying properties do not currently have any VOC/SVOC impacts to the groundwater, please have groundwater wells MW-104A, MW-104D, and the replacement well to be installed proximal to MW-21 sampled and analyzed for VOCs/SVOCs during the next groundwater monitoring event. Should a release of VOCs/SVOCs to the groundwater be identified on the qualifying properties, the vapor intrusion pathway will need to be re-evaluated and potentially the environmental covenants regarding future structures on the qualifying properties.*

Response to Comment 6:

At the request of EPD, groundwater samples were collected from monitoring wells MW-22, MW-104A, and MW-104D and were analyzed for the M&J Solvents site-specific list of VOCs and SVOCs in July and September 2010. Monitoring well MW-21 was dry during the July and September 2010 sampling events and adjacent monitoring well MW-22 was sampled instead. The analytical results are summarized on Table G-1 and shown on Figure G-1 in Appendix G of this Addendum to the Application.

Monitoring well MW-22, which screens the water table, had a concentration of cis-1,2-dichloroethene (2.7 µg/L) (well below the MCL of 70 ug/L) and no SVOCs were detected. Cis-1,2-dichloroethene was detected in M&J Solvent monitoring wells, upgradient of the BFEL site, at concentrations up to 32,000 µg/L (well MW-17). Well MW-104A, which screens the water table, had a detection of 1,4-dioxane and no detection of other VOCs or SVOCs. 1,4-Dioxane was detected in M&J Solvent monitoring wells (MW01, MW03QC, and MW05) upgradient of the BFEL site, at concentrations up to 730,000 µg/L (MW05). Well MW-104D, which screens the uppermost fractured bedrock, also had a detection of 1,4-dioxane, ketones, benzene, ethylbenzene, toluene, xylenes, and tetrahydrofuran. These constituents were also detected in the M&J Solvent monitoring wells at similar concentrations as shown on Table G-1 and Figure G-1 in Appendix G. Also shown on Figure G-1 is M&J Solvent's potentiometric surface map which shows groundwater flowing from the M&J Solvent property toward the east, south and west, radial flow away from the property. Based on this potentiometric surface map, groundwater appears to be flowing from the M&J Solvent property toward the BFEL and CSX properties. The detection of the same VOCs and SVOCs in wells MW-22, MW-104A, and MW-104D as detected in the M&J Solvents wells is therefore proven to be attributed to the M&J Solvents site based on the groundwater flow direction and the detection of the same constituents at similar concentrations. As such, BFEL maintains that the investigation and remediation of the VOC/SVOC groundwater plume is M&J Solvents' responsibility and not BFEL's responsibility.

There are no plans to re-develop the BFEL property with building structures and as such a vapor intrusion pathway is not applicable to the BFEL property. The future land use of the CSX railroad right of way property is not expected to change from its current use as a railyard. The environmental covenant(s) will have restrictions on the use of groundwater on the BFEL and CSX properties.

7. *According to Section 2.2 of the Plan, hydrologic data from the qualifying properties indicate a downward vertical gradient in the area of MW-110 and MW-111 (30 feet apart), but an upward vertical gradient in the area of MW-103A and MW-103D (nested). Drawing 4.2 also indicates that the groundwater elevation from MW-110 was anomalous due to drought and is partially screened in the bedrock. Please determine vertical gradients using appropriately nested wells in different zones.*

Response to Comment 7:

Monitoring well MW-110 is fully screened in the uppermost fractured bedrock and has a fully saturated screen interval. Vertical gradients were calculated using data from nested monitoring wells MW-104A (screening the water table) and MW-104D (screening the uppermost fractured bedrock), MW-111 (screening the water table) and MW-110 (screening the uppermost fractured bedrock). The vertical gradient in the MW-104A/MW-104D cluster is an upward gradient of 0.04 feet/feet. The vertical gradient in the MW-111/MW-110 cluster is a downward gradient of 0.2 feet/feet.

8. *Please include details of the proposed annual inspections and maintenance of the impermeable cover in a section called Long-Term Monitoring. Areas that are not to be capped, but where subsurface contamination still exists (i.e. Type 4 RRS areas with exposure controls) must also be monitored to ensure at least 2 feet of soil meeting applicable RRS is maintained and is not disturbed. This section should also incorporate the groundwater/surface water monitoring.*

Response to Comment 8:

Additional details regarding the long-term monitoring, inspections, and maintenance at the site are included in the VRP Application Addendum. Annual inspections will be conducted of the capped areas, as well as Type 4 RRS areas with exposure controls to evaluate whether the exposure pathway remains incomplete.

9. *EPD is unable to provide a detailed review of the fate and transport modeling (Bioscreen-AT) in the Plan at this time. Since the modeling is scheduled to be updated with the new groundwater data to be collected in 2010, EPD will provide detailed comments at that time. Nevertheless, after a preliminary review of the model, EPD has the following comments that should be addressed in the update model:*
    - a) *The model selected was designed as a screening-level model for natural attenuation of dissolved hydrocarbons from petroleum fuel release sites. Please justify the appropriateness of applying the model to pesticides. In addition, no model was used to evaluate potential impacts from heavy metals.*
    - b) *Both groundwater and soil concentrations (for leaching) must be proposed for all COCs that are to meet a Type 4 RRS with exposure controls. This includes the biodegradation products of lindane.*
    - c) *Please provide the calculations used to determine the site-specific half-life of 11 years for lindane.*
    - d) *The EPA chemical specific parameter table has been updated and the Koc value for lindane is now 0.0028L/kg. It also appears that the same Kd may have been used for both the residuum and bedrock analysis although the foc is an order of magnitude lower for bedrock.*
    - e) *Please note that lindane also has a 7Q10 value of 0.08 ug/L and that under these conditions the stream may have a different dilution facto*
    - f) *Since the model is using site-specific data, the unnamed stream must be gauged to collect the necessary stream flow data (e.g., flow rate, averaged channel width, etc.) as opposed to using scaled estimates from Peachtree Creek.*
    - g) *In all future model submittals, please include a list of input parameters for each COC being modeled.*
    - h) *Groundwater flow velocity should be 51 feet per year in the residuum to be conservative.*
    - i) *There is no discussion of how the model is to be field calibrated and validated (e.g., intermediate monitoring points between the source and point of demonstration).*

Response to Comment 9a:
MACTEC used the groundwater model BIOSCREEN AT to calculate the potential transport of COCs at the Site. This model is based on Microsoft Excel software that solves the widely-used analytical Domenico equation[1]. This equation describes fate and transport of solute in groundwater (inorganic or organic, decaying or non-decaying). MACTEC did not use the model's features designed to account for degradation processes specific to natural attenuation of dissolved hydrocarbons from petroleum fuel release sites (e.g., BTEX). The use of BIOSCREEN AT was limited to modeling advection and dispersion (two basic processes applicable to any dissolved constituent), adsorption onto porous media which is applicable to all COCs at the Site, as well as degradation based on solute's half-life which is applicable to all organic COCs at the Site including pesticides.

The use of the BIOSCREEN-AT groundwater model is consistent with the published recommendation of the USEPA as stated by Ford[2]. Specifically, the following quotes from this USEPA documents (Section ID.2.1, page 11) were taken into consideration when the BIOSCREEN-AT model was selected to estimate the expected attenuation of the COCs at the Site:

"*There are several types of models that may prove useful for characterizing attenuation processes at a site. In general, in approaching a specific question, it is most expedient to begin working with the simplest applicable model, adding complexity to the study as necessary. It is wise to avoid the temptation to begin by constructing the "ultimate" model, one that accounts for all aspects of transport and reaction at a site.*

Highly complex models are difficult to work with, expensive to produce, and difficult to interpret. A more efficient strategy is to begin with simple models of various aspects of the system, combining these as necessary into progressively more complex models, until reaching a satisfactory final result, one that reproduces the salient aspects of the system's behavior without introducing unnecessary complexity."

In addition, the following quote from the USEPA's Center for Subsurface Modeling Support (CSMoS) is consistent with the MACTEC use of BIOSCREEN-AT:

"CSMoS believes that the Domenico-based models in their current forms are reasonable for screening level tools, such as BIOCHLOR, BIOSCREEN, FOOTPRINT, and REMChlor." [3]

[1] Karanovic, M., Neville, C.J., and Andrews, C.B., 2007. BIOSCREEN-AT: BIOSCREEN with an exact analytical solution. *Ground Water*, vol. 45, no. 2, pp. 242–245.

[2] Ford, R.G., Wilkin, R.T., and Puls, R.W., (editors), 2007, Monitored Natural Attenuation of Inorganic Contaminants in Ground Water. Volume 1 - Technical Basis for Assessment. EPA/600/R-07/139, U.S. Environmental Protection Agency, Office of Research and Development, National Risk Management Research Laboratory, Ada, Oklahoma, 78 p.

[3] "CSMoS Comments on the Potential Limitations of the Domenico-based Fate and Transport Models," (Updated on Wednesday, July 23rd, 2008)

Response to Comment 9b:

The model will include an evaluation of the leaching of site-specific pesticides. 1,2,3-trichlorobenzene and 1,2,4-trichlorobenzene were not detected in the groundwater nor the surface water samples collected in 2010 and will not be evaluated in the model.

Response to Comment 9c:

The rationale for determining the site-specific half-life will be provided. The half-life of 11 years refers to the source zone depletion rate, not the lindane degradation rate. The rationale for simulating the source zone depletion rate is provided in the text. The dissolved lindane degradation rate is modeled by assigning the aerobic soil metabolism half-life of 980 days as explained in the text (USEPA, 2006). This value is conservative as lindane transformation is favored in biologically rich, anaerobic environments.

Response to Comment 9d:

The Regional Screening Level (RSL) Chemical-specific Parameters Supporting Table November 2010 shows the Koc value for lindane to be 2807 L/kg. This value was used in the model. The Koc values will be updated. Please note that different foc values for the residuum and bedrock were used in the model. This will be emphasized.

Response to Comment 9e:
We can not confirm EPD’s 0.08 µg/L 7Q10 value for lindane. The *391-3-6-.03 Water Use Classifications and Water Quality Standards*, effective February 18, 2009 shows the 7Q10 value for Lindane for chronic criteria indicated below under 7-day, 10-year minimum flow (7Q10) to be 0.95 µg/L. The regulation also shows that under annual average or higher stream flow conditions the Lindane ISWQC value is 1.8 µg/L.

Response to Comment 9f:
A surface water stream study was conducted in September 2010 in the un-named stream on CSX property to determine the stream discharge rate. See Appendix E of the VRP Addendum Application for results. The results of the stream study was used in the groundwater model.

Response to Comment 9g:
Input parameters will be included in future submittals of the model.

Response to Comment 9h:
Per EPD’s direction a groundwater flow velocity of 51 feet per year in the residuum will be used in the groundwater model. Please note that this value is very close to the previously calculated 50.65 ft/year.

Response to Comment 9i:
The model is designed to be used as a predictive tool, with the initial concentrations assigned based on the currently observed concentrations of COCs in groundwater. Calibration of the fate and transport model to the currently observed concentrations is not possible since the exact history (timing), locations, and mass of contaminants introduced into the subsurface is not known. Point of demonstration wells will be included in the long-term monitoring program to provide information on the validity of model predictions And possible adjustments to the model.

Human Health Risk Assessment Comments:

10. *It should be noted that the proposed exposure scenarios of construction worker and railroad worker are restrictive and may not allow for re-development of the property without recalculating new risk reduction standards.*

Response to Comment 10:

Future off-site land use (railroad right of way) is not expected to change. Thus, the railroad worker scenario remains applicable to off-site soil exposures. At this time, the on-site soils are not a source of exposure because the property is surrounded by rail tracks and the site is heavily overgrown with vegetation. If the site is to have a beneficial use in the future, construction to create access to the site and to remove surface debris and vegetation would have to be completed first. RRS designed to be protective of construction workers remain applicable for future site redevelopment. If site soils could serve as a source of future exposure to other receptors, additional RRS will be developed at that time. The owners recognize that land use controls may be part of the compliance decisions for the property if non-residential RRS are used to certify compliance.

11. *Table I-1: The Type 1 groundwater RRS for antimony should be based on the detection limit. Please revise. The Type 1 groundwater RRS for benzo(a)anthracene is based on detection limit; please indicate as such with "DL" next to the value. Please revise the Type 2 RRS values for Thallium (see comment 13).*

Response to Comment 11:

The Type 1/3 Groundwater RRS for antimony is 0.06 mg/L and is based on the detection limit (DL). "DL" has been added next to benzo(a)anthracene to indicate the Type 1/3 RRS is based on the detection limit. The values for thallium have been revised to reflect that thallium has no listed toxicity values (Appendix B).

12. *Table I-2: The overall soil Type 1 RRS values and Type 3 subsurface soil RRS presented are correct. The Type 3 surface soil RRS values are incorrect. Please note that according to §391-3-19-.07(8)(2) of the Rules for Hazardous Site Response (Rules), the surface soil must meet the subsurface criteria and not exceed items (i) through (iii) (i.e. RAGS equation values). In all instances, the values provided for surface soil Type 3 RRS exceed the subsurface RRS, which is incorrect. Please revise surface soil RRS as well as the overall soil Type 3 RRS, as appropriate.*

Response to Comment 12:

The Type 3 RRS have been revised.

13. *Table I-3: Currently, there are no toxicity values for thallium. Therefore, the Type 2 soil RRS for thallium would be based on the higher of the Table 2 Appendix III value, background or detection limit. Please revise.*

Response to Comment 13:

The Type 2 value is based on soil leaching, which is one of the four criteria listed under 391-3-19-.07(7)(c).

14. *Table I-5: Specific toxicity data for some of the regulated substances were found to be incorrect. Pursuant to the adoption of the amendments to Chapter 391-3-19 of the Rules, the hierarchy for the selection of toxicity factors has been changed to the following:*
    - *IRIS*
    - *PPRTVs*
    - *Other peer-reviewed values*

Since the EPA Regional Screening Level (RSL) table follows a similar hierarchy, it is recommended for risk assessment purposes that toxicity factors be obtained from the EPA RSL table. Please revise toxicity values for arsenic, nickel (please use soluble salts), thallium (note: no toxicity values are available(, 1,1,1-trichloroethane, 2,4-dinitrotoluene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, Chrysene, indeno(1,2,3-cd)pyrene, alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, DDD, and DDE. Please note that the use of surrogate compounds to obtain toxicity factors is not allowed under the Rules. Please update the comments section to reflect this.

Response to Comment 14:

The toxicity values used reflect those used in IRIS or the May 2010 Regional Screening Level table.

15. *Table I-6: It was noted that the chemical-specific parameters for the leachability calculations (e.g. Koc, Kd, H') were obtained from the Soil Screening Guidance Technical Background Document or the Superfund Chemical Data Matrix (SCDM). Please revise the input parameters and leachability calculation using EPD's preferred hierarchy for chemical-specific parameters of:*
    - *RSL table*
    - *Soil Screening Guidance Technical Background Document*
    - *SCDM*

Response to Comment 15:

The majority of the chemical parameters in Table I-6 (now Table A-7 in Appendix B) are from the RSL table. Parameters for benzo(ghi)perylene and phenanthrene are from the SCDM data base. The SSG equation was not applied to lead and arsenic. An SPLP study was completed for lead and arsenic. The highest detected total metals result with a paired SPLP result less than the groundwater standard times a dilution factor of 1 was selected as the soil concentration that would not leach over the groundwater Type 1 RRS. For arsenic, the selected soil concentration is 22 mg/kg; for lead, the selected soil concentration is 120 mg/kg.

16. *It is unclear in the Plan whether the Soil Screening Level equations were used in determining the leaching criteria for metals. If so, our comments pertaining to the dilution attenuation factor (DAF) still apply. Specifically, the use of a default DAF value of 20 is still not acceptable. A site-specific DAF may be calculated or a default DAF value of 1 may be used. Please ensure that the leaching values for all Type 4 RRS soil calculations are revised using the new default (1) or the site-specific DAF value.*

Response to Comment 16:
A default DAF of 1 was used.

17. *In regards to the calculated lead and arsenic soil-water partition coefficients, EPD will not accept the geometric mean of the individual Kd values as the site-specific Kd value. Use of an arithmetic mean (or geometric mean for that matter) is allowed only in situations where the dataset is linear. The SPLP dataset provided for lead and arsenic is not linear (i.e., $R^2<0.80$) and therefore does not exhibit a predictable pattern for leaching of contaminants. For instances where the dataset is not linear, EPD recommends the lowest individual Kd value be selected as the site-specific Kd value.*

Response to Comment 17:

See response to Comment 15. Site-specific Kd values for lead and arsenic are not proposed.

18. *Table I-8: Please note that 2,4-dinitrotoluene and fluoranthene are not volatile. Therefore, Volatilization Factors do not apply. Please see Comment 15 regarding chemical-specific parameters. Please update the VFs using the correct input parameters, if necessary.*

Response to Comment 18:

The volatilization factor table (I-8) (now Table A-8 in Appendix B) has been revised and now includes VFs for anthracene, phenanthrene, and 1,1,1-trichloroethane only. The parameters used for the calculation were obtained from the May 2010 RSL tables.

19. *IEUBK Model: Please note that the input parameters for the IEUBK model for Lead have changed and the current values are available at http://epa.gov/superfund/lead/products.htm. Please rerun the model, and include all the input parameters, output, and model results in the appendix for review. Please note that the probability of the blood Lead level of a 6-yr old resident that is great than 10 ug/L should be less than 5%. The model output provided had a probability of 5.342%, which is unacceptable. The overall Type 2 RRS for Lead is the lesser of the IEUBK model output and the leachability value determined by laboratory test or fate-and-transport modeling. Please revise the Type 2 RRS for Lead.*

Response to Comment 19:

The IEUBK modeling was updated to reflect the current version of the model (1.1 Build 9). A groundwater concentration of 15 micrograms per liter was used for the drinking water concentration. As a result, the project allowable concentration in soil was reduced to 325 mg/kg, which is protective of greater than 95 percent of the exposure population. However, the soil leaching value of 120 mg/kg is more restrictive and was selected as the Type 2 RRS for lead in soil.

20. *Table 4.11: Please note that regulated substances in sediment samples cannot be screened against industrial soil concentrations from USEPA Region IX Preliminary Remediation Goals. The RSL table should be used in place of Region IX PRGs.*

Response to Comment 20:

Table 4.11 has been revised to reflect industrial soil RSLs from the November 2010 RSL tables. The concentrations of arsenic exceed the screening value. However, only one point exceeds the Type 1 RRS for soil (20 mg/kg).

21. *RRS values should be calculated for both nitrate and sulfate in groundwater as EPD considers them COCs for the qualifying property. Nitrate also has a primary maximum contaminant level of 10 mg/L under the Rules for Safe Drinking Water.*

Response to Comment 21:

Nitrate and sulfate have been added to Table I-1 (now Table A-1 in Appendix B). The primary MCL was used as the Type 1 RRS for nitrate. However, sulfate has only a secondary MCL of 250 mg/L, which was used as the Type 1 RRS for sulfate. In addition, there are no listed toxicity values for sulfate in IRIS or the RSL tables, so no Type 2 or Type 4 RRS could be calculated for sulfate.

22. *Summary Table: It is unclear to which RRS standard the facility is seeking compliance. Please provide a summary table including the maximum detected concentration, and all applicable RRS standards for review. This will be helpful in determining if the facility is in compliance with any applicable standard.*

Response to Comment 22:

Summary table of the RRS in addition to tables listing the minimum and maximum detected soil concentrations and the EPCs calculated per risk assessment guidance (see Comment Response 1) for comparison against the appropriate RRS are included in Appendix D of the VRP Application Addendum.

Ecological Risk Assessment Comments:

23. *Table 6.2: The use of surrogates to “screen out” Chemical of Potential Ecological Concern (COPECs) is not allowed. If a regulated substance does not have an appropriate Ecological Screening Value (ESV), it should be carried forward in the risk assessment process. Therefore, delta-BHC should be carried forward.*

Response to Comment 23:

Because delta-BHC does not have a Surface Water ESV, Table 6.2 has been modified to indicate that delta-BHC has been carried forward in the risk assessment process. Delta-BHC was included as a COPEC in the risk calculations previously submitted. Therefore, no additional changes are necessary regarding delta-BHC.

In addition, Table 6.2 has been updated to include the surface water data collected at the site in September 2010 as part of the ecological risk assessment dataset for surface water. This update added Copper and Zinc as COPECs in surface water. Nitrate and sulfate were also added to Table 6.2. Sulfate was added as a COPEC in surface water because there is not a Surface Water ESV for sulfate. Nitrate was below the available screening criterion, and therefore, was not identified as a COPEC. Tables 6.5 through 6.7 were updated to include sulfate. Tables 6.12 through 6.17 were revised to include sulfate, as well as the updated surface water exposure point concentrations.

24. *Table 6.3: Since alpha-BHC, beta-BHC, delta-BHC, and heptachlor do not have Region 4 Sediment ESVs, these regulated substances should be carried forward in the risk assessment process.*

Response to Comment 24:

Because alpha-BHC, beta-BHC, delta-BHC and heptachlor do not have Region 4 Sediment ESVs, these chemicals were already carried forward in the risk assessment process, as indicated on Table 6.3. Therefore, no changes are necessary on Table 6.3 or for the risk calculations.

25. *Table 6.7: The Raccoon Toxicity Reference Values (TRVs) listed in Tables 6.7, 6.16, and 6.17 for DDD, DDE, DDT, alpha-BHC, delta-BHC, gamma-BHC, heptachlor, and dieldrin are incorrect. Their respective Uncertainty Factors (UFs) were not considered. Please correct these values and re-calculate the Hazard Quotients (HQs).*

Response to Comment 25:

The raccoon TRVs on Table 6.7 have been revised to account for the UFs for all the COPECs. In addition, the 2010 surface water data have been included in the risk assessment calculations. Thus, the raccoon HQs have been recalculated and are presented on the revised Table 6.16 and revised Table 6.17. These modifications resulted in revised raccoon HIs of 2,756 (Table 6.16) compared to 362 and 0.56 (Table 6.17 – sediment and surface water exposure only) compared to 0.11.

26. *Risk Calculations for Ecological Receptors: Risk calculations indicate that site contaminate levels pose a risk to some of the site receptors. However, the text indicates that "…site remediation will likely involve re-grading and removal or capping…," which will destroy current ecological habitat and eliminate certain exposure pathways (i.e., surface soil). It is the opinion of the Risk Assessment Unit (RAU) that in order to ensure that future risk from site contaminates is eliminated for ecological receptors that the removal of ecological exposure needs to be fully documented in the complete Voluntary Remediation Application and Plan and that maintaining any barriers used to eliminate exposure be a requirement in the applicant's completed application. If the redevelopment activities do not achieve the aforementioned results, the applicant will be required to perform a Baseline Ecological Risk Assessment (BERA) that documents that there are no unacceptable risks to ecological receptors or additional corrective action will be necessary.*

Response to Comment 26:
The Voluntary Remediation Application outlines the corrective actions for soil that may pose an ecological exposure risk at the site.

27. *The sample detection limits for acenaphthene, acenaphthylene, endosulfan I, fluorine, and naphthalene must be provided in Table 6.4 so that the EPD can determine if these constituents should be eliminated as COPECs.*

Response to Comment 27:

Soil concentrations for acenaphthene, acenaphthylene, endosulfan I, fluorene, and naphthalene were non-detect (*i.e.*, the detected concentrations were less than the laboratory detection limits for each constituent). Table 6.4 has been modified to include the minimum and maximum detected concentrations for each constituent, which were "J" flagged to indicate the detected concentrations were less than the laboratory detection limits. This modification provides the necessary information as to whether these constituents should be eliminated as COPECs. In addition, during review of Table 6.2 and Table 6.3 based on EPD's Comments 23 and 24, Table 6.4 was also reviewed for consistency with the use of surrogates and the lack of available ESVs. Surrogates were used for several constituents without soil ESVs. On the modified Table 6.4, several of the surrogates used were removed as screening values. Where appropriate, values for compound groups such as Total Polycyclic Aromatic Hydrocarbons and DDT/metabolites were used as screening values (e.g., the Total Polycyclic Aromatic Hydrocarbon (PAH) value was used for PAHs, the DDT/metabolites value was used for DDT, DDD, and DDE, etc.). Based on the inclusion of the "J" flagged concentrations and the surrogate use modification, four additional COPECs were identified in the screening process: endosulfan I, heptachlor epoxide, methoxychlor, and naphthalene. With the addition of these four soil COPECs and the one surface water COPEC, Tables 6.5 through 6.7 and Tables 6.12 through 6.17 were modified to include these five COPECs in the risk evaluation. The addition of these five COPECs and the addition of the 2010 surface water data resulted in the following revisions to the HIs: the HI for the northern bobwhite changed to 3,595 (Table 6.12) compared to 3,594 previously and the HI for the short-tailed shrew changed to 10,186 (Table 6.14) compared to 10,182 previously. The HIs for the northern bobwhite and the short-tailed shrew exposed to surface water only changed to 0.033 (Table 6.13) compared to 0.004 previously and 0.30 (Table 6.15) compared to 0.003 previously, respectively. HI revisions for the raccoon are discussed in Comment Response 25.

Schedule

28. Your proposal to submit the following items by December 31, 2010 is acceptable:

- *Groundwater data collected within the preceding 6 months of the completed application.*
- *Updated fate and transport model with recent groundwater data.*
- *Updated RRS calculations using current and anticipated future conditions.*
- *Permission from CSX Transportation to conduct the proposed corrective action on CSX property. (Please note that if CSX does not consent to become a qualifying property, a CAP pursuant to §391-3-19-.06 of the Rules must be submitted for this parcel by December 31, 2010.)*
- *Updated cost estimate.*
- *Gantt chart schedule for implementation of remediate including appropriate milestones such as submittal of semi-annual progress reports and final compliance status report.*
- *Updated groundwater and surface water usage map.*
- *Current Title Reports and Warranty Deeds for all qualifying properties.*

Response to Comment 28:
Groundwater samples were collected from the 21 existing site monitoring wells in July and September 2010. The analytical results are summarized on Table 4.10 in Appendix B of this Addendum.

An updated fate and transport model with the 2010 groundwater data is provided in Appendix C.

The RRS were updated using a DAF = 1 and were calculated for a construction worker on the BFEL property and a Site Worker on the CSX property and are provided in Appendix B.

A signed consent agreement with CSX to conduct further investigation and remediation on the railroad property is included in Appendix A.

An updated cost estimate is included in the Revised Voluntary Investigation and Remediation Plan located at the front of this Addendum. Financial assurance for implementing the VRP will be submitted to EPD upon issuance of the director's approval of the VRP Application and Remediation Plan.

A Gantt chart schedule for implementation of remediate is included in Revised Voluntary Investigation and Remediation Plan located at the front of this Addendum.

An updated groundwater and surface water usage map is included in Appendix D of this Addendum.

The current Title Report and Warranty Deeds for the BFEL property (Parcel 017-0191-LL0244) were included in Attachment A of the March 18, 2010 Application and are included again in this Application

Addendum in Appendix A. BFEL is seeking copies of the current Title Report and Warranty Deeds for the CSX property (Parcel 017-0191-LL0400) from CSX Transportation.

29. *EPD requests the submittal of financial assurance for the amount of the updated cost estimate by no later than December 31, 2010. Model financial assurance instruments can be located at http://www.gaepd.org/Files_PDF/forms/hwb/HSIModel.pdf.*

Response to Comment 29:

Financial assurance for implementing the Voluntary Remediation Plan will be submitted to EPD upon issuance of the director's approval of the VRP Application and Remediation Plan.

30. *A copy of the proposed Uniform Environmental Covenant (UEC) for the qualifying property(ies) and a list of names/contact information for adjoining properties with tax parcel ID numbers must be submitted by December 31, 2010. Model UEC documents can be found at: http://www.gaepd.org/Files_DOC/forms/hwb/modelcovenant.doc.*

Response to Comment 30:

A proposed Uniform Environmental Covenant for the BFEL property and CSX properties is provided in Appendix A of this Addendum. A list of the abutting property owners is also provided in Appendix A.

UPDATED TABLES AND FIGURES FOR GROUNDWATER AND SURFACE WATER DATA

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TABLES

Table 3.2: Summary of Soil and Ground-Water Samples Collected

Boring/Well Number	Media	Sample Depth (ft., bgs)	Date Sampled	Analyses	Comments
MW-1	Soil	1 - 2	8/15/1983	Arsenic and Pesticides[8]	(SS-1)
		3.5 - 5		Arsenic and Pesticides [2A]	
		8.5 - 10		Arsenic and Pesticides [2A]	
		13.5 - 15		Arsenic and Pesticides [2A]	
		18.5 - 20		Arsenic and Pesticides [2A]	
		23.5 - 25		Arsenic and Pesticides [2A]	Soil sample below ground water
MW-2	Soil	0 - 1	8/16/1983	Arsenic and Pesticides[8]	(SS-2)
		8.5 - 10		Arsenic and Pesticides [2A]	
		13.5 - 14		Arsenic and Pesticides [2A]	
		18.5 - 20		Arsenic and Pesticides [2A]	Soil sample below ground water
		23.5 - 25		Arsenic and Pesticides [2A]	Soil sample below ground water
		28.5 - 30		Arsenic and Pesticides [2A]	Soil sample below ground water
MW-3	Soil	0 - 1	8/16/1983	Arsenic and Pesticides[8]	(SS-3)
		3.5 - 5		Arsenic and Pesticides [2A]	
		8.5 - 10		Arsenic and Pesticides [2A]	
		13.5 - 15		Arsenic and Pesticides [2A]	
		18.5 - 20		Arsenic and Pesticides [2A]	Soil sample below ground water
		20.5 - 22.5		Arsenic and Pesticides [2A]	Soil sample below ground water
MW-4	Soil	0 - 1	8/17/1983	Arsenic and Pesticides[8]	(SS-4)
		3.5 - 5		Arsenic and Pesticides [2A]	
		8.5 - 10		Arsenic and Pesticides [2A]	
		13.5 - 15		Arsenic and Pesticides [2A]	
		18.5 - 20		Arsenic and Pesticides [2A]	Soil sample below ground water
		23.5 - 25		Arsenic and Pesticides [2A]	Soil sample below ground water
		28.5 - 30		Arsenic and Pesticides [2A]	Soil sample below ground water
MW-5	Soil	0 - 0.5	1/24/1984	Arsenic and Pesticides [2B]	
		3.5 - 5		Arsenic and Pesticides [2B]	
		8.5 - 10		Arsenic and Pesticides [2B]	
		13.5 - 15		Arsenic and Pesticides [2B]	Soil sample below ground water
		18.5 - 20		Arsenic and Pesticides [2B]	Soil sample below ground water
MW-6	Soil	0 - 0.5	1/31/1984	Arsenic and Pesticides [2B]	
		6 - 7.5		Arsenic and Pesticides [2B]	
		8.5 - 10		Arsenic and Pesticides [2B]	
		18.5 - 20		Arsenic and Pesticides [2B]	Soil sample below ground water
MW-8	Soil	0 - 0.5	1/26/1984	Arsenic and Pesticides [2B]	
		3.5 - 5		Arsenic and Pesticides [2B]	
		11 - 12.5		Arsenic and Pesticides [2B]	Soil sample below ground water
		16 - 17.5		Arsenic and Pesticides [2B]	Soil sample below ground water
MW-9	Soil	0 - 0.5	1/24/1984	Arsenic and Pesticides [2B]	
		3.5 - 5		Arsenic and Pesticides [2B]	
		8.5 - 10		Arsenic and Pesticides [2B]	
		13.5 - 15		Arsenic and Pesticides [2B]	
		18.5 - 20		Arsenic and Pesticides [2B]	Soil sample below ground water
		28.5 - 30		Arsenic and Pesticides [2B]	Soil sample below ground water
MW-10	Soil	0 - 0.5	1/23/1984	Arsenic and Pesticides [2B]	
		3.5 - 5		Arsenic and Pesticides [2B]	
		8.5 - 10		Arsenic and Pesticides [2B]	
		13.5 - 15		Arsenic and Pesticides [2B]	
		21 - 22.5		Arsenic and Pesticides [2B]	Soil sample below ground water
		26 - 27.5		Arsenic and Pesticides [2B]	Soil sample below ground water
MW-11	Soil	0 - 0.5	1/25/1984	Arsenic and Pesticides [2A]	
		3.5 - 5		Arsenic and Pesticides [2B]	
		8.5 - 10		Arsenic and Pesticides [2B]	
		13.5 - 15		Arsenic and Pesticides [2B]	
		18.5 - 20		Arsenic and Pesticides [2B]	
		28.5 - 30		Arsenic and Pesticides [2B]	Soil sample below ground water

Table 3.2: Summary of Soil and Ground-Water Samples Collected

Boring/Well Number	Media	Sample Depth (ft., bgs)	Date Sampled	Analyses	Comments
MW-12	Soil	0 - 0.5	1/20/1984	Arsenic and Pesticides [2B]	
		3.5 - 5		Arsenic and Pesticides [2B]	
		8.5 - 10		Arsenic and Pesticides [2B]	
		13.5 - 15		Arsenic and Pesticides [2B]	
		18.5 - 20		Arsenic and Pesticides [2B]	Soil sample below ground water
		26 - 27.5		Arsenic and Pesticides [2B]	Soil sample below ground water
MW-13	Soil	0 - 0.5	1/26/1984	Arsenic and Pesticides [2B]	
		3.5 - 5		Arsenic and Pesticides [2B]	
		8.5 - 10		Arsenic and Pesticides [2B]	Soil sample below ground water
		13.5 - 15		Arsenic and Pesticides [2B]	Soil sample below ground water
		18.5 - 20		Arsenic and Pesticides [2B]	Soil sample below ground water
		26 - 27.5		Arsenic and Pesticides [2B]	Soil sample below ground water
MW-14	Soil	0 - 0.5	2/8/1984	Arsenic and Pesticides [2B]	
		3.5 - 5		Arsenic and Pesticides [2B]	
		8.5 - 10		Arsenic and Pesticides [2B]	Soil sample below ground water
		13.5 - 15		Arsenic and Pesticides [2B]	Soil sample below ground water
MW-15	Soil	0 - 0.5	1/23/1984	Arsenic and Pesticides [2B]	
		3.5 - 5		Arsenic and Pesticides [2B]	
		8.5 - 10		Arsenic and Pesticides [2B]	
		13.5 - 15		Arsenic and Pesticides [2B]	
		18.5 - 20		Arsenic and Pesticides [2B]	Soil sample below ground water
		23.5 - 25		Arsenic and Pesticides [2B]	Soil sample below ground water
MW-16	Soil	0 - 1.5	6/18/1985	Arsenic and Pesticides [3]	
		4 - 5.5		Arsenic and Pesticides [3]	
		9 - 10.5		Arsenic and Pesticides [3]	
		14 - 15.5		Arsenic and Pesticides [3]	
		19 - 20.5		Arsenic and Pesticides [3]	
		24 - 25.5		Arsenic and Pesticides [3]	Soil sample below ground water
		29 - 30.5		Arsenic and Pesticides [3]	Soil sample below ground water
		34 - 35.5		Arsenic and Pesticides [3]	Soil sample below ground water
		39 - 40.5		Arsenic and Pesticides [3]	Soil sample below ground water
MW-17	Soil	0 - 1.5	6/19/1985	Arsenic and Pesticides [3]	
		4 - 5.5		Arsenic and Pesticides [3]	
		9 - 10.5		Arsenic and Pesticides [3]	
		14 - 15.5		Arsenic and Pesticides [3]	
		19 - 20.5		Arsenic and Pesticides [3]	
		24 - 25.5		Arsenic and Pesticides [3]	
		29 - 30.5		Arsenic and Pesticides [3]	
		39 - 40.5		Arsenic and Pesticides [3]	Soil sample below ground water
		46.5 - 48		Arsenic and Pesticides [3]	Soil sample below ground water
MW-18	Soil	0 - 1.5	6/19/1985	Arsenic and Pesticides [3]	
		4 - 5.5		Arsenic and Pesticides [3]	
		9 - 10.5		Arsenic and Pesticides [3]	
		14 - 15.5		Arsenic and Pesticides [3]	
MW-18	Soil	19 - 20.5	6/19/1985	Arsenic and Pesticides [3]	
		24 - 25.5		Arsenic and Pesticides [3]	
		31.5 - 33		Arsenic and Pesticides [3]	Soil sample below ground water
		39 - 40.5		Arsenic and Pesticides [3]	Soil sample below ground water
MW-19	Soil	0 - 1.5	6/20/1985	Arsenic and Pesticides [3]	
		4 - 5.5		Arsenic and Pesticides [3]	
		9 - 10.5		Arsenic and Pesticides [3]	
		14 - 15.5		Arsenic and Pesticides [3]	
		19 - 20.5		Arsenic and Pesticides [3]	
		24 - 25.5		Arsenic and Pesticides [3]	Soil sample below ground water
		34 - 35.5		Arsenic and Pesticides [3]	Soil sample below ground water

Table 3.2: Summary of Soil and Ground-Water Samples Collected

Boring/Well Number	Media	Sample Depth (ft., bgs)	Date Sampled	Analyses	Comments
MW-20	Soil	0 - 1.5	6/20/1985	Arsenic and Pesticides [3]	
		4 - 5.5		Arsenic and Pesticides [3]	
		9 - 10.5		Arsenic and Pesticides [3]	
		14 - 15.5		Arsenic and Pesticides [3]	
		19 - 20.5		Arsenic and Pesticides [3]	Soil sample below ground water
		24 - 25.5		Arsenic and Pesticides [3]	Soil sample below ground water
		31.5 - 33		Arsenic and Pesticides [3]	Soil sample below ground water
		36.5 - 38		Arsenic and Pesticides [3]	Soil sample below ground water
MW-21	Soil	0 - 1.5	4/18/1985	Arsenic and Pesticides [3]	
		4 - 5.5		Arsenic and Pesticides [3]	
		9 - 10.5		Arsenic and Pesticides [3]	
		14 - 15.5		Arsenic and Pesticides [3]	
		24 - 25.5		Arsenic and Pesticides [3]	Soil sample below ground water
MW-22	Soil	0 - 1.5	4/16/1985	Arsenic and Pesticides [3]	
		3.5 - 5		Arsenic and Pesticides [3]	
		8.5 - 10		Arsenic and Pesticides [3]	
		13.5 - 15		Arsenic and Pesticides [3]	
		23.5 - 25		Arsenic and Pesticides [3]	Soil sample below ground water
MW-23	Soil	0 - 1.5	4/17/1985	Arsenic and Pesticides [3]	
		4 - 5.5		Arsenic and Pesticides [3]	
		9 - 10.5		Arsenic and Pesticides [3]	
		14 - 15.5		Arsenic and Pesticides [3]	
		24 - 25.5		Arsenic and Pesticides [3]	Soil sample below ground water
MW-24	Soil	0 - 1.5	4/17/1985	Arsenic and Pesticides [3]	
		4.5 - 6		Arsenic and Pesticides [3]	
		9.5 - 11		Arsenic and Pesticides [3]	
		14.5 - 16		Arsenic and Pesticides [3]	
		24.5 - 26		Arsenic and Pesticides [3]	Soil sample below ground water
MW-25	Soil	0 - 1.5	4/17/1985	Arsenic and Pesticides [3]	
		4.5 - 6		Arsenic and Pesticides [3]	
		9.5 - 11		Arsenic and Pesticides [3]	
		14.5 - 16		Arsenic and Pesticides [3]	
		19.5 - 21		Arsenic and Pesticides [3]	
		24.5 - 26		Arsenic and Pesticides [3]	
		29.5 - 31		Arsenic and Pesticides [3]	Soil sample below ground water
MW-26	Soil	0 - 1.5	6/18/1985	Arsenic and Pesticides [3]	
		4 - 5.5		Arsenic and Pesticides [3]	
		9 - 10.5		Arsenic and Pesticides [3]	Soil sample below ground water
		14 - 15.5		Arsenic and Pesticides [3]	Soil sample below ground water
		19 - 20.5		Arsenic and Pesticides [3]	Soil sample below ground water
MW-27	Soil	0 - 1.5	6/17/1985	Arsenic and Pesticides [3]	
		4 - 5.5		Arsenic and Pesticides [3]	
		9 - 10.5		Arsenic and Pesticides [3]	Soil sample below ground water
		14 - 15.5		Arsenic and Pesticides [3]	Soil sample below ground water
		19 - 20.5		Arsenic and Pesticides [3]	Soil sample below ground water
DW-2B	Soil	0 - 0.5	1/31/1984	Arsenic and Pesticides [2B]	
		3.5 - 5		Arsenic and Pesticides [2B]	
		8.5 - 10		Arsenic and Pesticides [2B]	
		16 - 17.5		Arsenic and Pesticides [2B]	
		21 - 22.5		Arsenic and Pesticides [2B]	Soil sample below ground water
		28.5 - 30		Arsenic and Pesticides [2B]	Soil sample below ground water
		38.5 - 39.5		Arsenic and Pesticides [2B]	Soil sample below ground water
SB-1	Soil	0 - 1	1/11/1984	Arsenic and Pesticides [2A]	
		3.5 - 5		Arsenic and Pesticides [2A]	
		8.5 - 10		Arsenic and Pesticides [2A]	
		13.5 - 15		Arsenic and Pesticides [2A]	
		18.5 - 20		Arsenic and Pesticides [2A]	Soil sample below ground water
		26 - 26.5		Arsenic and Pesticides [2A]	Soil sample below ground water

Table 3.2: Summary of Soil and Ground-Water Samples Collected

Boring/Well Number	Media	Sample Depth (ft., bgs)	Date Sampled	Analyses	Comments
SB-2	Soil	0 - 1	1/12/1984	Arsenic and Pesticides [2A]	
		3.5 - 5		Arsenic and Pesticides [2A]	
		8.5 - 10		Arsenic and Pesticides [2A]	
		18.5 - 20		Arsenic and Pesticides [2A]	Soil sample below ground water
		23.5 - 25		Arsenic and Pesticides [2A]	Soil sample below ground water
		28.5 - 30		Arsenic and Pesticides [2A]	Soil sample below ground water
		33.5 - 35		Arsenic and Pesticides [2A]	Soil sample below ground water
		38.5 - 40		Arsenic and Pesticides [2A]	Soil sample below ground water
SB-3	Soil	0 - 0.5	1/11/1984	Arsenic and Pesticides [2A]	
		3.5 - 5		Arsenic and Pesticides [2A]	
		8.5 - 10		Arsenic and Pesticides [2A]	
		13.5 - 15		Arsenic and Pesticides [2A]	
		18.5 - 20		Arsenic and Pesticides [2A]	Soil sample below ground water
		23.5 - 25		Arsenic and Pesticides [2A]	Soil sample below ground water
		31 - 32.5		Arsenic and Pesticides [2A]	Soil sample below ground water
SB-4	Soil	0 - 0.5	1/12/1984	Arsenic and Pesticides [2A]	
		3.5 - 5		Arsenic and Pesticides [2A]	
		8.5 - 10		Arsenic and Pesticides [2A]	
		13.5 - 15		Arsenic and Pesticides [2A]	
		18.5 - 20		Arsenic and Pesticides [2A]	Soil sample below ground water
		26 - 27.5		Arsenic and Pesticides [2A]	Soil sample below ground water
SB-5	Soil	0 - 0.5	1/13/1984	Arsenic and Pesticides [2A]	
		3.5 - 5		Arsenic and Pesticides [2A]	
		8.5 - 10		Arsenic and Pesticides [2A]	
		13.5 - 15		Arsenic and Pesticides [2A]	Soil sample below ground water
		18.5 - 20		Arsenic and Pesticides [2A]	Soil sample below ground water
		36 - 37.5		Arsenic and Pesticides [2A]	Soil sample below ground water
SB-6	Soil	0 - 2	1/20/1984	Arsenic and Pesticides [2B]	
		3.5 - 5		Arsenic and Pesticides [2B]	
		8.5 - 10		Arsenic and Pesticides [2B]	
		13.5 - 15		Arsenic and Pesticides [2B]	Soil sample below ground water
		18.5 - 20		Arsenic and Pesticides [2B]	Soil sample below ground water
		26 - 27.5		Arsenic and Pesticides [2B]	Soil sample below ground water
		33.5 - 34.5		Arsenic and Pesticides [2B]	Soil sample below ground water
SB-7	Soil	0 - 1	8/16/1983	Arsenic and Pesticides [2A]	
		8 - 9.5		Arsenic and Pesticides [2A]	
		13 - 14.5		Arsenic and Pesticides [2A]	
		18 - 19.5		Arsenic and Pesticides [2A]	
		23 - 24.5		Arsenic and Pesticides [2A]	
SB-8	Soil	0 - 0.5	1/19/1984	Arsenic and Pesticides [2B]	
		3.5 - 5		Arsenic and Pesticides [2B]	
		8.5 - 10		Arsenic and Pesticides [2B]	
		13.5 - 15		Arsenic and Pesticides [2B]	Soil sample below ground water
		18.5 - 20		Arsenic and Pesticides [2B]	Soil sample below ground water
		28.5 - 30		Arsenic and Pesticides [2B]	Soil sample below ground water
		38.5 - 40		Arsenic and Pesticides [2B]	Soil sample below ground water
SB-9	Soil	0 - 0.5	1/18/1984	Arsenic and Pesticides [2B]	
		3.5 - 5		Arsenic and Pesticides [2B]	
		8.5 - 10		Arsenic and Pesticides [2B]	
		13.5 - 15		Arsenic and Pesticides [2B]	Soil sample below ground water
		18.5 - 20		Arsenic and Pesticides [2B]	Soil sample below ground water
		28.5 - 30		Arsenic and Pesticides [2B]	Soil sample below ground water
SB-10	Soil	0 - 0.5	1/27/1984	Arsenic and Pesticides [2B]	
		3.5 - 5		Arsenic and Pesticides [2B]	
		8.5 - 10		Arsenic and Pesticides [2B]	
		13.5 - 15		Arsenic and Pesticides [2B]	
SB-11	Soil	0 - 0.5	1/25/1984	Arsenic and Pesticides [2B]	
(MW-7)		8.5 - 10		Arsenic and Pesticides [2B]	
		13.5 - 15		Arsenic and Pesticides [2B]	
		16 - 17.5		Arsenic and Pesticides [2B]	

Table 3.2: Summary of Soil and Ground-Water Samples Collected

Boring/Well Number	Media	Sample Depth (ft., bgs)	Date Sampled	Analyses	Comments
SB-12	Soil	0 - 0.5	1/27/1984	Arsenic and Pesticides [2B]	
		3.5 - 5		Arsenic and Pesticides [2B]	
		8.5 - 10		Arsenic and Pesticides [2B]	
		13.5 - 15		Arsenic and Pesticides [2B]	
		18.5 - 20		Arsenic and Pesticides [2B]	
SB-13	Soil	0 - 1.5	4/18/1985	Arsenic and Pesticides [3]	
		3.5 - 5		Arsenic and Pesticides [3]	
		8.5 - 10		Arsenic and Pesticides [3]	
		13.5 - 15		Arsenic and Pesticides [3]	
		23.5 - 25		Arsenic and Pesticides [3]	Soil sample below ground water
		33.4 - 35		Arsenic and Pesticides [3]	Soil sample below ground water
SB-14	Soil	0 - 1.5	4/16/1985	Arsenic and Pesticides [3]	
		4 - 5.5		Arsenic and Pesticides [3]	
		9 - 10.5		Arsenic and Pesticides [3]	
		14 - 15.5		Arsenic and Pesticides [3]	
		19 - 20.5		Arsenic and Pesticides [3]	Soil sample below ground water
		24 - 25.5		Arsenic and Pesticides [3]	Soil sample below ground water
		34 - 35.5		Arsenic and Pesticides [3]	Soil sample below ground water
SB-15	Soil	0 - 1.5	4/18/1985	Arsenic and Pesticides [3]	
		4.5 - 6		Arsenic and Pesticides [3]	
		9.5 - 11		Arsenic and Pesticides [3]	
		14.5 - 16		Arsenic and Pesticides [3]	
		24.5 - 26		Arsenic and Pesticides [3]	Soil sample below ground water
		34.5 - 36		Arsenic and Pesticides [3]	Soil sample below ground water
SB-16	Soil	0 - 1.5	4/17/1985	Arsenic and Pesticides [3]	
		4.5 - 6		Arsenic and Pesticides [3]	
		9.5 - 11		Arsenic and Pesticides [3]	
		14.5 - 16		Arsenic and Pesticides [3]	
		24.5 - 26		Arsenic and Pesticides [3]	Soil sample below ground water
		34.5 - 36		Arsenic and Pesticides [3]	Soil sample below ground water
SB-17	Soil	0 - 1.5	4/19/1985	Arsenic and Pesticides [3]	
		4 - 5.5		Arsenic and Pesticides [3]	
		9 - 10.5		Arsenic and Pesticides [3]	
		14 - 15.5		Arsenic and Pesticides [3]	
		24 - 25.5		Arsenic and Pesticides [3]	Soil sample below ground water
		34 - 35.5		Arsenic and Pesticides [3]	Soil sample below ground water
SB-18	Soil	0 - 1.5	4/19/1985	Arsenic and Pesticides [3]	
		4 - 5.5		Arsenic and Pesticides [3]	
		9 - 10.5		Arsenic and Pesticides [3]	
		14 - 15.5		Arsenic and Pesticides [3]	
		24 - 25.5		Arsenic and Pesticides [3]	Soil sample below ground water
		34 - 35.5		Arsenic and Pesticides [3]	Soil sample below ground water
SB-19	Soil	0 - 1.5	4/19/1985	Arsenic and Pesticides [3]	
		4 - 5.5		Arsenic and Pesticides [3]	
		9 - 10.5		Arsenic and Pesticides [3]	
		14 - 15.5		Arsenic and Pesticides [3]	
		19 - 20.5		Arsenic and Pesticides [3]	Soil sample below ground water
		29 - 30.5		Arsenic and Pesticides [3]	Soil sample below ground water
SS-1	Soil	0 - 2	2/8/1984	Arsenic and Pesticides [2B]	
SS-2	Soil	0 - 2	2/8/1984	Arsenic and Pesticides [2B]	
SS-3	Soil	0 - 2	2/8/1984	Arsenic and Pesticides [2B]	
SS-4	Soil	0 - 2	2/8/1984	Arsenic and Pesticides [2B]	
SS-5	Soil	0 - 2	2/8/1984	Arsenic and Pesticides [2B]	
SS-6	Soil	0 - 2	2/8/1984	Arsenic and Pesticides [2B]	
SS-7	Soil	0 - 2	2/8/1984	Arsenic and Pesticides [2B]	
SS-8	Soil	0 - 2	2/8/1984	Arsenic and Pesticides [2B]	
SS-9	Soil	0 - 2	2/8/1984	Arsenic and Pesticides [2B]	
SS-10	Soil	0 - 2	2/8/1984	Arsenic and Pesticides [2B]	
SB-01	Soil	6 - 7	2/5/1988	Full CLP TCL/TAL	
SB-02	Soil	5.5 - 6.5	2/5/1988	Full CLP TCL/TAL	

Table 3.2: Summary of Soil and Ground-Water Samples Collected

Boring/Well Number	Media	Sample Depth (ft., bgs)	Date Sampled	Analyses	Comments
SB-03	Soil	6 - 7	2/5/1988	Full CLP TCL/TAL	
SS-01	Soil	0 - 1	2/5/1988	Full CLP TCL/TAL	
SS-02	Soil	0 - 1	2/5/1988	Full CLP TCL/TAL	
SS-03	Soil	0 - 1	2/5/1988	Full CLP TCL/TAL	
SS-04	Soil	0 - 1	2/5/1988	Full CLP TCL/TAL	
SS-05	Soil	0 - 1	2/5/1988	Full CLP TCL/TAL	
SS-06	Soil	0 - 1	2/5/1988	Full CLP TCL/TAL	
SS-07	Soil	0 - 1	2/5/1988	Full CLP TCL/TAL	
SS-08	Soil	0 - 1	2/5/1988	Full CLP TCL/TAL	
SS-09	Soil	0 - 1	2/5/1988	Full CLP TCL/TAL	
SS-10	Soil	0 - 1	2/5/1988	Full CLP TCL/TAL	
SS-11	Soil	0 - 1	2/5/1988	Full CLP TCL/TAL	
SS-12	Soil	0 - 1	2/5/1988	Full CLP TCL/TAL	
SS-13	Soil	0 - 1	2/5/1988	Full CLP TCL/TAL	
SS-14	Soil	0 - 1	2/5/1988	Full CLP TCL/TAL	
SS-15	Soil	0 - 1	2/5/1988	Full CLP TCL/TAL	
SS-16	Soil	0 - 1	2/5/1988	Full CLP TCL/TAL	
SS-17	Soil	0 - 1	2/5/1988	Full CLP TCL/TAL	
SS-18	Soil	0 - 1	2/5/1988	Full CLP TCL/TAL	
SS-19	Soil	0 - 1	2/5/1988	Full CLP TCL/TAL	
SS-20	Soil	0 - 1	2/5/1988	Full CLP TCL/TAL	
SS-21	Soil	0 - 1	2/5/1988	Full CLP TCL/TAL	
SS-22	Soil	0 - 1	2/5/1988	Full CLP TCL/TAL	
SS-23	Soil	0 - 1	2/5/1988	Full CLP TCL/TAL	
SS-24	Soil	0 - 1	2/5/1988	Full CLP TCL/TAL	
BG-01	Soil	0 - 2 8 - 10 18 - 20	1/21/1997	Metals, CN, PAHs, and Pesticides[1] Metals, CN, and Pesticides[1] Metals, CN, and Pesticides[1]	Background soil location
BG-02	Soil	0 - 2 8 - 10 13 - 15	1/23/1997	Metals, CN, PAHs, and Pesticides[1] Metals, CN, and Pesticides[1] Metals, CN, and Pesticides[1]	Background soil location
BG-03	Soil	0 - 2 3 - 5 13 - 15	1/23/1997	Metals, CN, PAHs, and Pesticides[1] Metals, CN, and Pesticides[1] Metals, CN, and Pesticides[1]	Background soil location
BG-04	Soil	0 - 2 8 - 10 18 - 20	1/23/1997	Metals, CN, PAHs, and Pesticides[1] Metals, CN, and Pesticides[1] Metals, CN, and Pesticides[1]	Background soil location
BG-05	Soil	0 - 2 3 - 5 13 - 15	1/22/1997	Metals, CN, PAHs, and Pesticides[1] Metals, CN, and Pesticides[1] Metals, CN, and Pesticides[1]	Background soil location
BG-06	Soil	0 - 2 13 - 15 18 - 20	1/22/1997	Metals, CN, PAHs, and Pesticides[1] Metals, CN, and Pesticides[1] Metals, CN, and Pesticides[1]	Background soil location
BG-07	Soil	0 - 2 3 - 5 8 - 10	1/22/1997	Metals, CN, PAHs, and Pesticides[1] Metals, CN, and Pesticides[1] Metals, CN, and Pesticides[1]	Background soil location Soil sample below ground water
BG-08	Soil	0 - 2	11/19/2002	Pesticides	Background soil location on Norfolk-Southern
BG-09	Soil	0 - 3.3	11/19/2002	Pesticides	Background soil location on Norfolk-Southern
BG-10	Soil	0 - 2.2	11/19/2002	Pesticides	Background soil location on Norfolk-Southern
MW-1A	Soil	0 - 2 18 - 20	6/25/1997	Arsenic, Lead, PAHs and Pesticides[5] Pesticides [5]	
MW-101	Soil	0 - 2 3 - 5 8 - 10	7/1/1997	Arsenic, Lead, PAHs and Pesticides[5] Arsenic, Lead, and Pesticides[5] Arsenic, Lead, and Pesticides[5]	

Table 3.2: Summary of Soil and Ground-Water Samples Collected

Boring/Well Number	Media	Sample Depth (ft., bgs)	Date Sampled	Analyses	Comments
MW-102	Soil	0 - 2	2/24/1997	Metals, PAHs, and Pesticides[4],	
		3 - 5		Metals and Pesticides[4]	
		8 - 10		Metals and Pesticides[4]	
		13 - 15		Metals and Pesticides[4]	
		18 - 20		Metals and Pesticides[4]	
		23 - 25		Metals and Pesticides[4]	Soil sample below ground water
		28 - 30		Metals and Pesticides[4]	Soil sample below ground water
MW-103	Soil	0 - 2	6/30/1997	Lead and Pesticides [5]	
		13 - 15		Pesticides [5]	
MW-104	Soil	0 - 2	6/25/1997	Arsenic, Lead, and Pesticides [5]	
		3 - 5		Arsenic, Lead, and Pesticides [5]	
MW-104D	Soil	0 - 2	12/15/1998	Pesticides[5]	
MW-105	Soil	0 - 2	6/27/1997	Arsenic, Lead, and Pesticides [5]	
		3 - 5		Arsenic, Lead, and Pesticides [5]	
		10 - 12		Arsenic, Lead, and Pesticides [5]	
		13 - 15		Arsenic, Lead, and Pesticides [5]	
MW-106	Soil	0 - 2	6/26/1997	Arsenic, Lead, and Pesticides [5]	
		8 - 10		Arsenic, Lead, and Pesticides [5]	
MW-107 (SB-106)	Soil	0 - 2	6/27/1997	Arsenic, Lead, and Pesticides [5]	
		3 - 5		Arsenic, Lead, and Pesticides [5]	
		8 - 10		Arsenic, Lead, and Pesticides [5]	
SB-101	Soil	0 - 2	2/24/1997	Metals, PAHs, and Pesticides[4]	
		3 - 5		Metals and Pesticides[4]	
		8 - 10		Metals and Pesticides[4]	
		13 - 15		Metals and Pesticides[4]	
SB-102	Soil	0 - 2	2/24/1997	Metals, PAHs, and Pesticides[4]	
		3 - 5		Metals and Pesticides[4]	
		8 - 10		Metals and Pesticides[4]	
		13 - 15		Metals and Pesticides[4]	
SB-103	Soil	0 - 2	6/26/1997	Arsenic, Lead, PAHs, and Pesticides[5]	
		3 - 5		Arsenic, Lead, and Pesticides [5]	
		8 - 10		Arsenic, Lead, and Pesticides [5]	
		13 - 15		Arsenic, Lead, and Pesticides [5]	
SB-104	Soil	0 - 2	6/27/1997	Arsenic, Lead, PAHs, and Pesticides[5]	
		3 - 5		Arsenic, Lead, and Pesticides [5]	
		8 - 10		Arsenic, Lead, and Pesticides [5]	
		13 - 15		Arsenic, Lead, and Pesticides [5]	
		18 - 20		Arsenic and Lead	
SB-105	Soil	0 - 2	6/27/1997	Arsenic, Lead, PAHs, and Pesticides[5]	
		3 - 5		Arsenic, Lead, and Pesticides [5]	
		8 - 10		Arsenic, Lead, and Pesticides [5]	
		13 - 15		Arsenic, Lead, and Pesticides [5]	
		18 - 20		Arsenic, Lead, and Pesticides [5]	
		23 - 25		Arsenic, Lead, and Pesticides [5]	
		28 - 30		Arsenic, Lead, and Pesticides [5]	
SB-107	Soil	0 - 2	6/26/1997	Arsenic, Lead, and Pesticides [5]	
		3 - 5		Arsenic, Lead, and Pesticides [5]	
		8 - 10		Arsenic, Lead, and Pesticides [5]	
		13 - 15	6/26/1997	Arsenic, Lead, and Pesticides [5]	
		18 - 20		Arsenic, Lead, and Pesticides [5]	
SB-108	Soil	0 - 2	6/26/1997	Arsenic, Lead, and Pesticides [5]	
		3 - 5		Arsenic, Lead, and Pesticides [5]	
		8 - 10		Arsenic, Lead, and Pesticides [5]	
		13 - 15		Arsenic, Lead, and Pesticides [5]	
		18 - 20		Arsenic, Lead, and Pesticides[5]	
SB-109	Soil	23 - 25	2/21/1997	pH and TOC, Grain size, Specific gravity, Falling-head Permeability, Porosity	Native soil
SB-110 (MW-110)	Soil	20 - 23	2/17/1997	pH and TOC, Grain size, Specific gravity, Falling-head Permeability, Porosity	First Native Soils Soil sample below ground water
SB-111	Soil	24 - 27	2/21/1997	pH and TOC, Grain size, Specific gravity, Falling-head Permeability, Porosity	Native soil

Table 3.2: Summary of Soil and Ground-Water Samples Collected

Boring/Well Number	Media	Sample Depth (ft., bgs)	Date Sampled	Analyses	Comments
SB-112	Soil	0 - 2	12/16/1997	Pesticides[5]	
		3 - 5		Pesticides[5]	
		8 - 10		Pesticides[5]	
		13 - 15		Pesticides[5]	
		18 - 20		Pesticides[5]	
		23 - 25		Pesticides[5]	
		28 - 30		Pesticides[5]	
SB-113	Soil	0 - 2	12/16/1997	Pesticides[5]	
		3 - 5		Pesticides[5]	
		8 - 10		Pesticides[5]	
		13 - 15		Pesticides[5]	
		23 - 25		Pesticides[5]	
		28 - 30		Pesticides[5]	
SB-114	Soil	0 - 2	12/17/1997	Pesticides[5]	
		8 - 10		Pesticides[5]	
		13 - 15		Pesticides[5]	
		18 - 20		Pesticides[5]	Soil sample below ground water
SB-115	Soil	0 - 2	12/17/1997	Pesticides[5]	
		13 - 15		Pesticides[5]	
SB-116	Soil	0 - 2	6/22/2005	Pesticides[1]	
SB-117	Soil	0 - 2	6/22/2005	Pesticides[1]	
SB-118	Soil	0 - 2	6/21/2005	Arsenic and Lead	
		5 - 6		Arsenic and Lead	
		13 - 15		Arsenic and Lead	
		18 - 20		Arsenic and Lead	
SB-119	Soil	0 - 2	6/22/2005	Arsenic, Lead, PAHs	
SB-120	Soil	0 - 2	6/21/2005	Arsenic and Lead	
SB-121	Soil	0 - 5	6/22/2005	Arsenic, Lead and Pesticides[1]	
		8 - 10		Arsenic, Lead and Pesticides[1]	
		10 - 15		Arsenic, Lead and Pesticides[1]	
		18 - 20		Pesticides[1]	
		23 - 25		Pesticides[1]	
SB-122	Soil	0 - 2	6/22/2005	Arsenic, Lead and Pesticides[1]	
		3 - 5		Pesticides[1]	
		8 - 10		Pesticides[1]	
		13 - 15		Pesticides[1]. Arsenic and Lead	
		18 - 20		Pesticides[1]. Arsenic and Lead	
		23 - 25		Pesticides[1]	
SB-123	Soil	0 - 2	6/21/2005	Pesticides[1]	
SB-124	Soil	0 - 2	6/21/2005	PAHs	
SB-125	Soil	2 - 3	6/21/2005	Arsenic, Lead, Pesticides[1] and PAHs	
SB-126	Soil	0 - 2	6/21/2005	Arsenic, Lead, Pesticides[1] and PAHs	
SB-127	Soil	0 - 2	6/22/2005	PAHs	
SB-128	Soil	0 - 2	6/22/2005	PAHs	
SB-129	Soil	0 - 2	6/22/2005	PAHs	
SB-130	Soil	0 - 2	6/22/2005	PAHs	
SB-131	Soil	0 - 2	6/21/2005	NA	
		3 - 5		Total Arsenic and Lead	
SB-132	Soil	3 - 5	6/21/2005	Total Arsenic and Lead; SPLP Arsenic and Lead	
		12 - 13		Total Arsenic and Lead; SPLP Arsenic and Lead	
		14 - 15		Total Arsenic and Lead; SPLP Arsenic and Lead	
SB-133	Soil	0 - 2	6/23/2005	Total Arsenic and Lead; SPLP Arsenic and Lead	
SB-134	Soil	0 - 2	6/21/2005	NA	
		8 - 10		Total Arsenic and Lead; SPLP Arsenic and Lead	
		13 - 15		Total Arsenic and Lead	
SB-135	Soil	0 - 2	6/22/2005	Total Arsenic and Lead; SPLP Arsenic and Lead	
SB-136	Soil	0 - 2	6/21/2005	NA	
		3 - 5		Total Arsenic and Lead; SPLP Arsenic and Lead	
SB-137	Soil	0 - 2	6/23/2005	Total Arsenic and Lead; SPLP Arsenic and Lead	
SB-138	Soil	0 - 2	6/21/2005	NA	
		3 - 5		Total Arsenic and Lead	

Table 3.2: Summary of Soil and Ground-Water Samples Collected

Boring/Well Number	Media	Sample Depth (ft., bgs)	Date Sampled	Analyses	Comments
SB-139	Soil	0 - 2 3 - 5	6/21/2005	NA Total Arsenic and Lead	
SB-140	Soil	0 - 2 3 - 5	6/21/2005	NA Total Arsenic and Lead	
SB-141	Soil	0 - 2	6/23/2005	Total Arsenic and Lead	
SB-142	Soil	0 - 2	6/23/2005	Total Arsenic and Lead; SPLP Arsenic and Lead	
SB-143	Soil	6 - 7 9 - 10	6/21/2005	Total Arsenic and Lead; SPLP Arsenic and Lead NA	
SB-144	Soil	0 - 2 10 - 12 14 - 15	6/21/2005	NA NA Total Arsenic and Lead; SPLP Arsenic and Lead	
SB-145	Soil	0 - 1	6/22/2005	NA	
SB-146	Soil	0 - 1	6/22/2005	NA	
SB-147	Soil	0 - 2	6/22/2005	Total Arsenic and Lead	
SB-148	Soil	0 - 2	6/23/2005	Total Arsenic and Lead	
SB-149	Soil	0 - 2 3 - 5	6/21/2005	NA NA	
SB-150	Soil	0 - 2	6/22/2005	Total Arsenic and Lead	
SB-151	Soil	1 - 1.8	10/11/2005	DDD	
SB-152	Soil	0.7 - 2	8/29/2005	DDE, DDT and Dieldrin	
SB-153	Soil	1.2 - 2	8/29/2005	Arsenic and Lead; DDE, DDT and Dieldrin	
SB-154	Soil	1 - 1.9	10/10/2005	Arsenic, DDD and DDT	
SB-155	Soil	1 - 2	8/29/2005	Lead	
SB-156	Soil	1 - 2	10/10/2005	Arsenic and PAHs	
SB-157	Soil	1.5 - 2.2	10/10/2005	Arsenic and PAHs	
SB-158	Soil	0.5 - 1.8	10/10/2005	Arsenic and Lead	
SB-159	Soil	1.2 - 1.9	10/10/2005	Arsenic and Lead	
SB-160	Soil	1 - 1.8	10/10/2005	Fluoranthene, Phenanthrene and Pyrene	
SB-161	Soil	1 - 2	10/10/2005	NA	Contingency Sample
SB-162	Soil	1 - 1.7	10/10/2005	NA	Contingency Sample
SB-163	Soil	1 - 2	8/29/2005	NA	Contingency Sample
SB-164	Soil	1 - 2	8/29/2005	DDE, DDT and Dieldrin	
SB-165	Soil	1.2 - 1.7	10/10/2005	DDD	
SB-166	Soil	1 - 2	8/29/2005	NA	Contingency Sample
SB-167	Soil	1.1 - 2	10/10/2005	Arsenic	
SB-168	Soil	0.9 - 2	10/10/2005	Arsenic and Lead	
SB-169	Soil	0.7 - 2	10/11/2005	NA	Contingency Sample
SB-170	Soil	0 - 2 4.5	5/30/2007 5/30/2007	Arsenic, Lead, Copper, Zinc, and Anions[11] Arsenic, Lead, Copper, Zinc, and Anions[11]	
SB-171	Soil	0 - 2 4.5	5/30/2007 5/30/2007	Arsenic, Lead, Copper, Zinc, and Anions[11] Arsenic, Lead, Copper, Zinc, and Anions[11]	
SB-172	Soil	0 - 2 4.5	5/30/2007 5/30/2007	Arsenic, Lead, Copper, Zinc, and Anions[11] Arsenic, Lead, Copper, Zinc, and Anions[11]	
SB-173	Soil	0 - 2 4.5	5/30/2007 5/30/2007	Arsenic, Lead, Copper, Zinc, and Anions[11] Arsenic, Lead, Copper, Zinc, and Anions[11]	
SB-174	Soil	0 - 2 4.5	5/30/2007 5/30/2007	Arsenic, Lead, Copper, Zinc, and Anions[11] Arsenic, Lead, Copper, Zinc, and Anions[11]	
SB-175	Soil	0 - 2 4.5	5/30/2007 5/30/2007	Arsenic, Lead, Copper, Zinc, and Anions[11] Arsenic, Lead, Copper, Zinc, and Anions[11]	
SB-176	Soil	1 - 2 3 - 4	8/13/2007 8/13/2007	Arsenic and Lead Arsenicand Lead	
SB-177	Soil	1 - 2 3 - 4	8/13/2007 8/13/2007	Arsenic and Lead Arsenicand Lead	
SB-178	Soil	1 - 2 3 - 4	8/13/2007 8/13/2007	Arsenic and Lead Arsenicand Lead	
SB-179	Soil	1 - 2 3 - 4	8/13/2007 8/13/2007	Arsenic and Lead Arsenicand Lead	
SS-101	Soil	0 - 0.6	7/1/1997	Arsenic, Lead, PAHs and Pesticides[5]	
SS-102	Soil	0 - 2	7/1/1997	Arsenic, Lead, and Pesticides[5]	
SS-103	Soil	0 - 2	12/16/1997	Pesticides[5]	

Table 3.2: Summary of Soil and Ground-Water Samples Collected

Boring/Well Number	Media	Sample Depth (ft., bgs)	Date Sampled	Analyses	Comments
HA-101	Soil	1 - 2	12/1/1999	Arsenic, Lead, and Pesticides[5]	
HA-102	Soil	1 - 2	12/1/1999	Arsenic, Lead, and Pesticides[5]	
		5 - 6	12/1/1999	Arsenic, Lead, and Pesticides[5]	
HA-103	Soil	1 - 2	12/1/1999	Arsenic, Lead, and Pesticides[5]	
		4 - 5	12/1/1999	Arsenic, Lead, and Pesticides[5]	
HA-104	Soil	1 - 2	11/30/1999	Arsenic, Lead, and Pesticides[5]	
		4 - 5	11/30/1999	Arsenic, Lead, and Pesticides[5]	
HA-105	Soil	1 - 2	12/1/1999	Arsenic, Lead, PAHs and Pesticides[5]	
		5 - 6	12/1/1999	Arsenic, Lead, PAHs and Pesticides[5]	
HA-106	Soil	1 - 2	12/2/1999	Arsenic, Lead, PAHs and Pesticides[5]	
		4 - 5	12/2/1999	Arsenic, Lead, PAHs and Pesticides[5]	
HA-107	Soil	1 - 2	12/2/1999	Arsenic, Lead, PAHs and Pesticides[5]	
		5 - 6	12/2/1999	Arsenic, Lead, PAHs and Pesticides[5]	
HA-108	Soil	1 - 2	12/1/99	Arsenic, Lead, PAHs and Pesticides[5]	
HA-109	Soil	1 - 2	12/2/1999	Arsenic, Lead, PAHs and Pesticides[5]	
		5 - 6	12/2/1999	Arsenic, Lead, PAHs and Pesticides[5]	
HA-110	Soil	1 - 2	12/2/1999	Arsenic, Lead, PAHs and Pesticides[5]	
		5 - 6	12/2/1999	Arsenic, Lead, PAHs and Pesticides[5]	
HA-111	Soil	1 - 2	12/1/1999	Arsenic, Lead, PAHs and Pesticides[5]	
		5 - 6	12/1/1999	Arsenic, Lead, PAHs and Pesticides[5]	
HA-112	Soil	1 - 2	12/1/1999	Arsenic, Lead, and Pesticides[5]	
		5 - 6	12/1/1999	Arsenic, Lead, and Pesticides[5]	
HA-113	Soil	1 - 2	12/1/1999	Arsenic, Lead, and Pesticides[5]	
		5 - 6	12/1/1999	Arsenic, Lead, and Pesticides[5]	
HA-114	Soil	1 - 2	12/1/1999	Arsenic, Lead, and Pesticides[5]	
		5 - 6	12/1/1999	Arsenic, Lead, and Pesticides[5]	
SD-01	Sediment	0 - 1	2/5/1988	Full CLP TCL/TAL	
SD-02	Sediment	0 - 1	2/5/1988	Full CLP TCL/TAL	
SD-03	Sediment	0 - 1	2/5/1988	Full CLP TCL/TAL	
SD-04	Sediment	0 - 1	2/5/1988	Full CLP TCL/TAL	
SD-05	Sediment	0 - 1	2/5/1988	Full CLP TCL/TAL	
SD-06	Sediment	0 - 1	2/5/1988	Full CLP TCL/TAL	
SD-07	Sediment	0 - 1	2/5/1988	Full CLP TCL/TAL	
SD-08	Sediment	0 - 1	2/5/1988	Full CLP TCL/TAL	
SD-09	Sediment	0 - 1	2/5/1988	Full CLP TCL/TAL	
SED-101	Sediment	0 - 1	1/20/2000	Arsenic, Lead, and Pesticides[5]	
SED-102	Sediment	0 - 1	1/20/2000	Arsenic, Lead, and Pesticides[5]	
SED-103	Sediment	0 - 1	1/20/2000	Arsenic, Lead, and Pesticides[5]	
SED-104	Sediment	0 - 1	1/20/2000	Arsenic, Lead, and Pesticides[5]	
SED-105	Sediment	0 - 1	1/20/2000	Arsenic, Lead, and Pesticides[5]	
Main Point	Sediment	0 - 1	5/26/2004	Priority Pollutant Pesticides, Metals Calcium, Magnesium, Sodium, Potassium, Iron	Sampling performed at request of EPD Water Quality
DW-1A	Ground Water	39.6 - 49.6(10)	2/8/1984	Arsenic and Pesticides [2B]	Well Abandoned 8/25/98
			6/21/1985	Arsenic and Pesticides[3]	
			7/26/1985	Arsenic and Pesticides[3]	
DW-1B	Ground Water	70 - 80(10)	2/8/1984	Arsenic and Pesticides[2B]	Well retained for water level measurement
			6/21/1985	Arsenic and Pesticides[3]	
			7/26/1985	Arsenic and Pesticides[3]	
DW-2A	Ground Water	35 - 45(10)	2/8/1984	Arsenic and Pesticides[2B]	Well Abandoned 8/26/98
			6/21/1985	Arsenic and Pesticides[3]	

Table 3.2: Summary of Soil and Ground-Water Samples Collected

Boring/Well Number	Media	Sample Depth (ft., bgs)	Date Sampled	Analyses	Comments
DW-2B	Ground Water	70 - 80(10)	2/8/1984 6/21/1985	Arsenic and Pesticides[2B] Arsenic and Pesticides[3]	Well Abandoned 6/24/97
MW-1	Ground Water	19 - 29(10)	8/18/1983 2/8/1984 6/21/1985	Arsenic and Pesticides[8] Arsenic and Pesticides[2B] Arsenic and Pesticides[3]	Well Abandoned 6/24/97
MW-2	Ground Water	18 - 28(10)	8/18/1983 2/8/1984 6/21/1985	Arsenic and Pesticides[8] Arsenic and Pesticides[2B] Arsenic and Pesticides[3]	Well Abandoned 8/25/98
MW-3	Ground Water	14 - 24(10)	8/18/1983 2/8/1984 6/21/1985	Arsenic and Pesticides[8] Arsenic and Pesticides[2B] Arsenic and Pesticides[3]	Well Abandoned 6/24/97
MW-4	Ground Water	14 - 24(10)	8/18/1983 2/8/1984 6/21/1985	Arsenic and Pesticides[8] Arsenic and Pesticides[2B] Arsenic and Pesticides[3]	Well Abandoned 8/26/98
MW-5	Ground Water	10 - 20(10)	2/8/1984 6/21/1985	Arsenic and Pesticides[2B] Arsenic and Pesticides[3]	Well cannot be located
MW-6	Ground Water	10 - 20(10)	2/8/1984 6/21/1985	Arsenic and Pesticides[2B] Arsenic and Pesticides[3]	Well Abandoned 8/26/98
MW-8	Ground Water	8.5 - 18.5(10)	2/8/1984 6/21/1985 12/5/1989 1/29/1998	Arsenic and Pesticides[2B] Arsenic and Pesticides[3] Metals and Pesticides[9] Lead and Pesticides[5]	Well Abandoned 8/24/98
MW-9	Ground Water	21 - 31(10)	2/8/1984 6/21/1985	Arsenic and Pesticides[2B] Arsenic and Pesticides[3]	Well Abandoned 6/25/97
MW-10	Ground Water	21 - 31(10)	2/8/1984 7/26/1985	Arsenic and Pesticides[2B] Arsenic and Pesticides[3]	Well cannot be located
MW-11	Ground Water	23.5 - 33.5(10)	2/8/1984 7/26/1985	Arsenic and Pesticides[2B] Arsenic and Pesticides[3]	Well Abandoned 6/25/97
MW-12	Ground Water	19 - 29(10)	2/8/1984 6/21/1985	Arsenic and Pesticides[2B] Arsenic and Pesticides[3]	Well Abandoned 6/25/97
MW-13	Ground Water	18 - 28(10)	2/8/1984 6/21/1985 12/5/1989	Arsenic and Pesticides[2B] Arsenic and Pesticides[3] Metals and Pesticides[9]	Well Abandoned 8/24/98
MW-14	Ground Water	6 - 16(10)	2/8/1984 6/21/1985 12/5/1989 1/29/1998	Arsenic and Pesticides[2B] Arsenic and Pesticides[3] Metals and Pesticides[9] Lead and Pesticides[5]	Well Abandoned 8/24/98
MW-15	Ground Water	16 - 26(10)	2/8/1984 6/21/1985	Arsenic and Pesticides[2B] Arsenic and Pesticides[3]	Well Abandoned 8/24/98
MW-16	Ground Water	29 - 39(10)	7/26/1985	Arsenic and Pesticides[3]	Well cannot be located
MW-17	Ground Water	39 - 49(10)	6/21/1985	Arsenic and Pesticides[3]	Well cannot be located
MW-18	Ground Water	31.5 - 41.5(10)	6/21/1985	Arsenic and Pesticides[3]	Well Abandoned 6/25/95
MW-19	Ground Water	27 - 37(10)	6/21/1985	Arsenic and Pesticides[3]	Well Abandoned 6/25/95
MW-20	Ground Water	26.5 - 36.5(10)	6/21/1985	Arsenic and Pesticides[3]	Well Abandoned 6/25/95
MW-21	Ground Water	17.5 - 27.5(10)	7/26/1985 5/20/1998 12/1/1999	Arsenic and Pesticides[3] Pesticides[5] Arsenic, Lead, and Pesticides [5]	
MW-22	Ground Water	17 - 27(10)	6/21/1985 2/19/1997 5/20/1998 11/30/1999 5/30/2007 7/28/2010 9/13/2010	Arsenic and Pesticides[3] Arsenic, Lead, and Pesticides [5] Pesticides [5] Arsenic, Lead, and Pesticides [5] Arsenic, Lead, and Pesticides [12] Arsenic, Lead, and Pesticides [5] Nitrate, Sulfate, Copper, Zinc, VOCs and SVOCs	M&J Solvent site-specific VOCs and SVOCs
MW-23	Ground Water	19 - 29(10)	6/21/1985	Arsenic and Pesticides[3]	Well Abandoned 8/25/98
MW-24	Ground Water	20 - 30(10)	6/21/1985 1/18/2000 11/22/2002	Arsenic and Pesticides[3] Arsenic, Lead, and Pesticides [5] Lead	

Table 3.2: Summary of Soil and Ground-Water Samples Collected

Boring/Well Number	Media	Sample Depth (ft., bgs)	Date Sampled	Analyses	Comments
MW-25	Ground Water	18 - 28(10)	6/21/1985	Arsenic and Pesticides[3]	
			5/27/1998	Pesticides [5]	
			8/15/2007	Arsenic, Lead, and Pesticides [5]	
			9/14/2010	Nitrate, Sulfate, Arsenic, Copper, Lead, Zinc, Pesticides [5], 1,2,3-Trichlorobenzene and 1,2,4-Trichlorobenzene	
MW-26	Ground Water	9 - 19(10)	6/21/1985	Arsenic and Pesticides[3]	
			5/19/1998	Pesticides[5]	
			12/1/1999	Arsenic, Lead, and Pesticides [5]	
			5/31/2007	Arsenic, Lead, and Pesticides [12]	
			7/28/2010	Arsenic, Lead, and Pesticides [5]	
			9/13/2010	Nitrate, Sulfate, Copper, Zinc, 1,2,3-Trichlorobenzene and 1,2,4-Trichlorobenzene	
MW-27	Ground Water	9 - 19(10)	6/17/1985	Arsenic and Pesticides [3]	Well Abandoned 8/27/98
			2/19/1997	Arsenic, Lead, and Pesticides [5]	
MW-1A	Ground Water	18.3 - 27.3(10)	7/8/1997	Arsenic, Lead, and Pesticides [5]	Well Abandoned 1/17/00
			12/17/1997	Pesticides [5]	
MW-1B	Ground Water	20.5 - 29.5	1/2020/00	Arsenic, Lead, and Pesticides [5]	Upgradient well
			5/31/2007	Arsenic, Lead, and Pesticides [12]	
			9/20/2007	Copper, Zinc	
			7/29/2010	Arsenic, Lead, and Pesticides [5]	
			9/13/2010	Nitrate, Sulfate, Copper, Zinc, 1,2,3-Trichlorobenzene and 1,2,4-Trichlorobenzene	
MW-101	Ground Water	14.4 - 24.4(10)	7/8/1997	Arsenic, Lead, and Pesticides [5]	
			5/19/1998	Pesticides [5]	
			12/1/1999	Arsenic, Lead, and Pesticides [5]	
			5/31/2007	Arsenic, Lead, and Pesticides [12]	
			7/28/2010	Arsenic, Lead, and Pesticides [5]	
			9/13/2010	Nitrate, Sulfate, Copper, Zinc, 1,2,3-Trichlorobenzene and 1,2,4-Trichlorobenzene	
MW-102	Ground Water	21 - 30(10)	2/25/1997	Arsenic, Lead, and Pesticides [5]	
			6/1/2007	Arsenic, Lead, and Pesticides [12]	
			7/29/2010	Arsenic, Lead, and Pesticides [5]	
			9/14/2010	Nitrate, Sulfate, Copper, Zinc, 1,2,3-Trichlorobenzene and 1,2,4-Trichlorobenzene	
MW-103A	Ground Water	24.4 - 34.4(10)	7/7/1997	Arsenic, Lead, and Pesticides [5]	
			1/19/2000	Arsenic, Lead, and Pesticides [5]	
			8/14/2007	Arsenic, Lead, and Pesticides [5]	Abandoned by CSX February 2008
MW-103D	Ground Water	54.9 - 63.9(10)	12/22/1997	Pesticides [5]	
			1/20/1998	Pesticides [5]	
			1/19/2000	Arsenic, Lead, and Pesticides [5]	
			1/26/2000	Pesticides [5]	
			8/14/2007	Arsenic, Lead, and Pesticides [5]	Abandoned by CSX February 2008
MW-104	Ground Water	29.9 - 38.9(10)	7/7/1997	Arsenic, Lead, and Pesticides [5]	
			1/19/2000	Arsenic, Lead, and Pesticides [5]	Well Abandoned 2007
MW-104A	Ground Water	39 - 39.5(10)	8/21/2007	Arsenic, Lead, and Pesticides [5]	
			9/15/2010	Nitrate, Sulfate, Arsenic, Copper, Lead, Zinc, Pesticides [5], VOCs and SVOCs	M&J Solvent site-specific VOCs and SVOCs
MW-104D	Ground Water	69.5 - 79.5(10)	12/29/1997	Pesticides [5]	
			8/21/2007	Arsenic, Lead, and Pesticides[5]	
			9/20/2007	Pesticides [5]	
			9/15/2010	Nitrate, Sulfate, Arsenic, Copper, Lead, Zinc, Pesticides [5], VOCs and SVOCs	M&J Solvent site-specific VOCs and SVOCs
MW-105	Ground Water	14.9 - 23.9(10)	7/7/1997	Arsenic, Lead, and Pesticides [5]	
			1/19/2000	Arsenic, Lead, and Pesticides [5]	
			1/26/2000	Pesticides [5]	
			8/15/2007	Arsenic, Lead, and Pesticides [5]	
			9/15/2010	Nitrate, Sulfate, Arsenic, Copper, Lead, Zinc, Pesticides [5], 1,2,3-Trichlorobenzene and 1,2,4-Trichlorobenzene	

Table 3.2: Summary of Soil and Ground-Water Samples Collected

Boring/Well Number	**Media**	**Sample Depth (ft., bgs)**	**Date Sampled**	**Analyses**	**Comments**
MW-106D	Ground Water	60 - 69(10)	12/22/1997 1/20/1998 1/29/1998 5/28/1998 1/21/2000 8/13/2007 9/15/2010	Pesticides [5] Pesticides [5] Pesticides [5] Pesticides [5] Arsenic, Lead, and Pesticides [5] Arsenic, Lead, and Pesticides [5] Nitrate, Sulfate, Arsenic, Copper, Lead, Zinc, Pesticides [5], 1,2,3-Trichlorobenzene and 1,2,4-Trichlorobenzene	
MW-107D	Ground Water	39 - 40.5(10)	8/21/2007 9/15/2010	Arsenic, Lead, and Pesticides [5] Nitrate, Sulfate, Arsenic, Copper, Lead, Zinc, Pesticides [5], 1,2,3-Trichlorobenzene and 1,2,4-Trichlorobenzene	
MW-108	Ground Water	24.0 - 33.0	5/28/1998 11/30/1999 6/1/2007 7/29/2010 9/14/2010	Arsenic, Lead, and Pesticides [5] Arsenic, Lead, and Pesticides [5] Arsenic, Lead, and Pesticides [12] Arsenic, Lead, and Pesticides [5] Nitrate, Sulfate, Copper, Zinc, 1,2,3-Trichlorobenzene and 1,2,4-Trichlorobenzene	
MW-109	Ground Water	21.5 - 30.5	5/27/1998 8/28/1998 1/18/2000 11/22/2002 8/21/2007 9/14/2010	Arsenic, Lead, and Pesticides [5] Total and Dissolved Lead Arsenic, Lead, and Pesticides [5] Lead Arsenic, Lead, and Pesticides [5] Pesticides [5], Nitrate, Sulfate, Arsenic, Copper, Lead, Zinc, 1,2,3-Trichlorobenzene and 1,2,4-Trichlorobenzene	
MW-110	Ground Water	66.5 - 75.5(10)	2/25/1997 7/8/1997 11/25/1997 12/17/1997 12/1/1999 1/1820/00 6/1/2007 7/29/2010 9/14/2010	Arsenic, Lead, and Pesticides [5] Pesticides [5] Pesticides [5] Pesticides [5] Arsenic, Lead, and Pesticides [5] Arsenic, Lead, and Pesticides [5] Arsenic, Lead, and Pesticides [12] Arsenic, Lead, and Pesticides [5] Nitrate, Sulfate, Copper, Zinc, 1,2,3-Trichlorobenzene and 1,2,4-Trichlorobenzene	
MW-111	Ground Water	33.2 - 42.2	5/28/1998 1/1820/00 8/21/2007 9/14/2010	Arsenic, Lead, and Pesticides [5] Arsenic, Lead, and Pesticides [5] Arsenic, Lead, and Pesticides [5] Pesticides [5], Nitrate as N, Sulfate, Arsenic, Copper, Lead, Zinc, 1,2,3-Trichlorobenzene and 1,2,4-Trichlorobenzene	
MW-112	Ground Water	12.0 - 21.0	5/28/1998 8/28/1998 11/30/1999 8/22/2007 7/28/2010 9/13/2010	Arsenic, Lead, and Pesticides [5] Total and Dissolved Lead Arsenic, Lead, and Pesticides [5] Arsenic, Lead, and Pesticides [12] Arsenic, Lead, and Pesticides [5] Nitrate, Sulfate, Copper, Zinc, 1,2,3-Trichlorobenzene and 1,2,4-Trichlorobenzene	

Table 3.2: Summary of Soil and Ground-Water Samples Collected

Boring/Well Number	Media	Sample Depth (ft., bgs)	Date Sampled	Analyses	Comments
MW-113	Ground Water	31.6 - 40.6	5/21/1998 1/20/2000 8/16/2007 9/15/2010	Arsenic, Lead, and Pesticides [5] Arsenic, Lead, and Pesticides [5] Arsenic, Copper, Lead, Zinc, Anions[11], and Pesticides [5] Nitrate, Sulfate, Arsenic, Copper, Lead, Zinc, Pesticides [5], 1,2,3-Trichlorobenzene and 1,2,4-Trichlorobenzene	
MW-114	Ground Water	33.8 - 42.8	5/21/1998 1/18/2000 8/14/2007 9/14/2010	Arsenic, Lead, and Pesticides [5] Arsenic, Lead, and Pesticides [5] Arsenic, Copper, Lead, Zinc, Anions[11], and Pesticides [5] Pesticides [5], Nitrate, Sulfate, Arsenic, Copper, Lead, Zinc, 1,2,3-Trichlorobenzene and 1,2,4-Trichlorobenzene	
MW-115	Ground Water	10.5 - 19.5	5/21/1998 1/18/2000 1/26/2000 8/15/2007 9/14/2010	Arsenic, Lead, and Pesticides [5] Arsenic, Lead, and Pesticides [5] Pesticides [5] Arsenic, Copper, Lead, Zinc, Anions[11], and Pesticides [5] Pesticides [5], Nitrate, Sulfate, Arsenic, Copper, Lead, Zinc, 1,2,3-Trichlorobenzene and 1,2,4-Trichlorobenzene	
MW-116	Ground Water	21.6 - 30.6	5/28/1998 8/28/1998 5/31/2007 7/28/2010 9/13/2010	Arsenic and Pesticides [8] Total and Dissolved lead Arsenic, Lead, and Pesticides [12] Arsenic, Lead, and Pesticides [5] Nitrate, Sulfate, Copper, Zinc, 1,2,3-Trichlorobenzene and 1,2,4-Trichlorobenzene	
MW-117	Ground Water	12 22	11/22/2002 8/15/2007 9/14/2010	Arsenic, Lead, and Pesticides [5] Arsenic, Copper, Lead, Zinc, Anions[11], and Pesticides [5] Pesticides [5], Nitrate, Sulfate, Arsenic, Copper, Lead, Zinc, 1,2,3-Trichlorobenzene and 1,2,4-Trichlorobenzene	
MW-118	Ground Water	55 65	11/22/2002 8/17/2007 9/20/2007	Pesticides Arsenic, Lead, and Pesticides 5 Copper, Zinc, and Pesticides [5]	Abandoned by CSX February 2008
SW-1	Surface Water		8/13/1983	Arsenic and Pesticides [8]	
SW-2	Surface Water		8/18/1983	Arsenic and Pesticides [8]	
SW-1	Surface Water		2/8/1984 4/26/1984	Arsenic and Pesticides [6] Arsenic and Pesticides [7]	Spillway from impoundments
SW-2007-1	Surface Water		8/10/2007	Total and Dissolved Pesticides, Lead, and Arsenic	
SW2010-1	Surface Water		9/23/2010	Arsenic, Copper, Lead, Zinc (total and dissolved), Nitrate, Sulfate and 1,2,3-Trichlorobenzene, 1,2,4-Trichlorobenzene and Pesticides [5]	
SW-2	Surface Water		2/8/1984	Arsenic and Pesticides [7]	Tankage Building
SW-2007-2	Surface Water		8/10/2007	Total and Dissolved Pesticides, Lead, and Arsenic	
SW2010-2	Surface Water		9/23/2010	Arsenic, Copper, Lead, Zinc (total and dissolved), and Pesticides [5]	
SW-2007-3	Surface Water		8/10/2007	Total and Dissolved Pesticides, Lead, and Arsenic	
SW2010-3	Surface Water		9/23/2010	Arsenic, Copper, Lead, Zinc (total and dissolved), and Pesticides [5]	
SW-4	Surface Water		2/8/1984	Arsenic and Pesticides [6]	Drain Culvert
SW-2007-4	Surface Water		8/10/2007	Total and Dissolved Pesticides, Lead, and Arsenic	
SW2010-4	Surface Water		9/23/2010	Arsenic, Copper, Lead, Zinc (total and dissolved), and Pesticides [5]	
SW-5	Surface Water		2/8/1984	Arsenic and Pesticides [7]	Concrete Vault
SW-2007-5	Surface Water		8/10/2007	Total and Dissolved Pesticides, Lead, and Arsenic	
SW2010-5	Surface Water		9/23/2010	Arsenic, Copper, Lead, Zinc (total and dissolved), Nitrate, Sulfate and 1,2,3-Trichlorobenzene, 1,2,4-Trichlorobenzene and Pesticides[5], hardness as calcium carbonate	
SW-6	Surface Water		2/8/1984	Arsenic and Pesticides [7]	Drainage from Bulk Distribution Warehouse
SW-2007-6	Surface Water		8/10/2007	Total and Dissolved Pesticides, Lead, and Arsenic	
SW2010-6	Surface Water		9/23/2010	Arsenic, Copper, Lead, Zinc (total and dissolved), and Pesticides [5]	
SW-7	Surface Water		4/26/1984	Arsenic and Pesticides [7]	

Table 3.2: Summary of Soil and Ground-Water Samples Collected

Boring/Well Number	Media	Sample Depth (ft., bgs)	Date Sampled	Analyses	Comments
SW-2007-7	Surface Water		8/10/2007	Total and Dissolved Pesticides, Lead, and Arsenic	
SW2010-7	Surface Water		9/23/2010	Arsenic, Copper, Lead, Zinc (total and dissolved), and Pesticides [5]	
SW-8	Surface Water		4/26/1984	Arsenic and Pesticides [7]	
SW2010-8	Surface Water		9/23/2010	Arsenic, Copper, Lead, Zinc (total and dissolved), and Pesticides [5]	
SW-9	Surface Water		4/26/1984	Arsenic and Pesticides [7]	
SW2010-9	Surface Water		9/23/2010	Arsenic, Copper, Lead, Zinc (total and dissolved), and Pesticides [5]	
SW-10	Surface Water		4/26/1984	Arsenic and Pesticides [7]	
SW2010-10	Surface Water		9/23/2010	Arsenic, Copper, Lead, Zinc (total and dissolved), and Pesticides [5]	
SW-11	Surface Water		4/26/1984	Arsenic and Pesticides [7]	
SW2010-11	Surface Water		9/23/2010	Arsenic, Copper, Lead, Zinc (total and dissolved), Nitrate, Sulfate and 1,2,3-Trichlorobenzene, 1,2,4-Trichlorobenzene and Pesticides[5]	
SW-12	Surface Water		4/26/1984	Arsenic and Pesticides [7]	
SW2010-12	Surface Water		9/23/2010	Pesticides [5]	
SW-13	Surface Water		4/26/1984	Arsenic and Pesticides [7]	
SW2010-13	Surface Water		9/23/2010	Arsenic, Copper, Lead, Zinc (total and dissolved), Nitrate, Sulfate and 1,2,3-Trichlorobenzene, 1,2,4-Trichlorobenzene and Pesticides[5]	
SW-14	Surface Water		4/26/1984	Arsenic and Pesticides [7]	
SW2010-14	Surface Water		9/23/2010	Arsenic, Copper, Lead, Zinc (total and dissolved), and Pesticides [5]	
SW-15	Surface Water		4/26/1984	Arsenic and Pesticides [7]	
SW2010-15	Surface Water		9/23/2010	Arsenic, Copper, Lead, Zinc (total and dissolved), Nitrate, Sulfate and 1,2,3-Trichlorobenzene, 1,2,4-Trichlorobenzene and Pesticides[5]	
SW-16	Surface Water		4/26/1984	Arsenic and Pesticides [7]	
SW2010-16	Surface Water		9/23/2010	Arsenic, Copper, Lead, Zinc (total and dissolved), and Pesticides [5]	
SW-17	Surface Water		4/26/1984	Arsenic and Pesticides [7]	
SW2010-17	Surface Water		9/23/2010	Arsenic, Copper, Lead, Zinc (total and dissolved), and Pesticides [5]	
SW2010-18	Surface Water		9/23/2010	Arsenic, Copper, Lead, Zinc (total and dissolved), Nitrate, Sulfate and 1,2,3-Trichlorobenzene, 1,2,4-Trichlorobenzene and Pesticides[5]	
SW-101	Surface Water		11/19/2002	Total and Dissolved Pesticides, Lead, and Arsenic	

Table 3.2: Summary of Soil and Ground-Water Samples Collected

Boring/Well Number	Media	Sample Depth (ft., bgs)	Date Sampled	Analyses	Comments
SW-102	Surface Water		11/19/2002	Total and Dissolved Pesticides, Lead, and Arsenic	
SW-103	Surface Water		11/19/2002	Total and Dissolved Pesticides, Lead, and Arsenic	
SW-104	Surface Water		11/19/2002	Total and Dissolved Pesticides, Lead, and Arsenic	
SW-105	Surface Water		11/19/2002	Total and Dissolved Pesticides, Lead, and Arsenic	
Main Point	Surface Water		5/26/2004	Priority Pollutant Pesticides, Metals Sulfate, Alkalinity, Sodium, Potassium, Iron, Calcium, Magnesium, Chloride	
Allied Outfall	Surface Water		5/26/2004	Priority Pollutant Pesticides, Metals Sulfate, Alkalinity, Sodium, Potassium, Iron, Calcium, Magnesium, Chloride	

Prepared by/Date: Rrogero 11/18/10
Checked by/Date: R Quinn 3/6/11

Notes:

CN = Total cyanide
PAHs = Polynuclear aromatic hydrocarbons
TOC = Total organic carbon
VOC = Volatile organic compounds
SVOC = Semivolatile organic compounds
BNA = Base/neutral/acid extractable organic compounds
PCBs = Polychlorinated biphenyls
CLP TCL/TAL = Contract Laboratory Program Target Compound List/Target Analyte List
NA = Not analyzed
SPLP = Synthetic Precipitate Leaching Procedure

1) = Metals analyzed: arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, zinc.
Pesticides analyzed: alpha-BHC, beta-BHC, delta-BHC; gamma-BHC; chlordane; 4,4'-DDD; 4,4'-DDE; 4,4'-DDT; dieldrin; heptachlor; methoxychlor; toxaphene.
2A) = Pesticides analyzed: alpha-BHC; gamma-BHC; heptachlor; chlordane; DDE; DDD; dieldrin; endrin; O,P-DDT; P,P-DDT; toxaphene, methoxychlor
2B) = Pesticides analyzed: alpha-BHC, beta-BHC, delta-BHC; gamma-BHC; heptachlor; chlordane; DDE; DDD; dieldrin; endrin; O, P-DDT; P,P-DDT; toxaphene; methoxychlor.
3) = Pesticides analyzed: alpha-BHC, beta-BHC, delta-BHC; gamma-BHC; chlordane; DDE; O,P,-DDT; P,P,-DDT; heptachlor; toxaphene.
4) = Metals analyzed: arsenic, barium, cadmium, copper, lead, mercury, nickel, silver, zinc.
Pesticides analyzed: alpha-BHC, beta-BHC, delta-BHC; gamma-BHC; chlordane; 4,4'-DDD; 4,4'-DDE; 4,4'-DDT; dieldrin; heptachlor; methoxychlor; toxaphene.
5) = Pesticides analyzed: alpha-BHC, beta-BHC, delta-BHC; gamma-BHC; chlordane; 4,4'-DDD; 4,4'-DDE; 4,4'-DDT; dieldrin; heptachlor; methoxychlor; toxaphene.
6) = Pesticides analyzed: alpha-BHC, beta-BHC, delta-BHC; gamma-BHC; chlordane; DDD; DDE; O,P,-DDT; P,P,-DDT; dacthal; dieldrin; endrin; heptachlor; methoxychlor; toxaphene.
7) = Pesticides analyzed: alpha-BHC, beta-BHC, delta-BHC; gamma-BHC; chlordane; DDD; DDE; O,P,-DDT; P,P,-DDT; dieldrin; endrin; heptachlor; methoxychlor; toxaphene.
8) = Pesticides analyzed: Aldrin; O,P-DDT; P,P-DDT; O,P-DDD; P,P-DDD; O,P-DDE; P,P-DDE; gamma-BHC; methoxychlor; dieldrin; endrin; methyl parathion; parathion; heptachlor; toxaphene.
9) = Metals analyzed: Arsenic, chromium, lead.
Pesticides analyzed: 2,4-D; 2,4,5-T; 2,4,5-TP(silvex); alpha-BHC, beta-BHC, delta-BHC; gamma-BHC (lindane), 4,4'-DDD; 4,4'-DDE; 4,4'-DDT; dieldrin; endrin; toxaphene; methoxychlor.
10) = Ground-water sample depth equals screened interval.
11) = Anions analyzed: Nitrate as NO3, Nitrite as NO2, and Sulfate
12) = Pesticides analyzed: aldrin, alpha-BHC, beta-BHC, delta-BHC; gamma-BHC; chlordane; 4,4'-DDD; 4,4'-DDE; 4,4'-DDT; dieldrin; endosulfan I, endosulfan II, endosulfan sulfate, endrin, endrin aldehyde, endrin ketone, heptachlor; heptachlor epoxide, methoxychlor; toxaphene.

Table 3.3: Summary of Monitoring Well Construction Data

Well Number	Date Installed	Installed By	Well Type	Casing and Well Screen Material	Ground Surface Elevation (ft. NGVD)	TOC Elevation (ft. NGVD)	Total Depth (ft, bgs)	Screened Interval (ft, bgs)	Screened Interval (ft. NGVD)	Lithology Screened	Current Status
MW-1	8/15/1983	TMG	II	PVC	913.2	Not Available	30.0	19-29	894.2 - 884.2	silty clay to clayey fine sandy silt	Abandoned on 6/27/97
MW-2	8/16/1983	TMG	II	PVC	899.0	901.88	33.5	18-28	881.0 - 871.0	clayey fine sandy silt	Abandoned on 8/25/98
MW-3	8/16/1983	TMG	II	PVC	895.5	Not Available	24.0	14-24	881.5 - 871.5	sandy silt	Abandoned on 6/24/97
MW-4	8/17/1983	TMG	II	PVC	894.2	896.22	30.0	14-24	880.2 - 870.2	clayey very fine sandy silt	Abandoned on 8/26/98
MW-5	1/24/1984	TMG	II	PVC	889.9 (1)	Not Available	20.0	10-20	879.9 - 869.9	clayey silt	Could not be located
MW-6	1/31/1984	TMG	II	PVC	892.7	894.19	20.0	10-20	882.7 - 872.7	fill grading to silty clay	Abandoned on 8/26/98
MW-7	---	---	---	---	---	---	---	---	--- ---	---	Well not installed
MW-8	1/26/1984	TMG	II	PVC	901.6	903.78	18.5	8.5-18.5	893.1 - 883.1	clayey silty fine sand (fill) to clayey silt	Abandoned on 8/24/98
MW-9	1/24/1984	TMG	II	PVC	909.1	Not Available	31.0	21-31	888.1 - 878.1	clayey silt	Abandoned on 6/24/97
MW-10	1/23/1984	TMG	II	PVC	901.3 (1)	Not Available	31.0	21-31	880.3 - 870.3	clayey silt to PWR	Could not be located
MW-11	1/25/1984	TMG	II	PVC	897.3	899.81	33.5	23.5-33.5	873.8 - 863.8	clayey silt	Abandoned on 6/24/97
MW-12	1/20/1984	TMG	II	PVC	896.8	898.59	29.0	19-29	877.8 - 867.8	clayey silt	Abandoned on 6/27/97
MW-13	1/26/1984	TMG	II	PVC	903.7 (1)	905.50	28.0	18-28	885.7 - 875.7	clayey silt	Abandoned on 8/24/98
MW-14	2/7/1984	TMG	II	PVC	897.4	899.62	16.0	6-16	891.4 - 881.4	silty clay fill to silty clayey sandy gravel	Abandoned on 8/24/98
MW-15	1/25/1984	TMG	II	PVC	902.8	904.91	26.0	16-26	886.8 - 876.8	silty clay to clayey silt	Abandoned on 8/24/98
MW-16	6/18/1984	TMG	II	PVC	894 (2)	Not Available	40.5	29-39	865 - 855	silt with clay	Could not be located
MW-17	6/19/1984	TMG	II	PVC	894 (2)	Not Available	50.5	39-49	855 - 845	clay to silt	Could not be located
MW-18	6/20/1985	TMG	II	PVC	894 (2)	Not Available	43.0	31.5-41.5	862 - 852	clayey silt to sandy silty	Abandoned on 6/2/95
MW-19	6/20/1985	TMG	II	PVC	893 (2)	Not Available	38.5	27-37	866 - 856	sandy silt	Abandoned on 6/2/95
MW-20	6/20/1985	TMG	II	PVC	892 (2)	Not Available	38.0	26.5-36.5	865 - 855	sandy silt	Abandoned on 6/2/95
MW-21	4/18/1985	TMG	II	PVC	903.4	905.70	30.5	17.5-27.5	885.9 - 875.9	clayey silt to silty clay	Repaired and usable
MW-22	4/16/1985	TMG	II	PVC	892.3	894.23	30.0	17-27	875.3 - 865.3	silty clay and clayey silt	Repaired and usable
MW-23	4/17/1985	TMG	II	PVC	892.1	892.91	30.5	19-29	873.1 - 863.1	silty clay to clayey silt	Abandoned on 8/25/98
MW-24	4/17/1985	TMG	II	PVC	894.8	897.31	31.0	20-30	874.8 - 864.8	silty clay to clayey silt	Repaired and usable
MW-25	4/17/1985	TMG	II	PVC	893.1	895.05	31.0	18-28	875.1 - 865.1	silty clay to clayey silt	Repaired and usable
MW-26	6/18/1985	TMG	II	PVC	902.5	905.11	20.5	9-19	893.5 - 883.5	clayey silt	Repaired and usable
MW-27	6/17/1985	TMG	II	PVC	903.5	905.83	20.9	9-19	894.5 - 884.5	gravel and sand fill to silty clay and clayey silt	Abandoned on 8/27/98
DW-1A	2/7/1984	TMG	II	PVC	913.5	916.03	49.6	39.6-49.6	873.9 - 863.9	bedrock	Abandoned on 8/25/98
DW-1B	2/8/1984	TMG	II	PVC	913.8	915.50	80.0	70-80	843.8 - 833.8	bedrock	Repaired and usable
DW-2A	2/4/1984	TMG	II	PVC	896.2	898.64	45.0	35-45	861.2 - 851.2	silty sand to silt	Abandoned on 8/26/98
DW-2B	2/2/1984	TMG	II	PVC	896.3	898.76	80.0	70-80	826.3 - 816.3	bedrock	Abandoned on 6/23/97
MW-1A	6/25/1997	LAW	II	PVC	913.7	913.25	28.4	18.3-27.3	895.4 - 886.4	silty fine sand to PWR	Abandoned on 1/17/00
MW-1B	1/17/2000	LAW	II	PVC	913.5	915.95	30.0	20-29	893.5 - 884.5	fine sandy silt to silty fine sand	New well

Table 3.3: Summary of Monitoring Well Construction Data

Well Number	Date Installed	Installed By	Well Type	Casing and Well Screen Material	Ground Surface Elevation (ft. NGVD)	TOC Elevation (ft. NGVD)	Total Depth (ft, bgs)	Screened Interval (ft, bgs)	Screened Interval (ft. NGVD)	Lithology Screened	Current Status
MW-101	7/1/1997	LAW	II	PVC	910.0	912.55	25.0	14.4-24.4	895.6 - 885.6	silty fine sand	New well
MW-102	2/24/1997	LAW	II	PVC	913.5	915.19	31.2	21.1-30.1	892.4 - 883.4	silty fine sand and PWR	New well
MW-103	---	---	---	---	---	---	---	---	--- ---	---	Well not installed
MW-103A	6/30/1997	LAW	II	PVC	878.7	880.83	35.0	24.4-34.4	854.3 - 844.3	sandy silt	Abandoned by CSX 2008
MW-103D	12/17/1997	LAW	II	PVC	879.6	881.82	64.9	54.9-63.9	824.7 - 815.7	sandy silt and bedrock	Abandoned by CSX 2008
MW-104	6/25/1997	LAW	II	PVC	898.5	901.33	40.0	29.9-38.9	868.6 - 859.6	silty fine sand	Abandoned on 8/14/07
MW-104A	8/16/2007	MACTEC	II	PVC	898.3	898.00	40.0	30.0-39.5	868.3 858.8	silty very fine sand	New well
MW-104D	12/19/1997	LAW	III	PVC	899.4	901.59	80.0	69.5-79.5	829.9 - 819.9	bedrock	New well
MW-105	6/27/1997	LAW	II	PVC	902.5	904.55	25.0	14.8-23.8	887.7 878.7	silty fine to medium sand	New well
MW-106	---	---	---	---	---	---	---	---	--- ---	---	Well not installed
MW-106D	12/19/1997	LAW	II	PVC	876.1	878.60	70.0	60-69	816.1 - 807.1	bedrock	New well
MW-107	---	---	---	---	---	---	---	---	--- ---	---	Well not installed
MW-107D	8/15/2007	MACTEC	II	PVC	857.5	857.14	50.0	40.0-49.5	817.5 808.0	sandy silt and bedrock	New well
MW-108	5/18/98	LAW	II	PVC	899.8	901.91	34.0	24-33	875.8 - 866.8	silty fine sand	New well
MW-109	5/15/98	LAW	II	PVC	893.6	895.90	31.5	21.5-30.5	872.1 - 863.1	silty fine sand with brick fragments (fill)	New well
MW-110	2/21/1997	LAW	III	PVC	898.4	900.52	80.0	66.5-75.5	831.9 - 822.9	bedrock	New well
MW-111	5/13/1998	LAW	II	PVC	897.5	900.10	43.2	33.2-42.2	864.3 - 855.3	silty sand and PWR	New well
MW-112	5/18/1998	LAW	II	PVC	902.7	904.90	22.0	12-21	890.7 - 881.7	silty very fine sand	New well
MW-113	5/11/1998	LAW	II	PVC	897.8	900.06	41.6	31.6-40.6	866.2 - 857.2	sandy clayey silt	New well
MW-114	5/12/1998	LAW	II	PVC	890.6	892.96	43.8	33.8-42.8	856.8 - 847.8	silty clayey fine sand to silty fine sand	New well
MW-115	5/14/1998	LAW	II	PVC	891.0	893.40	20.5	10.5-19.5	880.5 - 871.5	silty sand with concrete fragments (fill)	New well
MW-116	5/19/1998	LAW	II	PVC	903.4	905.62	31.6	21.6-30.6	881.8 - 872.8	fine sand	New well
MW-117	11/19/2002	LAW	II	PVC	890.1	892.42	25.5	12-22	878.1 - 868.1	very sandy silt to very silty fine sand	New Well
MW-118	11/19/2002	LAW	II	PVC	874.0	876.07	65.0	55-65	819.0 - 809.0	bedrock	Abandoned by CSX 2008

Notes:

NGVD = National Geodetic Vertical Datum
PVC = Polyvinyl chloride
TOC = Top of Casing
TMG = T.M. Gates, Inc.
LAW = Law Engineering and Environmental Services
bgs = below ground surface
NA = Not applicable
PWR = Partially weathered rock
--- = Well not installed
[1] = Elevations obtained from Topographic Survey for BFEL Indemnitor, Inc. by Travis Pruitt & Associates, P.C., January 24, 1990.
[2] = Elevations estimated based upon T.M. Gates measurements and Topographic Survey by Travis Pruitt & Associates.

Prepared by/Date: J Hartness 9/13/07
Checked by/Date: R Quinn 3/6/11

All elevations, except where noted, are based on surveys performed by W.L. Jorden and Company on 4/2/97, 7/29/97, 1/8/98, and 5/22/98. MACTEC provided elevations in 2002, 2005, and 2007.

Table 4.2: Summary of Ground-Water Elevations for 2010

Well Number	Screened Interval (ft NGVD)			Lithology Screened	Casing Elevation (ft., NGVD)	Depth to Ground Water (ft., btoc) 8/20/2007	Ground-Water Elevation (ft., NGVD) 8/20/2007	Depth to Ground Water (ft., btoc) 9/20/2007	Ground-Water Elevation (ft., NGVD) 9/20/2007	Depth to Ground Water (ft., btoc) 7/29/2010	Ground-Water Elevation (ft., NGVD) 7/29/2010	Depth to Ground Water (ft., btoc) 9/14/2010	Ground-Water Elevation (ft., NGVD) 9/14/2010
MW-1B	893.5	-	884.5	fine sandy silt to silty fine sand	915.95	28.47	887.48	22.98	892.97	23.60	892.35	26.40	889.55
MW-21	885.9	-	875.9	clayey silt to silty clay	905.70	dry		dry		24.57	881.13	dry	
MW-22	875.3	-	865.3	silty clay and clayey silt	894.23	20.88	873.35			18.16	876.07	19.46	874.77
MW-24	874.8	-	864.8	silty clay to clayey silt	897.31	dry		dry		not measured		24.01	873.30
MW-25	875.1	-	865.1	silty clay to clayey silt	895.05	28.31	866.74	not measured				25.56	869.49
MW-26	893.5	-	883.5	clayey silt	904.99	13.57	891.42	not measured		10.04	894.95	11.75	893.24
DW-1B	843.8	-	833.8	bedrock	915.50	not measured		not measured		34.42	881.08	36.40	879.10
MW-101	895.6	-	885.6	silty fine sand	912.55	18.11	894.44	not measured		15.12	897.43	16.80	895.75
MW-102	892.4	-	883.4	silty fine sand and PWR	915.19	26.17	889.02	not measured		23.58	891.61	24.82	890.37
MW-103A	854.3	-	844.3	sandy silt	880.83	28.16	852.67	not measured		abandoned			
MW-103D	824.7	-	815.7	sandy silt and bedrock	881.82	26.87	854.95	not measured		abandoned			
MW-104	868.6		859.6	silty fine sand	901.33			not measured		abandoned			
MW-104A	868.3		858.8	silty very fine sand	898.00	16.73	881.27	not measured		not measured		14.63	883.37
MW-104D	829.9	-	819.9	bedrock	901.59	21.80	879.79	20.77	880.82	not measured		16.77	884.82
MW-105	887.7		878.7	silty fine to medium sand	904.55	15.96	888.59	not measured		not measured		15.00	889.55
MW-106D	816.1	-	807.1	bedrock	878.60	32.90	845.70	33.08	845.52	not measured		25.78	852.82
MW-107D	817.5		808.0	bedrock	857.14	25.63	831.51	26.07	831.07	not measured		22.99	834.15
MW-108	875.8	-	866.8	silty fine sand	901.91	22.50	879.41	not measured		19.69	882.22	21.23	880.68
MW-109	872.1	-	863.1	silty fine sand with brick fragments (fill)	895.90	17.25	878.65	not measured		not measured		15.57	880.33
MW-110	831.9	-	822.9	bedrock	900.52	31.35	869.17	not measured		27.11	873.41	28.31	872.21
MW-111	864.3	-	855.3	silty sand and PWR	900.10	21.86	878.24	not measured		not measured		20.33	879.77
MW-112	890.7	-	881.7	silty very fine sand	904.90	18.13	886.77	not measured		14.31	890.59	16.35	888.55
MW-113	866.2	-	857.2	sandy clayey silt	900.06	30.85	869.21	not measured		not measured		29.21	870.85
MW-114	856.8	-	847.8	silty clayey fine sand to silty fine sand	892.96	26.91	866.05	not measured		not measured		25.14	867.82
MW-115	880.5	-	871.5	silty sand with concrete fragments (fill)	893.40	16.00	877.40	not measured		not measured		15.16	878.24
MW-116	881.8	-	872.8	fine sand	905.62	30.61	875.01	not measured		23.20	882.42	25.44	880.18
MW-117	878.1	-	868.1	very sandy silt to very silty fine sand	892.42	13.91	878.51	not measured		not measured		13.17	879.25
MW-118	819.0	-	809.0	bedrock	876.07	29.66	846.41	30.02	846.05	abandoned			
Upstream Staff Gauge				un-named stream on CSX	863.03	2.12	860.91	2.13	860.90	not measured		2.1	860.9
Downstream Staff Gauge					858.62	8.10	850.52	7.89	850.73	not measured		7.8	850.8

Table 4.2: Summary of Ground-Water Elevations for 2010

Well Number	Ground Surface Elevation (ft, NGVD)*	Depth to Ground Water (ft, bgs)**	Ground-Water Elevation (ft., NGVD)
MW-1 (BFI)	889	29	860
MW-2 (BFI)	894	24	870
MW-3 (BFI)	899	27	872

Prepared by/Date: RNQ 11/2/10
Checked by/Date: MHA 3/2/2011

Notes:
ft. = feet
NGVD = National Geodetic Vertical Datum
Monitoring wells MW-1, MW-1A, MW-2 through MW-15, MW-18, MW-19, MW-20, MW-23, MW-27, DW-1A, DW-2A, DW-2B, and MW-104 have been abandoned.
Monitoring wells MW-7, MW-103, MW-106 and MW-107 were not installed.
Monitoring wells MW-5, MW-10, MW-16 and MW-17 could not be located and assumed to have been destroyed.

* Ground surface elevations are from Fulton County, Georgia GIS website www.wms.co.fulton.ga.us/ms/master
** Depth to ground water is from Jordan, Jones & Goulding, Inc., 1993b, Phase II Investigation of the CSX Site Located on Marietta Boulevard, Atlanta, Georgia, June 1993.

Table 4.10: Summary of Regulated Substances Detected in Most Recent Ground-Water Samples

Parameter, Units	*HSRA* *Type 1 RRS* *Concentrations*	**Location, Date**										
		MW-1B 7/29/2010 & 9-13-10	**MW-1B 5-31-07**	**MW-2 6-21-85**	**MW-3 6-21-85**	**MW-4 6-21-85**	**MW-5 6-21-85**	**MW-6 6-21-85**	**MW-8 1-29-98**	**MW-9 6-21-85**	**MW-10 7-26-85**	**MW-11 7-26-85**
Well Status		Replaced MW-1A	Replaced MW-1A	Abandoned	Abandoned	Abandoned	Missing	Abandoned	Abandoned	Abandoned	Missing	Abandoned
pH (std units)		5.92	6.27									
Specific Conductance (mS/cm)		0.36	0.34									
Turbidity (NTUs)		6.4	1.67									
Property Location		BFEL	BFEL									
Metals (mg/L)												
Arsenic	0.01	<0.0025	<0.005	<0.05	<0.25	1.50	0.04	0.15	0.171	<0.005	<0.005	<0.005
Lead	0.015	<0.0015	<0.003						0.0064			
Copper	1.3	<0.005	0.044									
Zinc	2	<0.02	0.06									
Organochlorine Pesticides (mg/L)												
alpha, beta, delta-BHC	--	na	na	0.2066	0.0703	0.00601	0.00065	0.00162	na	0.00966	0.00936	0.00841
alpha-BHC	0.00005	<0.000048	<0.000047	na	na	na	na	na	0.22	na	na	na
beta-BHC	0.00005	<0.000048	<0.000047	na	na	na	na	na	0.031	na	na	na
Chlordane	0.002	<0.00048	<0.00047	0.00117	0.00696	<0.00004	<0.0000	0.00008	0.0054	<0.00004	0.00147	0.00088
DDD	0.001	<0.000095	<0.000094	na	na	na	na	na	0.013	<0.00005(2)	<0.00004	<0.00005(2)
DDE	0.001	<0.000095	<0.000094	0.00015	0.0035	<0.00002	<0.0000	<0.00002	<0.000025	<0.00002	<0.00004	<0.00004
DDT	0.001	<0.000095	<0.000094	<0.001	0.0036	<0.00002	<0.0000	<0.00002	0.00029	<0.00002	<0.00004	<0.00004
delta-BHC	0.00005	<0.000048	<0.000047	na	na	na	na	na	0.03	na	na	na
Dieldrin	0.001	<0.000095	<0.000094	na	na	na	na	na	0.0051	<0.00005(2)	<0.00004	<0.00005(2)
gamma-BHC (lindane)	0.0002	<0.000048	<0.000047	0.0139	0.003	0.00062	0.00013	0.00038	0.059	0.00168	0.00238	0.00236
Heptachlor	0.004	<0.000048	<0.000047	<0.00001	0.00146	<0.00001	<0.0000	<0.00001	<0.000025	<0.00001	<0.00001	0.0001
Methoxychlor	0.04	<0.000095	<0.00047	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.000025	<0.0002	<0.0002	<0.0002
Toxaphene	0.005	<0.0048	<0.0028	0.0273	0.0558	<0.00008	<0.0000	<0.00008	<0.000025	<0.00008	<0.0001	<0.00005
Total Pesticides	--	BDL	BDL	0.24912	0.14462	0.00663	0.00078	0.00208	0.36379	0.01134	0.01321	0.01175
Trichlorobenzenes (mg/L)												
1,2,3-Trichlorobenzene	0.005	<0.0097										
1,2,4-Trichlorobenzene	0.07	<0.0097										
Nitrate/Sulfate (mg/L)												
Nitrate	10 (NR)	**4.5**										
Sulfate	250 (NR)	**35**										

Table 4.10: Summary of Regulated Substances Detected in Most Recent Ground-Water Samples

	HSRA	**Location, Date**											
	Type 1 RRS	**MW-12**	**MW-13**	**MW-14**	**MW-15**	**MW-16**	**MW-17**	**MW-18**	**MW-19**	**MW-20**	**MW-21**	**MW-21**	**MW-21**
Parameter, Units	*Concentrations*	**6-21-85**	**12-5-89**	**1-29-98**	**6-21-85**	**7-26-85**	**6-21-85**	**6-21-85**	**6-21-85**	**6-21-85**	**7-28-10**	**12-1-99**	**5-20-98**
Well Status		Abandoned	Abandoned	Abandoned	Abandoned	Missing	Destroyed	Abandoned	Abandoned	Abandoned		Usable	Usable
pH (std units)											Well		
Specific Conductance (mS/cm)											was		
Turbidity (NTUs)											Dry		
Property Location											Not		
Metals (mg/L)											Sampled		
Arsenic	0.01	<0.1	<0.005	0.0655	<0.005	<0.00005	<0.02	0.013	<0.005	<0.005	in 2010	<0.005	
Lead	0.015		0.36	0.0842								0.0045	
Copper	1.3												
Zinc	2												
Organochlorine Pesticides (mg/L)													
alpha, beta, delta-BHC	--	0.2088	na	na	0.0136	0.0152	0.0336	0.00506	0.0009	0.00038		na	na
alpha-BHC	0.00005	na	0.0088	0.00037	na	na	na	na	na	na		0.00008	<0.000025
beta-BHC	0.00005	na	0.0043	0.011	na	na	na	na	na	na		<0.000025	0.00019
Chlordane	0.002	<0.00004	0.0002 (3)	<0.000025	<0.00004	0.00041	<0.00004	<0.00004	0.00007	<0.00004		<0.000025	<0.000025
DDD	0.001	<0.00005(2)	<0.0002	<0.000025	<0.00005(2)	na	na	na	na	na		<0.000025	<0.000025
DDE	0.001	<0.00002	<0.0002	<0.000025	<0.00002	<0.00004	<0.00002	<0.00002	<0.00002	0.00021		<0.000025	<0.000025
DDT	0.001	0.00006	<0.0002	0.00015	<0.00002	<0.00004	<0.00002	<0.00002	0.00013	<0.00002		<0.000025	<0.000025
delta-BHC	0.00005	na	0.0019	0.00013	na	na	na	na	na	na		<0.000025	<0.000025
Dieldrin	0.001	<0.00005(2)	<0.0002	0.00018	<0.00005(2)	na	na	na	na	na		0.00008	0.00043
gamma-BHC (lindane)	0.0002	0.0889	0.0038	0.00014	0.0039	0.00652	0.0102	0.00223	0.0002	0.00017		<0.000025	<0.000025
Heptachlor	0.004	<0.00001	<0.00001(3)	<0.000025	<0.00001	<0.00001	<0.00001	<0.00001	0.00005	0.00009		<0.000025	<0.000025
Methoxychlor	0.04	<0.0002	<0.0002	<0.000025	<0.0002	na	na	na	na	<0.0002		<0.000025	
Toxaphene	0.005	<0.00008	<0.002	<0.000025	<0.00008	<0.00005	<0.00008	<0.00008	<0.00008	<0.00008		<0.0005	<0.000025
Total Pesticides	--	0.29776	0.0188	0.01197	0.0175	0.02213	0.0438	0.00729	0.00135	0.00085		0.00016	0.00062
Trichlorobenzenes (mg/L)													
1,2,3-Trichlorobenzene	0.005												
1,2,4-Trichlorobenzene	0.07												
Nitrate/Sulfate (mg/L)													
Nitrate	10 (NR)												
Sulfate	250 (NR)												

Table 4.10: Summary of Regulated Substances Detected in Most Recent Ground-Water Samples

	HSRA	**Location, Date**											
Parameter, Units	*Type 1 RRS Concentrations*	**MW-22 7-28-10 & 9-13-10**	**MW-22 5-30-07**	**MW-23 6-21-85**	**MW-24**	**MW-24 11-22-02**	**MW-25 9-14-10**	**MW-25 8-15-07**	**MW-26 7-28-10 & 9-13/10**	**MW-26 6-1-07**	**MW-27 2-19-97**	**DW-1A 7-26-85**	**DW-1B 7-26-85**
Well Status		Usable	Usable	Abandoned		Usable	Usable	Usable	Usable	Usable	Abandoned	Abandoned	Measure Only
pH (std units)		3.97/4.01	3.64		Well was Dry Not Sampled in 2010		4.07	4.84	4.47	4.91			
Specific Conductance (mS/cm)		0.76/1.03	0.87				0.49	0.57	0.51	0.7			
Turbidity (NTUs)		6.8/1.98	3.57				9.7	110	7.1	2.92			
Property Location		BFEL	BFEL				Railroad	Railroad	BFEL	BFEL			
Metals (mg/L)													
Arsenic	0.01	**0.0038**	<0.005	<0.25		na	**0.0027**	0.0027	<0.0025	<0.005	<0.025	<0.005	<0.005
Lead	0.015	**0.004**	0.009	na		0.035	**0.02**	0.047	<0.0015	<0.003	<0.01	na	na
Copper	1.3	**4.0**					**0.32**		**0.01**				
Zinc	2	**8.3**					**2.9**		**0.16**				
Organochlorine Pesticides (mg/L)													
alpha, beta, delta-BHC	--	na	na	0.0964		na	na	na	na	na	na	0.0149	0.000207
alpha-BHC	0.00005	**0.00079**	0.00037	na		na	**0.00019**	0.00014	**0.00011**	<0.00004	0.0000595	na	na
beta-BHC	0.00005	**0.00096**	0.00094	na		na	**0.00095**	0.0016	**0.00054**	0.00026	0.0000574	na	na
Chlordane	0.002	<0.00049	<0.00047	0.0003		na	<0.00048	<0.00049	<0.00048	<0.00047	<0.0005	0.000037	0.000089
DDD	0.001	<0.000097	<0.000094	na		na	<0.000095	<0.000098	<0.000095	<0.00009	<0.0001	<0.00005$^{(2)}$	<0.00005$^{(2)}$
DDE	0.001	<0.000097	<0.000094	0.0001		na	<0.000095	<0.000098	<0.000095	<0.00009	<0.00004	<0.00004	<0.00004
DDT	0.001	<0.000097	<0.000094	0.00258		na	<0.000095	<0.000098	<0.000095	<0.00009	<0.0001	<0.00004	<0.00004
delta-BHC	0.00005	**0.00026**	0.00012	na		na	**0.00013**	0.000075 P	**0.00014**	0.00005	<0.00005	na	na
Dieldrin	0.001	<0.000097	<0.000094	na		na	<0.000095	<0.000098	<0.000095	<0.00009	<0.00002	<0.00005$^{(2)}$	<0.00005$^{(2)}$
gamma-BHC (lindane)	0.0002	**0.00047**	0.00029	0.0204		na	**0.00012**	0.000061 P	**0.00007**	<0.000047	<0.00004	0.00453	0.000034
Heptachlor	0.004	<0.000049	<0.000047	<0.00001		na	<0.000048	<0.000049	<0.000048	<0.000047	<0.00003	<0.00001	<0.00001
Methoxychlor	0.04	<0.000097	<0.00047	na		na	<0.000095	<0.00049	<0.000095	<0.00047	<0.0005	<0.0002	<0.0002
Toxaphene	0.005	<0.0049	<0.0028	<0.00008		na	<0.0048	<0.0049	<0.0048	<0.0028	<0.002	<0.00005	<0.00005
Total Pesticides	--	**0.00248**	0.00172	0.11978		na	**0.00139**	0.001876	**0.00086**	0.00031	0.0001169	0.019467	0.00033
Trichlorobenzenes (mg/L)													
1,2,3-Trichlorobenzene	0.005	<0.0095					<0.0097		<0.01				
1,2,4-Trichlorobenzene	0.07	<0.0095					<0.0097		<0.01				
Nitrate/Sulfate (mg/L)													
Nitrate	10 (NR)	**1.5**					**4.7**		**4.8**				
Sulfate	250 (NR)	**750**					**200**		**210**				

Table 4.10: Summary of Regulated Substances Detected in Most Recent Ground-Water Samples

Parameter, Units	*HSRA Type 1 RRS Concentrations*	**Location, Date**										
		DW-2A 6-21-85	**DW-2B 6-21-85**	**MW-101 7-28-10 & 9-13-10**	**MW-101 5-31-07**	**MW-102 7-29-10 & 9-14-10**	**MW-102 6-1-07**	**MW-103A 2010**	**MW-103A 8-14-07**	**MW-103D 2010**	**MW-103D 8-14-07**	**MW-104 1-19-00**
Well Status		Abandoned	Abandoned	Usable	Usable	Usable	Usable	Well Abandoned by CSX 2-15-08		Well Abandoned by CSX 2-15-08		Abandoned
pH (std units)				4.32/4.5	4.45	4.84/5.54	5.07		5.61		5.26	
Specific Conductance (mS/cm)				0.22/0.26	0.24	0.41/0.37	0.22		0.22		0.47	
Turbidity (NTUs)				2.44/0.89	2.71	1.11/0.03	6.7		3.5		8.7	
Property Location				BFEL	BFEL	BFEL	BFEL		Railroad		Railroad	
Metals (mg/L)												
Arsenic	0.01	<0.15	<0.05	<0.0025	<0.005	<0.0025	<0.005		<0.0025		<0.0025	<0.005
Lead	0.015	na	na	**0.0035**	0.0044	**0.0025**	<0.003		0.012		0.0022	<0.003
Copper	1.3			**0.022**		<0.005						
Zinc	2			**0.66**		<0.02						
Organochlorine Pesticides (mg/L)												
alpha, beta, delta-BHC	--	0.4083	0.0862	na	na	na	na		na		na	na
alpha-BHC	0.00005	na	na	<0.000049	<0.000047	<0.000049	<0.000047		<0.000047		<0.00049	<0.000025
beta-BHC	0.00005	na	na	<0.000049	<0.000047	<0.000049	<0.000047		<0.000047		<0.00049	<0.000025
Chlordane	0.002	0.00089	<0.0004	<0.00049	<0.00047	<0.00049	<0.00047		<0.00047		<0.00049	<0.000025
DDD	0.001	na	na	<0.000097	<0.000094	<0.000097	<0.000094		<0.000094		<0.000097	<0.000025
DDE	0.001	0.00049	<0.0002	<0.000097	<0.000094	<0.000097	<0.000094		<0.000094		<0.000097	<0.000025
DDT	0.001	<0.0001	<0.0002	<0.000097	<0.000094	<0.000097	<0.000094		<0.000094		<0.000097	<0.000025
delta-BHC	0.00005	na	na	<0.000049	<0.000047	<0.000049	<0.000047		<0.000047		<0.000049	<0.000025
Dieldrin	0.001	na	na	<0.000097	<0.000094	<0.000097	<0.000094		<0.000094		<0.000097	<0.000025
gamma-BHC (lindane)	0.0002	0.2146	0.0261	<0.000049	<0.000047	<0.000049	<0.000047		<0.000047		<0.000049	<0.000025
Heptachlor	0.004	<0.0001	<0.0001	<0.000049	<0.000047	<0.000049	<0.000047		<0.000047		<0.000049	<0.000025
Methoxychlor	0.04	<0.0002	<0.0002	<0.000097	<0.00047	<0.000097	<0.00047		<0.00047		<0.00049	<0.000025
Toxaphene	0.005	<0.0008	<0.0005	<0.0049	<0.0028	<0.0049	<0.0028		<0.0047		<0.0049	<0.0005
Total Pesticides	--	0.62428	0.1123	BDL	BDL	BDL	BDL		BDL		BDL	BDL
Trichlorobenzenes (mg/L)												
1,2,3-Trichlorobenzene	0.005			<0.0097		<0.0094						
1,2,4-Trichlorobenzene	0.07			<0.0097		<0.0094						
Nitrate/Sulfate (mg/L)												
Nitrate	10 (NR)			**11**		**5.1**						
Sulfate	250 (NR)			**84**		**160**						

Table 4.10: Summary of Regulated Substances Detected in Most Recent Ground-Water Samples

	HSRA	**Location, Date**											
Parameter, Units	*Type 1 RRS Concentrations*	**MW-104A 9-15-10**	**MW-104A 8-21-07**	**MW-104D 9-15-10**	**MW-104D 9-20-07**	**MW-105 9-15-10**	**MW-105 8-15-07**	**MW-106D 9-15-10**	**MW-106D 8-13-07**	**MW-107D 9-15-10**	**MW-107D 8-22-07**	**MW-108 7-29-2010 &9-14-10**	**MW-108 6-1-07**
Well Status		Replaced MW-104	Replaced MW-104	Usable	Usable	Usable	Usable	Usable	Usable	Usable	New Well Usable	Usable	Replaced MW-2
pH (std units)		6.274	6.4	6.51	6.17	5.57	5.92	6.28	6.38	5.52	4..90	4.3/5.14	5.31
Specific Conductance (mS/cm)		0.74	0.85	3.13	3.64	0.36	0.43	1.25	1.52	0.58	0.4	0.72/0.68	0.63
Turbidity (NTUs)		1.49	3.21	18	41.7	9.7	54.2	0	0.08	0	2.42	2.15/0.8	4.74
Property Location		Railroad	Railroad	Railroad	Railroad	Railroad	Railroad	Railroad	Railroad	Railroad	Railroad	BFEL	BFEL
Metals (mg/L)													
Arsenic	0.01	<0.0025	<0.0025	**0.0042**	0.0035	<0.0025	0.004	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.005
Lead	0.015	<0.0015	0.0027	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.003
Copper	1.3	<0.005		<0.005		**0.0057**		<0.005		<0.005		**0.3**	
Zinc	2	<0.02		<0.02		**0.024**		**0.11**		<0.02		**3.6**	
Organochlorine Pesticides (mg/L)													
alpha, beta, delta-BHC	--	na	na	na	na	na	na	na	na	na	na	na	na
alpha-BHC	0.00005	<0.000047	<0.000049	<0.000047	<0.000049	<0.000047	<0.000047	**0.0082**	0.0014	<0.000048	<0.000049	**0.0058**	0.0064
beta-BHC	0.00005	<0.000047	<0.000049	<0.000047	<0.000049	<0.000047	<0.000047	**0.0019**	0.00032	<0.000048	<0.000049	**0.0024**	0.0022
Chlordane	0.002	<0.00047	<0.00049	<0.00047	<0.00049	<0.00047	<0.00047	<0.00047	<0.0005	<0.00048	<0.00049	<0.00048	<0.0049
DDD	0.001	<0.000094	<0.000098	<0.000094	<0.000097	<0.000094	<0.000094	<0.000094	<0.0001	<0.000095	<0.000097	<0.000095	<0.00049
DDE	0.001	<0.000094	<0.000098	<0.000094	<0.000097	<0.000094	<0.000094	<0.000094	<0.0001	<0.000095	<0.000097	<0.000095	<0.00049
DDT	0.001	<0.000094	<0.000098	<0.000094	<0.000097	<0.000094	<0.000094	<0.000094	<0.0001	<0.000095	<0.000097	<0.000095	<0.00049
delta-BHC	0.00005	<0.000047	<0.000049	<0.000047	<0.000049	<0.000047	<0.000047	**0.01**	0.002	<0.000048	<0.000049	**0.0018**	0.0012
Dieldrin	0.001	<0.000094	<0.000098	<0.000094	<0.000097	<0.000094	<0.000094	<0.000094	<0.0001	<0.000095	<0.000097	**0.000098 P**	<0.00049
gamma-BHC (lindane)	0.0002	<0.000047	<0.000049	<0.000047	<0.000049	<0.000047	<0.000047	**0.0051**	0.00088	<0.000048	<0.000049	**0.0002 P**	0.00063
Heptachlor	0.004	<0.000047	<0.000049	<0.000047	<0.000049	<0.000047	<0.000047	<0.000047	<0.00005	<0.000048	<0.000049	<0.000048	<0.00024
Methoxychlor	0.04	<0.000094	<0.00049	<0.000094	<0.00049	<0.000094	<0.00047	<0.000094	<0.0005	<0.000095	<0.00049	<0.000095	<0.0049
Toxaphene	0.005	<0.0047	<0.0049	<0.0047	<0.0049	<0.0047	<0.0047	<0.0047	<0.005	<0.0048	<0.0049	<0.0048	<0.015
Total Pesticides	--	BDL	BDL	BDL	BDL	BDL	BDL	**0.0252**	0.0046	BDL	BDL	**0.010298**	0.01043
Trichlorobenzenes (mg/L)													
1,2,3-Trichlorobenzene	0.005	<0.0094		<1		<0.0094		<0.01		<0.0095		<0.0095	
1,2,4-Trichlorobenzene	0.07	<0.0094		<1		<0.0094		<0.01		<0.0095		<0.0095	
Nitrate/Sulfate (mg/L)													
Nitrate	10 (NR)	<0.25		<0.25		<0.25		**1.4**		**4.7**		**0.42**	
Sulfate	250 (NR)	**93**		<5		**97**		**430**		**190**		**320**	

Table 4.10: Summary of Regulated Substances Detected in Most Recent Ground-Water Samples

	HSRA	**Location, Date**											
Parameter, Units	*Type 1 RRS Concentrations*	**MW-109 9-14-10**	**MW-109 8-21-07**	**MW-110 7-29-10 & 9-14-10**	**MW-110 6-1-07**	**MW-111 9-14-10**	**MW-111 8-21-07**	**MW-112 7-28-10 & 9-13-10**	**MW-112 5-31-07**	**MW-113 9-15-10**	**MW-113 8-22-07**	**MW-114 9-14-10**	**MW-114 8-14-07**
Well Status		Usable	Replaced MW-4 and MW-6	Usable	Replaced DW-2B	Usable	Replaced MW-3	Usable	Replaced MW-8 MW-3 MW-14	Usable	Replaced MW-16	Usable	Usable
pH (std units)		4.56	4.39	5.03/5.04	5.15	5.79	5.36	5.52/5.51	5.91	3.69	3.42	4.05	3.82
Specific Conductance (mS/cm)		2.71	2.8	0/0.94	1.01	1.22	1.36	0.55/0.57	0.48	2.58	2.61	1.13	1.51
Turbidity (NTUs)		0.1	0.5	0.22/0.6	0.55	0.81	10.19	5.1/4.04	5.0	5.21	28.6	4.97	7.3
Property Location		Railroad	Railroad	BFEL	BFEL	Railroad	Railroad	BFEL	BFEL	Railroad	Railroad	Railroad	Railroad
Metals (mg/L)													
Arsenic	0.01	**0.061**	0.16	<0.0025	<0.005	<0.0025	0.0066	**0.015**	0.014	**0.023**	0.02	<0.0025	<0.0025
Lead	0.015	**0.61**	2.50	**0.0015**	<0.003	<0.0015	0.0019	<0.0015	<0.003	**0.0019**	0.0081	**0.004**	0.0038
Copper	1.3	**0.079**		**0.39**		**0.039**		**0.054**		**15**	17	**2.2**	2.7
Zinc	2	**25**		**5.7**		**4.4**		**1**		**95**	110	**8.7**	12
Organochlorine Pesticides (mg/L)													
alpha, beta, delta-BHC	--	na	na	na	na	na	na	na	na	na	na	na	na
alpha-BHC	0.00005	**0.0028**	0.023	**0.00047**	0.0012	**0.014**	0.011	<0.0025	0.0007	**0.0014**	0.00098	**0.00024**	0.00026
beta-BHC	0.00005	<0.00048	0.0044	**0.00043**	0.00037	<0.01	0.0044	**0.031**	0.0009	**0.0018**	0.00097 P	**0.0046**	0.0033
Chlordane	0.002	<0.00048	<0.00049	<0.00048	<0.00048	<0.0005	<0.00048	<0.0005	<0.00047	<0.00047	<0.00049	<0.0005	<0.00049
DDD	0.001	<0.000095	<0.00098	<0.000095	<0.000096	<0.0001	<0.000096	<0.0001	<0.000094	<0.000094	<0.000097	<0.0001	<0.000097
DDE	0.001	<0.000095	<0.00098	<0.000095	<0.000096	<0.0001	<0.000096	<0.0001	<0.000094	<0.000094	<0.000097	<0.0001	<0.000097
DDT	0.001	<0.000095	<0.00098	<0.000095	<0.000096	<0.0001	<0.000096	<0.0001	<0.000094	<0.000094	<0.000097	<0.0001	<0.000097
delta-BHC	0.00005	<0.00048	0.0053	**0.00088**	0.0027	**0.03**	0.017	<0.0025	0.0002	**0.0016**	0.00044 P	**0.00011 P**	0.000062
Dieldrin	0.001	<0.000095	<0.00098	<0.000095	<0.000096	**0.00014**	<0.000096	**0.00012**	<0.000094	<0.000094	<0.000097	<0.0001	<0.000097
gamma-BHC (lindane)	0.0002	**0.0019**	0.015	**0.00055**	0.0013	<0.01	0.01	**0.00059**	0.000082	**0.0012**	0.00078	**0.00027**	0.00023
Heptachlor	0.004	<0.000048	<0.000049	<0.000048	<0.000048	<0.00005	<0.000048	<0.00005	<0.000047	<0.000047	<0.000049	<0.00005	<0.000049
Methoxychlor	0.04	<0.000095	<0.00049	<0.000095	<0.00048	<0.0001	<0.00048	<0.0001	<0.00047	<0.000094	<0.00049	<0.0001	<0.00049
Toxaphene	0.005	<0.0048	<0.0049	<0.0048	<0.0029	<0.005	<0.0048	<0.005	<0.0028	<0.0047	<0.0049	<0.005	<0.0049
Total Pesticides	--	**0.0047**	0.0477	**0.00233**	0.00557	**0.04414**	0.0424	**0.03171**	0.001882	**0.006**	0.00317	**0.00522**	0.003852
Trichlorobenzenes (mg/L)													
1,2,3-Trichlorobenzene	0.005	<0.0095		<0.0095		<0.0097		<0.0097		<0.0094	na	<0.0097	na
1,2,4-Trichlorobenzene	0.07	<0.0095		<0.0095		<0.0097		<0.0097		<0.0094	na	<0.0097	na
Nitrate/Sulfate (mg/L)													
Nitrate	10 (NR)	**0.38**		**9.8**		<0.25		**0.89**		**1.6**	9.2	**19**	130
Sulfate	250 (NR)	**1300**		**310**		**240**		**220**		**2100**	2400	**290**	570

Table 4.10: Summary of Regulated Substances Detected in Most Recent Ground-Water Samples

Parameter, Units	*HSRA Type 1 RRS Concentrations*	MW-115 9-14-10	MW-115 8-15-07	MW-116 7-28-10 & 9-13-10	MW-116 5-31-07	MW-117 9-14-10	MW-117 8-15-07	MW-118	MW-118 8-17-07& 9-20-07
		Location, Date							
Well Status		Usable	Replaced MW-5	Usable	Replaced MW-10	Usable	Usable	Well	Usable
pH (std units)		3.76	3.61	3.92/3.94	4.19	4.24	4.09	Abandoned	5.59
Specific Conductance (mS/cm)		1.18	0.97	2.06/2.3	1.56	0.51	0.36	by CSX	0.62
Turbidity (NTUs)		0.21	2.25	3.75/4.95	4.96	8.19	8.0	2-15-08	0.07
Property Location		Railroad	Railroad	BFEL	BFEL	Railroad	Railroad		Railroad
Metals (mg/L)									
Arsenic	0.01	<0.0025	<0.0025	<0.0025	<0.005	<0.0025	<0.0025		<0.0025
Lead	0.015	<0.0015	0.0083	**0.0073**	<0.003	<0.0015	0.0073		<0.0015
Copper	1.3	**6.7**	6.1	**4.1**		**0.038**	0.069		0.018
Zinc	2	**20**	16	**12**		**1.6**	1.3		0.053
Organochlorine Pesticides (mg/L)									
alpha, beta, delta-BHC	--	na	na	na	na	na	na		na
alpha-BHC	0.00005	**0.00024**	0.00064	**0.00019**	0.000089	<0.00005	<0.00005		<0.000047
beta-BHC	0.00005	**0.00013**	0.00039	**0.00063**	0.0005	<0.00005	<0.00005		<0.000047
Chlordane	0.002	<0.00047	<0.0005	<0.00048	<0.0005	<0.0005	<0.0005		<0.00047
DDD	0.001	<0.000094	<0.0001	<0.000095	<0.0001	<0.0001	<0.0001		<0.000094
DDE	0.001	<0.000094	<0.0001	<0.000095	<0.0001	<0.0001	<0.0001		<0.000094
DDT	0.001	<0.000094	<0.0001	<0.000095	<0.0001	<0.0001	<0.0001		<0.000094
delta-BHC	0.00005	<0.000047	0.00018	<0.000048	<0.00005	<0.00005	<0.00005		<0.000047
Dieldrin	0.001	<0.000094	<0.0001	<0.000095	<0.0001	<0.0001	<0.0001		<0.000094
gamma-BHC (lindane)	0.0002	**0.000073**	0.00018	**0.00027**	0.000079	<0.00005	<0.00005		<0.000047
Heptachlor	0.004	<0.000047	<0.00005	<0.000048	<0.00005	<0.00005	<0.00005		<0.000047
Methoxychlor	0.04	<0.000094	<0.0005	<0.000095	<0.0005	<0.0001	<0.0005		<0.00047
Toxaphene	0.005	<0.0047	<0.005	<0.0048	<0.003	<0.005	<0.005		<0.0047
Total Pesticides	--	**0.000443**	0.00139	**0.00109**	0.000668	BDL	BDL		BDL
Trichlorobenzenes (mg/L)									
1,2,3-Trichlorobenzene	0.005	<0.0094	na	<0.0095		<0.0094			
1,2,4-Trichlorobenzene	0.07	<0.0094	na	<0.0095		<0.0094			
Nitrate/Sulfate (mg/L)									
Nitrate	10 (NR)	**3.2**	8.6	**91**		**2.5**	17		
Sulfate	250 (NR)	**430**	730	**710**		**260**	150		

Notes:
mg/L = milligrams per liter
na = constituent not analyzed
Bolded concentrations indicate a positive detection in 2010
Boxed concentrations exceed Type 1 RRS in 2010
RRS = Risk Reduction Standard
CSX = CSX Transportation

Table 4.11: Summary of Regulated Substances Detected in Sediment Samples

		Location					
Sample Date PARAMETER, UNITS	**USEPA Regional Screening Levels, Industrial Soil (mg/kg)**	**SED-101** 1/20/2000	**SED-102** 1/20/2000	**SED-103** 1/20/2000	**SED-104** 1/20/2000	**SED-105** 1/20/2000	**Main Point** 5/26/2004
METALS (mg/kg)							
Arsenic	1.6	**50.7**	**4.4**	**6.1**	**7.7**	**10.4**	**7.7**
Lead	800	66.1	30.9	52.9	91.5	34.7	36
ORGANOCHLORINE PESTICIDES (mg/kg)							
alpha-BHC	0.27	<0.002	<0.002	<0.002	0.054	0.011	0.016
beta-BHC	0.96	<0.002	<0.002	0.0024	0.027	0.011	0.065
Chlordane	6.5	<0.002	<0.002	<0.002	0.062	0.012	<0.054
DDD	7.2	0.0091	0.0025	0.0086	0.89	0.052	<0.010
DDE	5.1	0.0032	<0.002	0.0021	0.034	0.0095	<0.010
DDT	7	0.0069	<0.002	0.0041	0.34	0.055	<0.010
delta-BHC	0.96	<0.002	<0.002	<0.002	0.029	0.0076	0.022
Dieldrin	0.11	0.0032	<0.002	<0.002	0.088	0.012	0.011
gamma-BHC (lindane)	2.1	<0.002	<0.002	<0.002	0.03	0.0067	0.0085
Heptachlor	0.38	<0.002	<0.002	<0.002	0.0049	<0.002	<0.0054
Methoxychlor	310 (a)	<0.002	<0.002	<0.002	<0.0083	<0.002	<0.054
Toxaphene	1.6	<0.050	<0.050	<0.050	<0.170	<0.050	<0.54
Total Pesticides		0.0224	0.0025	0.0172	1.5589	0.1768	0.1225

Notes:

<0.002 = Constituent not detected above the detection limit shown.
mg/kg = milligrams/kilogram
Bold values exceed Regional Screening Levels.
(a) Screening level based on noncarcinogenic hazard and has been divided by 10 to address potential additive effects.

Prepared by L. Smith
Checked by: R. Quinn

Table 4.12: Summary of Regulated Substances Detected in Surface Water Samples

PARAMETER, UNITS		Sample Location	SW-101	SW-102	SW-103	SW-104	SW-105	Main Point	Allied Outfall	SW-2007-1	SW-2007-2	SW-2007-3	SW-2007-4	SW-2007-5	SW-2007-6
		Sample Date	11/19/2002	11/19/2002	11/19/2002	11/19/2002	11/19/2002	5/26/2004	5/26/2004	8/10/2007	8/10/2007	8/10/2007	8/10/2007	8/10/2007	8/10/2007
		Distance Along Stream (ft)													
Total Organochlorine Pesticides (ug/L)	**Georgia Instream Concentrations Protective of Human Health**	**Georgia Instream Concentrations Protective of Aquatic Life, Chronic**								**(a)**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**
alpha-BHC	0.013	0.0049 *	<0.025	<0.025	<0.025	0.054	0.29	0.75	<0.05	0.010 J	0.14	0.39	0.43	0.43	0.47
beta-BHC	0.046	0.017 *	0.048P	<0.025	0.079P	0.14	0.28	2.4	0.078P	0.11	0.12	0.48	0.56	0.52	0.58
gamma-BHC (lindane)	0.063	0.95	<0.025	<0.025	<0.025	<0.025	0.12	0.52	<0.05	<0.0059	0.046 J	0.22	0.18	0.18	0.21
delta-BHC	not established	not established	<0.025	<0.025	<0.025	<0.025	0.15	0.46P	<0.05	<0.0069	0.11 P	0.21 P	0.63	0.36 P	0.39 P
Chlordane	0.0022	0.0043	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.049	<0.049	<0.048	<0.047	<0.047	<0.048
4,4'-DDD	0.00084	0.00031 *	<0.05	<0.05	<0.05	<0.05	<0.05	<0.4	<0.1	<0.0059	<0.0059	0.020 J	<0.0057	<0.0057	<0.0057
4,4'-DDE	0.00059	0.00022 *	<0.05	<0.05	<0.05	<0.05	<0.05	<0.4	<0.1	<0.0098	<0.0098	<0.0096	<0.0094	<0.0094	<0.0095
4,4'-DDT	0.00059	0.001	<0.05	<0.05	<0.05	<0.05	<0.05	<0.4	<0.1	<0.015	<0.015	<0.015	<0.014	<0.014	<0.015
Dieldrin	0.00014	0.056	<0.025	<0.025	<0.025	<0.025	<0.025	<0.4	<0.1	<0.0078	<0.0078	0.020 J	0.0097 JP	<0.0075	<0.0076
Heptachlor	0.00021	0.0038	<0.025	<0.025	<0.025	<0.025	<0.025	<0.2	<0.05	<0.0045	<0.0045	<0.0044	<0.0043	<0.0043	<0.0044
Methoxychlor	not established	0.03	<0.1	<0.1	<0.1	<0.1	<0.1	<2	<0.5	<0.023	<0.023	<0.023	<0.022	<0.022	<0.022
Toxaphene	0.00075	0.0002	<2	<2	<2	<2	<2	<20	<5	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3
Dissolved Organochlorine Pesticides (ug/L)															
alpha-BHC	0.013	0.0049 *	<0.025	<0.025	<0.025	<0.025	0.3	NA	NA	0.011 J	0.11	0.33	0.53	0.48	0.60
beta-BHC	0.046	0.017 *	0.053P	0.031P	0.073P	0.29	0.3	NA	NA	0.084	0.12	0.44	0.64	0.56	0.67
gamma-BHC (lindane)	0.063	0.95	<0.025	<0.025	<0.025	<0.025	0.098P	NA	NA	<0.0060	0.043 J	0.17	0.24	0.2	0.25
delta-BHC	not established	not established	<0.025	<0.025	<0.025	<0.025	0.23	NA	NA	<0.0070	0.10 P	0.18 P	0.43 P	0.37 P	0.43 P
Chlordane	0.0022	0.0043	<0.2	<0.2	<0.2	<0.2	<0.2	NA	NA	<0.050	<0.049	<0.049	<0.048	<0.049	<0.048
4,4'-DDD	0.00084	0.00031 *	<0.05	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.0060	<0.0059	0.014 J	<0.0057	<0.0059	<0.0058
4,4'-DDE	0.00059	0.00022 *	<0.05	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.010	<0.0098	<0.0098	<0.0095	<0.0098	<0.0096
4,4'-DDT	0.00059	0.001	<0.05	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Dieldrin	0.00014	0.056	<0.025	<0.025	<0.025	<0.025	<0.025	NA	NA	<0.0080	<0.0078	<0.0078	0.014 J	<0.0078	0.012 J
Heptachlor	0.00021	0.0038	<0.025	<0.025	<0.025	<0.025	<0.025	NA	NA	<0.0046	<0.0045	<0.0045	<0.0044	<0.0045	<0.0044
Methoxychlor	not established	0.03	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.023	<0.023	<0.023	<0.022	<0.023	<0.023
Toxaphene	0.00075	0.0002	<2	<2	<2	<2	<2	NA	NA	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3
Total Metals (mg/L)															
Arsenic	0.34	0.15	0.039	0.0064	0.0069	<0.005	<0.005	<0.01	0.016	0.32	0.009	0.0039	<0.0025	<0.0025	0.0033
Copper	0.007	0.005	NA	NA	NA	NA	NA	1.6	<0.02	NA	NA	NA	NA	NA	NA
Lead	0.03	0.0012	<0.003	<0.003	<0.003	<0.003	<0.003	0.0094	<0.005	0.011	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015
Zinc	0.065	0.065	NA	NA	NA	NA	NA	13	0.68	NA	NA	NA	NA	NA	NA
Dissolved Metals (mg/L)															
Arsenic	0.34	0.15	0.005	<0.005	<0.005	<0.005	<0.005	NA	NA	0.063	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Copper	0.007	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	0.03	0.0012	<0.003	<0.003	<0.003	<0.003	<0.003	NA	NA	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015
Zinc	0.065	0.065	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Trichlorobenzenes (ug/L)															
1,2,3-Trichlorobenzene	no criteria established		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene		70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate and Sulfate (mg/L)															
Nitrate as N	no criteria established		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	no criteria established		NA	NA	NA	NA	NA	510	85	NA	NA	NA	NA	NA	NA
Hardness as CaCo3 (mg/L)	no criteria established		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

(a) = Total and dissolved pesticide results are reported to the method detection limits (MDLs) in an effort to report the lowest possible value obtained by the method.
Results reported between the MDL and the reporting limits (RLs) are considered quantitative estimates.
<0.025 = Constituent not detected above the detection limit shown.
ug/L = micrograms per liter
mg/L = milligrams per liter
J = Result reported between the MDL and RL. Result is a quantitative estimate.
P = Indentification of target analytes using gas chromatography (GC) is based on retention time.
Although 2 dissimilar GC columns confirmed the presence of the target anlyte in the sample, relative
percent difference is >40%.
NA = constituent not analyzed
na = criteria is not applicable to these concentrations
Bolded = Value exceeded Instream Criteria
* Instream criteria is for annual average or higher flow volumes
In-Stream Concentrations for Metals are for dissolved metals. Other criteria are for total recoverable metals.

Prepared by/Date: J Hartness 9/14/07/ LRP 10/15/10
Checked by/Date: R Quinn 3/6/11

Table 4.12: Summary of Regulated Substances Detected in Surface Water Samples

		Sample Location	SW2010-1	SW2010-2	SW2010-3	SW2010-4	SW2010-5	SW2010-6	SW2010-7	SW2010-8	SW2010-9	SW2010-10	SW2010-11	SW2010-12	SW2010-13	SW2010-14	SW2010-15	SW2010-16	SW2010-17	SW2010-18
		Sample Date	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010
PARAMETER, UNITS		Distance Along Stream (ft)	0	141	328	478	735	886	963	1040	1092	1152	1222	1367	1511	1667	1761	1907	2099	2275
Total Organochlorine Pesticides (ug/L)	**Georgia Instream Concentrations Protective of Human Health**	**Georgia Instream Concentrations Protective of Aquatic Life, Chronic**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**
alpha-BHC	0.013	0.0049 *	<0.0057	**0.13**	**0.057**	**0.039 J**	**0.13**	**0.094**	**0.09**	**0.18**	**0.16**	**0.13**	**0.19**	**0.25**	**0.5**	**0.62**	**0.62**	**0.37**	**0.31**	**0.45**
beta-BHC	0.046	0.017 *	<0.0067	**0.16 P**	**0.15**	**0.14**	**0.23**	**0.15**	**0.16**	**0.19 P**	**0.14 P**	**0.18**	**0.45**	**0.46**	**0.63**	**0.73**	**0.75**	**0.6**	**0.48**	**0.64**
gamma-BHC (lindane)	0.063	0.95	<0.0059	0.058 P	0.06	0.028 JP	0.037 P	0.043 J	0.029 P	**0.12**	**0.1**	**0.084**	**0.11**	**0.13**	**0.2**	**0.22**	**0.22**	**0.15**	**0.11**	**0.17**
delta-BHC	not established	not established	<0.0048	0.22 P	0.13 P	0.11 P	0.2	0.14	0.091 P	0.19 P	0.2	0.11 P	0.13 P	0.15 P	0.32 P	0.48 P	0.44 P	0.33 P	0.21 P	0.3 P
Chlordane	0.0022	0.0043	<0.1	<0.1	<0.094	<0.094	<0.1	<0.094	<0.094	<0.1	<0.095	<0.094	<0.094	<0.094	<0.095	<0.095	<0.095	<0.094	<0.094	<0.095
4,4'-DDD	0.00084	0.00031 *	<0.0065	<0.0065	<0.0061	<0.0061	<0.0065	<0.0061	**0.014 J**	<0.0065	<0.0062	<0.0061	<0.0061	<0.0061	<0.0062	<0.0062	<0.0062	<0.0061	<0.0061	<0.0062
4,4'-DDE	0.00059	0.00022 *	<0.0077	<0.0077	<0.0073	<0.0073	<0.0077	<0.0073	<0.0073	<0.0077	<0.0073	<0.0073	<0.0073	<0.0073	<0.0073	<0.0073	<0.0073	<0.0073	<0.0073	<0.0073
4,4'-DDT	0.00059	0.001	<0.0097	<0.0097	<0.0092	<0.0092	<0.0097	<0.0092	<0.0092	<0.0097	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092
Dieldrin	0.00014	0.056	<0.0091	<0.0091	<0.0086	<0.0086	<0.0091	<0.0086	<0.0086	**0.014 J**	<0.0087	**0.011 J**	**0.012 J**	**0.012 J**	**0.015 J**	**0.015 J**	**0.017 J**	**0.012 J**	<0.0086	<0.0087
Heptachlor	0.00021	0.0038	<0.007	<0.007	<0.0066	<0.0066	<0.007	<0.0066	<0.0066	<0.007	<0.0067	<0.0066	<0.0066	<0.0066	<0.0067	<0.0067	<0.0067	<0.0066	<0.0066	<0.0067
Methoxychlor	not established	0.03	<0.013	<0.013	<0.012	<0.012	<0.013	<0.012	<0.012	<0.013	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
Toxaphene	0.00075	0.0002	<0.5	<0.5	<0.47	<0.47	<0.5	<0.47	<0.47	<0.5	<0.48	<0.47	<0.47	<0.47	<0.48	<0.48	<0.48	<0.47	<0.47	<0.48
Dissolved Organochlorine Pesticides (ug/L)																				
alpha-BHC	0.013	0.0049 *	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
beta-BHC	0.046	0.017 *	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-BHC (lindane)	0.063	0.95	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
delta-BHC	not established	not established	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chlordane	0.0022	0.0043	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDD	0.00084	0.00031 *	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	0.00059	0.00022 *	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	0.00059	0.001	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	0.00014	0.056	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor	0.00021	0.0038	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methoxychlor	not established	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toxaphene	0.00075	0.0002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Metals (mg/L)																				
Arsenic	0.34	0.15	0.09	0.043	0.025	0.016	0.008	0.0059	0.0082	0.0053	0.0049	0.0041	0.0059	0.0067	0.0029	0.028	0.0025	0.0055	0.0029	0.0032
Copper	0.007	0.005	0.0043J	**0.0065**	**0.0071**	**0.016**	**0.016**	**0.012**	**0.015**	**0.013**	**0.011**	**0.01**	**0.22**	**0.31**	**0.11**	**0.78**	**0.084**	**0.12**	**0.054**	**0.052**
Lead	0.03	0.0012	**0.0024**	**0.0015**	0.00096 J	**0.0046**	0.00067 J	0.00055 J	**0.0032**	**0.0022**	0.00064 J	<0.0005	**0.012**	**0.0019**	<0.0005	**0.014**	<0.0005	**0.0047**	<0.0005	<0.0005
Zinc	0.065	0.065	0.016 J	0.027	**0.084**	**0.54**	**0.97**	**0.87**	**0.81**	**0.65**	**0.62**	**0.5**	**3**	**3.2**	**2.3**	**15**	**2.4**	**2.8**	**1.9**	**2**
Dissolved Metals (mg/L)																				
Arsenic	0.34	0.15	0.025	0.0074	0.0014 J	<0.0013	0.0015 J	0.0018 J	0.0019 J	0.002 J	0.0023 J	0.0023 J	0.0016 J	0.0016 J	0.0013 J	<0.0013	<0.0013	<0.0013	0.0013 J	0.0014 J
Copper	0.007	0.005	0.0012 J	0.0034 J	0.0031 J	**0.0073**	**0.0074**	**0.0056**	**0.006**	**0.0055**	**0.0059**	**0.0054**	**0.097**	**0.092**	**0.053**	**0.048**	**0.038**	**0.03**	**0.024**	**0.02**
Lead	0.03	0.0012	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Zinc	0.065	0.065	<0.0083	0.012 J	0.038	**0.56**	**0.89**	**0.72**	**0.76**	**0.5**	**0.54**	**0.44**	**2.7**	**2.6**	**2.1**	**2.5**	**2.2**	**2.3**	**1.6**	**1.7**
Total Trichlorobenzenes (ug/L)																				
1,2,3-Trichlorobenzene	no criteria established		<1	NA	NA	NA	<0.97	NA	NA	NA	NA	NA	<1	NA	<0.94	NA	<0.95	NA	NA	<0.94
1,2,4-Trichlorobenzene		70	<0.56	NA	NA	NA	<0.54	NA	NA	NA	NA	NA	<0.56	NA	<0.53	NA	<0.53	NA	NA	<0.53
Nitrate and Sulfate (mg/L)																				
Nitrate as N	no criteria established		0.65	NA	NA	NA	0.74	NA	NA	NA	NA	NA	4.1	NA	3.3	NA	530	NA	NA	3.1
Sulfate	no criteria established		64	NA	NA	NA	110	NA	NA	NA	NA	NA	220	NA	180	NA	330	NA	NA	190
Hardness as CaCo3 (mg/L)	no criteria established		200	NA	NA	190	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

(a) = Total and dissolved pesticide results are reported to the method detecti
Results reported between the MDL and the reporting limits (RLs) are
<0.025 = Constituent not detected above the detection limit shown.
ug/L = micrograms per liter
mg/L = milligrams per liter
J = Result reported between the MDL and RL. Result is a quantitative estim
P = Indentification of target analytes using gas chromatography (GC) is base
Although 2 dissimilar GC columns confirmed the presence of the target
percent difference is >40%.
NA = constituent not analyzed
na = criteria is not applicable to these concentrations
Bolded = Value exceeded Instream Criteria
* Instream criteria is for annual average or higher flow volumes
In-Stream Concentrations for Metals are for dissolved metals. Other criteria

TABLE 6.1: Protected Animal and Plant Species Occurring within Fulton and Surrounding Counties, Georgia

Species Name ***(Scientific Name)***	**Federal Status***	**State Status****	**Preferred Habitat**	**Habitat Available in Project Area**
MAMMALS				
Gray Bat *(Myotis grisescens)*	E	E	Caves or cave-like habitats with foraging primarily over water along rivers or lake shores.	No
BIRDS				
Bachman's Sparrow *(Aimophila aestivalis)*	SC	R	Abandoned fields with scattered shrubs, pines, or oaks.	No
Peregrine Falcon *(Falco peregrinus)*	E	E	Nests on cliffs, high hills, or tall buildings.	No
Bald Eagle *(Haliaeetus leucocephalus)*	T	E	Associated with coasts, rivers and lakes, usually nesting near bodies of water.	No
Red-cockaded Woodpecker *(Picoides borealis)*	E	E	Open stands of mature pine trees.	No
Appalachian Bewick's Wren *(Thyromanes bewickii altus)*	SC	R	Dense undergrowth, overgrown fields, thickets, and brush in open or semi-open habitat; feeds primarily on insects.	No
REPTILES				
Northern Pine Snake *(Pituophis m. melanoleucus)*	SC		Flat sandy pine barrens, sandhills, and dry mountain ridges, most often in or near pine woods	No
FISHES				
Bluestripe Shiner *(Cyprinella callitaenia)*	SC	T	Large-stream species of open, sand or rock-bottomed channels with flowing water and little or no aquatic vegetation.	No
Etowah Darter *(Etheostoma etowahae)*	E	E	Riffles in small-medium size streams of the Etowah River Basin.	No

TABLE 6.1: Protected Animal and Plant Species Occurring within Fulton and Surrounding Counties, Georgia

Species Name ***(Scientific Name)***	**Federal Status***	**State Status****	**Preferred Habitat**	**Habitat Available in Project Area**
Cherokee Darter *(Etheostoma scotti)*	T	T	Found in small to large tributaries of the upper Coosa River System, primarily in the Etowah River Basin.	No
Highscale Shiner *(Notropis hypsilepis)*	SC	T	Chattahoochee and Flint River systems, closely associated with sandy substrate.	No
Frecklebelly Madtom *(Noturus munitus)*		E	Riffles and rapids of rivers and their large tributaries of the Mobile Basin.	No
Freckled Madtom *(Noturus nocturnus)*		E	Medium-sized creeks to large rivers in the Mobile Basin.	No
Amber Darter *(Percina antesella)*	E		Gentle riffle areas over sand and gravel substrate that becomes vegetated during summer. Confined to the Conasauga River and the Etowah River Basin.	No
Freckled Darter *(Percina lenticula)*		E	Restricted to the upper Conasauga River and the Etowah River upstream of Canton.	No
MUSSELS				
Purple Bankclimber *(Elliptoideus sloatianus)*	PT		Main channel of ACF Basin Rivers in moderate currents over sand, sand mixed with mud, or gravel substrate.	No
Shiny-rayed Pocketbook *(Lampsilis subangulata)*	PE		Medium creeks to the mainstems of rivers with slow to moderate currents over sandy substrates and associated with rock or clay.	No

TABLE 6.1: Protected Animal and Plant Species Occurring within Fulton and Surrounding Counties, Georgia

Species Name *(Scientific Name)*	**Federal Status***	**State Status****	**Preferred Habitat**	**Habitat Available in Project Area**
Gulf Moccasinshell *(Medionidus pencillatus)*	PE	E	Medium streams to large rivers with slight to moderate current over sand and gravel substrates; may be associated with muddy sand substrates around tree roots.	No
Southern Clubshell *(Pleurobema decisum)*	E	E	Rivers of medium size with a moderately high gradient and with areas of stable sand-gravel substrate.	No
Ovate Clubshell *(Pleurobema perovatum)*	E	E	Large to small rivers and streams in stable gravel and sandy-gravel substrates.	No
Oval Pigtoe *(Pleurobema pyriforme)*	PE		River tributaries and main channels in slow to moderate currents over silty sand, muddy sand, sand and gravel substrates.	No
Triangular Kidneyshell *(Ptychobranchus greeni)*	E	T	High quality rivers and large creeks in stable gravel and sandy-gravel substrates.	No
PLANTS				
Flatrock Onion *(Allium speculae)*	SC	T	Found on seepy edges of vegetation mats on outcrops of a type of granite rock confined to central Georgia.	No
Little Amphianthus *(Amphianthus pusillus)*	T	T	Restricted to shallow flat-bottomed depressions on granite outcrops.	No
Alexander Rock Aster *(Aster avitus)*	SC		Only found on margins of granite outcroppings.	No
Pink Ladyslipper *(Cypripedium acaule)*		U	Acid soils of pinelands, upland hardwoods with pine, occasionally on edges of rhododendron thickets.	No

TABLE 6.1: Protected Animal and Plant Species Occurring within Fulton and Surrounding Counties, Georgia

Species Name ***(Scientific Name)***	**Federal Status***	**State Status****	**Preferred Habitat**	**Habitat Available in Project Area**
Large-flowered Yellow Ladyslipper *(Cypripedium calceolus pubescens)*		U	Rich moist hardwood coves and forests.	No
Open Ground Whitlow-grass *(Draba aprica)*	SC	E	Found in shallow soils on granite outcrops, especially beneath widely scattered old growth eastern red cedars.	No
Small-headed Pipewort *(Eriocaulon kornickianum)*	SC		Granite outcrops and upland-sandhill-acid seeps.	No
Harper Heartleaf *(Hexastylis shuttleworthii)*		U	Peaty soils at edges of forested bogs (Piedmont) and on moist hammocks and bases of bluff forest slopes along floodplain forests (Coastal Plain).	No
Golden Seal *(Hydrastis canadensis)*		E	Rich woods and cove forests in the mountains.	No
Black-spored Quillwort *(Isoetes melanospora)*	E	E	Restricted to shallow, flat-bottomed depression on granite outcrops, where water collects.	No
Fraser Loosestrife *(Lysimachia fraseri)*	SC	R	Gravel bars and shrub islands in streams and on sunny, rocky slopes and roadsides.	No
Indian Olive *(Nestronia umbellula)*		T	Dry, open, upland forests of mixed hardwood and pine.	No
Monkey-face *(Platanthera integrilabia)*	SC	T	Found in red maple-blackgum swamps; along sandy, damp stream margins; or in seepy, rocky, thinly vegetated slopes.	No

TABLE 6.1: Protected Animal and Plant Species Occurring within Fulton and Surrounding Counties, Georgia

Species Name *(Scientific Name)*	**Federal Status***	**State Status****	**Preferred Habitat**	**Habitat Available in Project Area**
Michaux's Sumac *(Rhus michauxii)*	E	E	Found in rocky, open woods, especially in sandy soils with large concentrations of magnesium, also on ridges with a history of disturbance.	No
Cumberland Rose Gentian *(Sabatia capitata)*		R	Wet meadows and openings in oak-hickory-pine forests, persisting in maintained rights of way and along roadsides in thin soils over sandstone.	No
Bay Star-vine *(Schisandra glabra)*		T	Found twining over understory trees and shrubs in rich, forested bottomlands and adjacent slopes.	No
Dwarf Granite Stonecrop *(Sedum pusillum)*		T	Found growing on granite outcrops among mosses in partial shade, usually in leaf litter and mats of mosses under mature eastern red cedar trees.	No
Wood's False Hellebore *(Veratrum woodii)*		R	Moist hardwood-dominated woods, usually in small clumps on terraces along streams.	No
Piedmont Barren Strawberry *(Waldsteinia lobata)*		T	Found in rocky, acidic woods along streams with mountain laurel rarely in drier, upland oak-hickory-pine woods.	No

Listed by the U.S. Fish and Wildlife Service, Region 4, and the Georgia Department of Natural Resources.

Notes:

*Federal:
E = indicates Endangered
T = indicates Threatened
SC = indicates Species of Concern
PE = indicates Proposed Endangered
PT = indicates Proposed Threatened

**State:
E = indicates Endangered
T = indicates Threatened
U = indicates Unusual
R = indicates Rare

PREPARED/DATE: EFC 3/21/97
CHECKED/DATE: LMS 3/23/97

TABLE 6.2: SURFACE WATER DATA SUMMARY (2002, 2004, 2007, and 2010)

Chemical	Minimum Detected Concentration	Maximum Detected Concentration	Maximum Location and Date	Frequency of Detection (Total Only)	Screening Value (a)
Total/Dissolved Metals					
Arsenic	0.0025/0.0014	0.32/0.063	SW-2007-1 (8/10/2007)	26/31	0.19
Copper	0.0043/0.0012	0.78/0.097	SW2010-14/SW2010-11 (9/23/2010)	18/18	0.00654
Lead	0.0006/<0.0002	0.014/<0.003	SW2010-14 (9/23/2010)	15/31	0.00132
Zinc	0.016/0.012	15/2.7	SW2010-14/SW2010-11 (9/23/2010)	18/18	0.0589
Total Pesticides					
alpha-BHC	0.00001	0.00075	Main Point (5/26/2004)	26/31	0.5
beta-BHC	0.000048	0.0024	Main Point (5/26/2004)	29/31	5
delta-BHC	0.000091	0.00063	SW-2007-4 (8/10/2007)	24/31	NA
gamma-BHC (Lindane)	0.000028	0.00052	Main Point (5/26/2004)	24/31	0.00008
4,4'-DDD	0.000014	0.00002	SW-2007-3 (8/10/2007)	2/31	0.0000064
Dieldrin	0.0000097	0.00002	SW-2007-3 (8/10/2007)	10/31	0.0000019
Nitrate and Sulfate					
Nitrate as N	0.65	530	SW2010-15 (9/23/2010)	6/6	10,000 (b)
Sulfate	64	510	Main Point (5/26/2004)	8/8	NA

Notes:

Boxing indicates concentration either exceeds screening value or is carried through in risk calculations because there is no screening value.

Concentrations are milligrams per liter (mg/L).

(a) United States Environmental Protection Agency, Region 4 Ecological Risk Assessment Bulletins - Supplement to RAGS, Table 1, Freshwater Surface Water Screening Values for Hazardous Waste Sites.

(b) Reproductive NOAEL value for guinea pigs exposed to nitrates in drinking water as cited in: Sleight, S. D. and O. A. Atallah. 1968. *Reproduction in the guinea pig as affected by chronic administration of potassium nitrate and potassium nitrite.* Toxicol. Appl. Pharmacol. 12: 179-185

NA = Not Available
ND = Not Detected

PREPARED/DATE: L Smith 10/4/07
CHECKED/DATE: M Bystedt 10/11/07
REVISED/DATE: M Bystedt 11/16/10
CHECKED/DATE: N Ruberti 11/16/10

TABLE 6.3: SEDIMENT DATA SUMMARY

Chemical	Minimum Detected Concentration	Maximum Detected Concentration	Location and Date	Frequency of Detection	Screening Value (a)
<u>Metals</u>					
Arsenic	4.4	$\boxed{50.7}$	SED-101 (1/20/2000)	6/6	7.24
Lead	30.9	$\boxed{92}$	SED-104 (1/20/2000)	6/6	30.2
<u>Pesticides</u>					
alpha-BHC	0.011	$\boxed{0.054}$	SED-104 (1/20/2000)	3/6	NA
beta-BHC	0.0024	$\boxed{0.065}$	Main Point (5/26/2004	4/6	NA
delta-BHC	0.0076	$\boxed{0.029}$	SED-104 (1/20/2000)	3/6	NA
gamma-BHC (Lindane)	$\boxed{0.0067}$	$\boxed{0.03}$	SED-104 (1/20/2000)	3/6	0.0033
Chlordane	$\boxed{0.012}$	$\boxed{0.062}$	SED-104 (1/20/2000)	2/6	0.0017
4,4'-DDD	0.0025	$\boxed{0.89}$	SED-104 (1/20/2000)	5/6	0.0033
4,4'-DDE	0.0021	$\boxed{0.034}$	SED-104 (1/20/2000)	4/6	0.0033
4,4'-DDT	$\boxed{0.0041}$	$\boxed{0.34}$	SED-104 (1/20/2000)	4/6	0.0033
Dieldrin	0.0032	$\boxed{0.088}$	SED-104 (1/20/2000)	4/6	0.0033
Heptachlor	ND	$\boxed{0.0049}$	SED-104 (1/20/2000)	1/6	NA

<u>Notes:</u>
Boxing indicates concentration either exceeds screening value or is carried through in risk calculations because there is no screening value.
All concentrations are milligrams per kilogram (mg/kg).
(a) United States Environmental Protection Agency, Region 4 Ecological Risk Assessment Bulletins -
Supplement to RAGS, Table 3, Sediment Screening Values for Hazardous Waste Sites.
NA = Not Available
ND = Not Detected

PREPARED/DATE: <u>L Smith 10/4/07</u>

TABLE 6.4: SURFACE SOIL DATA SUMMARY

Chemical	Minimum Detected Concentration	Location and Depth (ft)	Maximum Detected Concentration	Location and Depth (ft)	Number of Detects	Screening Value (a)
Acenaphthene	0.13 J*	SS-17 (0-1)	0.75 J*	SS-07 (0-1)	0	20
Acenaphthylene	0.14 J*	SS-14 (0-1)	0.72 J*	SS-18 (0-1)	0	20 (b)
Aldrin	140	SS-21 (0-1)	140	SS-21 (0-1)	1	0.0025
Anthracene	2	SS-07 (0-1)	2	SS-07 (0-1)	1	0.1
Antimony	20	SS-07 (0-1)	37	SS-06 (0-1)	3	3.5
Arsenic	1.2	MW-107 (0-2)	1,547	MW-24 (0-1.5)	109	10
Barium	28	SS-22 (0-1)	2,000	SS-20 (0-1)	24	165
Benzo(a)anthracene	0.33	HA-111 (1-2)	32	SS-24 (0-1)	14	1.0 (c)
Benzo(a)pyrene	0.17	HA-105 (1-2)	3.6	SS-07 (0-1)	13	0.1
Benzo(b)fluoranthene	0.21	HA-105 (1-2)	2.9	MW-101 (0-2)	8	1.0 (c)
Benzo(b,k)fluoranthene	0.81	SS-06 (0-1)	12	SS-07 (0-1)	7	1.0 (c)
Benzo(g,h,i)perylene	0.048	HA-105 (1-2)	21	SS-07 (0-1)	6	1.0 (c)
Benzo(k)fluoranthene	0.069	HA-105 (1-2)	0.99	MW-101 (0-2)	5	1.0 (c)
Beryllium	1	SS-11 (0-1)	1.8	SS-08 (0-1)	4	1.1
BHC (alpha-, beta-, delta-)	0.006	MW-11 (0-0.05)	40.7	MW-23 (0-0.5)	33	0.001 (d)
alpha-BHC	0.011	HA-111 (1-2)	960	SS-24 (0-1)	19	0.0025
beta-BHC	0.0092	HA-102 (1-2)	930	SS-24 (0-1)	15	0.001
delta-BHC	0.003	MW-101 (0-2)	69	SS-24 (0-1)	9	NA
gamma-BHC (Lindane)	0.0051	HA-113 (1-2)	2.1	SB-8 (0-0.5)	46	0.00005
Chlordane	0.0042	SB-112 (0-2)	390	SS-21 (0-1)	50	NA
Chromium	5.9	SS-01 (0-1)	68	SS-23 (0-1)	24	0.4
Chrysene	0.45	SB-119 (0-2)	32	SS-24 (0-1)	15	1.0 (c)
Copper	20	SS-17 (0-1)	820	SS-06 (0-1)	37	40
Cyanides (soluble salts)	1.8	SS-16 (0-1)	1.8	SS-16 (0-1)	1	0.9
4,4'-TDE/DDD (includes DDD)	0.0039	SB-116 (0-2)	550	SS-24 (0-1)	32	0.0025 (e)
4,4'-DDE (includes DDE)	0.0029	HA-104 (1-2)	59	SS-2 (0-2)	76	0.0025 (e)
4,4'-DDT (includes DDT)	0.003	HA-105 (1-2)	9,100	SS-24 (0-1)	94	0.0025 (e)
Dieldrin	0.00398	BG-07 (0-2)	590	SS-24 (0-1)	27	0.0005
2,4-Dinitrotoluene	7.5	SS-14 (0-1)	7.5	SS-14 (0-1)	1	NA
Endosulfan I	0.005 J*	SS-22 (0-1)	0.005 J*	SS-22 (0-1)	0	NA
Endosulfan sulfate	1.3	SS-23 (0-1)	1.3	SS-23 (0-1)	1	NA
Endrin	38	SS-24 (0-1)	38	SS-24 (0-1)	1	0.001
Fluoranthene	0.8	SB-130 (0-2)	34	SS-05 (0-1)	18	0.1
Fluorene	0.14 J*	SS-17 (0-1)	0.57 J*	SS-07 (0-1)	0	1.0 (c)
Heptachlor	0.0015	BG-07 (0-2)	210	SS-21 (0-1)	40	NA
Heptachlor epoxide	0.016	SS-02 (0-1)	0.016	SS-02 (0-1)	1	NA
Indeno(1,2,3-cd)pyrene	1.2	SS-16 (0-1)	2	SS-07 (0-1)	2	1.0 (c)
Lead	2.3	MW-106 (0-2)	7,450	HA-106 (1-2)	90	50
Mercury	0.1	SS-01 (0-1)	0.325	SB-101 (0-2)	2	0.1
Methoxychlor	0.031	MW-11 (0-0.05)	0.067	HA-113 (1-2)	2	NA
Naphthalene	0.071 J*	SS-13 (0-1)	0.25 J*	SS-07 (0-1)/SS-16 (0-1	0	0.1
Nickel	36	SS-23 (0-1)	120	SS-07 (0-1)	6	30
Phenanthrene	0.42	SB-130 (0-2)	1.14	BG-07 (0-2)	5	0.1
Pyrene	0.087	HA-109 (1-2)	32	SS-05 (0-1)	21	0.1
Silver	6.1	SS-05 (0-1)	21	SS-06 (0-1)	6	2
Thallium	2.9	SS-05 (0-1)	8.8	SS-03 (0-1)	6	1
Toxaphene	0.071	SB-17 (0-1.5)	1,633	SS-7 (0-2)	36	NA
1,1,1-Trichloroethane	0.009	SS-17 (0-1)	0.009	SS-17 (0-1)	1	NA
Zinc	50.4	BG-05 (0-2)	3,200	SS-10 (0-1)	45	50

Notes:
Boxing indicates maximum concentration either exceeds screening value or is carried through in risk calculations because there is no screening value.
All concentrations are milligrams per kilogram (mg/kg).
* Indicates detected concentration is less than the detection limit.
J = detected concentration was less than the laboratory detection limit
(a) United States Environmental Protection Agency, Region 4 Ecological Risk Assessment Bulletins - Supplement to RAGS, Table 4, Soil Screening Values for Hazardous Waste Sites.
(b) Value for Acenaphthene.
(c) Value for total PAHs (polycyclic aromatic hydrocarbons).
(d) Value for beta-BHC (beta-HCH).
(e) Value for total DDD, DDE, and DDT.
NA = Not Available

PREPARED/DATE: R Quinn 12/5/
CHECKED/DATE: E Curtis 12/1
REVISED/DATE: N Ruberti 9/2
CHECKED/DATE: E Curtis 9/20/

TABLE 6.5: NORTHERN BOBWHITE TOXICITY REFERENCE VALUES

ANALYTE	STUDY DOSE (mg/kg-BW-day)	TEST SPECIES	EFFECT	UNCERTAINTY FACTOR (c)	NORTHERN BOBWHITE TRV (mg/kg-BW-day) (d)	REFERENCE
Aldrin	6.59	Northern Bobwhite	LD50	100	0.066	HSDB, 1993
Anthracene	2	Starling	Chronic NOAEL	1	2.00	Trust et al., 1994
Antimony	NA	--	--	--	--	--
Arsenic	2.5	Brown-headed Cowbird	Chronic NOAEL	1	2.50	USEPA, 1999b
Barium	208.26	Chick (1 day old)	Subchronic NOAEL	10	20.8	USEPA, 1999b
Benzo(a)anthracene	2	Starling	Chronic NOAEL	1	2.00	Trust et al., 1994
Benzo(a)pyrene	2	Starling	Chronic NOAEL	1	2.00	Trust et al., 1994
Benzo(b)fluoranthene	2	Starling	Chronic NOAEL	1	2.00	Trust et al., 1994
Benzo(b,k)fluoranthene	2	Starling	Chronic NOAEL	1	2.00	Trust et al., 1994
Benzo(g,h,i)perylene	2	Starling	Chronic NOAEL	1	2.00	Trust et al., 1994
Beryllium	NA	--	--	--	--	--
BHC(alpha-, beta-, delta-)	0.56	Japanese quail	Chronic NOAEL (a)	1	0.560	Sample et al., 1996
alpha-BHC	0.56	Japanese quail	Chronic NOAEL (a)	1	0.560	Sample et al., 1996
beta-BHC	0.56	Japanese quail	Chronic NOAEL (a)	1	0.560	Sample et al., 1996
delta-BHC	0.56	Japanese quail	Chronic NOAEL (a)	1	0.560	Sample et al., 1996
gamma-BHC	0.56	Japanese quail	Chronic NOAEL (a)	1	0.560	Sample et al., 1996
Chlordane	2.1	Red-winged Blackbird	Chronic NOAEL	1	2.10	Sample et al., 1996
Chromium	1	Black Duck	Chronic NOAEL	1	1.00	USEPA, 1999b
Chrysene	2	Starling	Chronic NOAEL	1	2.00	Trust et al., 1994
Copper	47	Chicks (1-day old)	Chronic NOAEL	1	47.0	USEPA, 1999b
Cyanides (soluble salts)	4	American kestrel	Acute LD50	100	0.0400	USEPA, 1999b
DDD	84500	Coturnix quail	Acute LOAEL (b)	50	1690	USEPA, 1999b
DDE	84500	Coturnix quail	Acute LOAEL	50	1690	USEPA, 1999b
DDT	84500	Coturnix quail	Acute LOAEL (b)	50	1690	USEPA, 1999b
Dieldrin	0.077	Barn owl	Chronic NOAEL	1	0.0770	Sample et al., 1996
2,4-Dinitrotoluene	NA	--	--	--	--	--
Endosulfan I	10	Gray partridge	Chronic NOAEL	1	10.0	Sample et al., 1996
Endosulfan sulfate	10	Gray partridge	Chronic NOAEL	1	10.0	Sample et al., 1996
Endrin	0.30	Mallard duck	Chronic NOAEL	1	0.300	Sample et al., 1996
Fluoranthene	2	Starling	Chronic NOAEL	1	2.00	Trust et al., 1994
Heptachlor	6500	Quail	Acute LOAEL	50	130	USEPA, 1999b
Heptachlor epoxide	6500	Quail	Acute LOAEL	50	130	USEPA, 1999b
Indeno(1,2,3-cd)pyrene	2	Starling	Chronic NOAEL	1	2.00	Trust et al., 1994
Lead	1.13	Japanese quail	Chronic NOAEL	1	1.13	Sample et al., 1996
Mercury	325	Coturnix quail	Acute LOAEL	50	6.50	USEPA, 1999b
Methoxychlor	NA	--	--	--	--	--
Naphthalene	2	Starling	Chronic NOAEL	1	2.00	Trust et al., 1994
Nickel	650	Coturnix quail	Subchronic NOAEL	10	65.0	USEPA, 1999b
Phenanthrene	2	Starling	Chronic NOAEL	1	2.00	Trust et al., 1994
Pyrene	2	Starling	Chronic NOAEL	1	2.00	Trust et al., 1994
Silver	1780	Mallard duck	Subchronic NOAEL	10	178	USEPA, 1999b
Thallium	35	Starling	Acute LD50	100	0.350	USEPA, 1999b
Toxaphene	NA	--	--	--	--	--
1,1,1-Trichloroethane	NA	--	--	--	--	--
Zinc	130.9	Chicken	Chronic NOAEL	1	131	USEPA, 1999b
Sulfate	NA	--	--	--	--	--

Notes:
(a) BHC mixed isomers used as a surrogate
(b) DDE used as a surrogate
(c) Uncertainty Factors (UF) accounting for differences in response due to exposure duration and endpoint obtained from the *Standard Practice for Wildlife Toxicity Reference Values Technical Guidance Document No. 254* (October 2000) published by the U.S. Army Center for Health Promotion and Preventative Medicine (CHPPM).
(d) Study Dose/UF
NA - Not applicable

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TABLE 6.6: SHORT-TAILED SHREW TOXICITY REFERENCE VALUES

ANALYTE	STUDY DOSE (mg/kg-BW-day)	TEST SPECIES	EFFECT	UNCERTAINTY FACTOR (j)	NOAEL (k)	BODY WEIGHT OF TEST SPECIES (kg)	SHORT-TAILED SHREW TRV (mg/kg-BW-day)	REFERENCE
Aldrin	0.2	Rat	Chronic NOAEL	1	0.2	0.35	0.440	Sample et al., 1996
Anthracene	3300	Rodent	Chronic LOAEL	10	330	0.165	601	Eisler, 1987b
Antimony	0.66	Rat	Chronic LOAEL	10	0.066	0.3	0.140	USEPA, 1999b
Arsenic	1.25	Dog	Chronic NOAEL	1	1.3	12.7	6.74	USEPA, 1999b
Barium	5.1	Rat	Chronic NOAEL	1	5.1	0.435	11.8	Sample et al., 1996
Benzo(a)anthracene	16666	Mouse	Acute LOAEL	50	333	0.03	396	USEPA, 1999b
Benzo(a)pyrene	10000	Mouse	Acute LOAEL	50	200	0.03	238	USEPA, 1999b
Benzo(b)fluoranthene	10000	Mouse	Acute LOAEL (b)	50	200	0.03	238	USEPA, 1999b
Benzo(b,k)fluoranthene	10000	Mouse	Acute LOAEL (b)	50	200	0.03	238	USEPA, 1999b
Benzo(g,h,i)perylene	10000	Mouse	Acute LOAEL (b)	50	200	0.03	238	USEPA, 1999b
Beryllium	0.66	Rat	Chronic NOAEL	1	0.66	0.35	1.45	USEPA, 1999b
BHC(alpha-, beta-, delta-)	4	Rat	Subhronic NOAEL (c)	10	0.4	0.35	0.879	Sample et al., 1996
alpha-BHC	4	Rat	Subhronic NOAEL (c)	10	0.4	0.35	0.879	Sample et al., 1996
beta-BHC	4	Rat	Subhronic NOAEL (c)	10	0.4	0.35	0.879	Sample et al., 1996
delta-BHC	4	Rat	Subhronic NOAEL (c)	10	0.4	0.35	0.879	Sample et al., 1996
gamma-BHC	4	Rat	Subhronic NOAEL (c)	10	0.4	0.35	0.879	Sample et al., 1996
Chlordane	4.6	Mouse	Chronic NOAEL	1	4.6	0.03	5.47	Sample et al., 1996
Chromium	3.5	Rat	Chronic NOAEL	1	3.5	0.3	7.40	USEPA, 1999b
Chrysene	99	Rodent	Chronic LOAEL	10	9.9	0.165	18.0	Eisler, 1987b
Copper	12	Mink	Chronic NOAEL	1	12	1.613	38.6	USEPA, 1999b
Cyanides (soluble salts)	24	Rat	Chronic NOAEL	1	24	0.3	50.8	USEPA, 1999b
DDD	10000	Rat	Subchronic NOAEL (d)	10	1000	0.3	2115	USEPA, 1999b
DDE	10000	Rat	Subchronic NOAEL	10	1000	0.3	2115	USEPA, 1999b
DDT	10000	Rat	Subchronic NOAEL (d)	10	1000	0.3	2115	USEPA, 1999b
Dieldrin	0.2	Rat	Chronic LOAEL	10	0.02	0.35	0.044	Sample et al., 1996
2,4-Dinitrotoluene	700	Dog	Chronic NOAEL	1	700	12.7	3776	USEPA, 1999b
Endosulfan I	1.5	Rat	Subchronic NOAEL	10	0.15	0.35	0.330	Sample et al., 1996
Endosulfan sulfate	1.5	Rat	Subchronic NOAEL	10	0.15	0.35	0.330	Sample et al., 1996
Endrin	0.92	Mouse	Chronic LOAEL	10	0.092	0.03	0.109	Sample et al., 1996
Fluoranthene	2000	Rodent	Acute LD50	100	20	0.165	36.4	Eisler, 1987b
Heptachlor	1	Mink	Chronic LOAEL	10	0.1	1	0.286	Sample et al., 1996
Heptachlor epoxide	1	Mink	Chronic LOAEL	10	0.1	1	0.286	Sample et al., 1996
Indeno(1,2,3-cd)pyrene	10000	Mouse	Acute LOAEL (b)	50	200	0.03	238	USEPA, 1999b
Lead	8	Rat	Chronic NOAEL	1	8	0.35	17.6	Sample et al., 1996
Mercury	1.01	Mink	Chronic NOAEL	1	1.0	1	2.89	USEPA, 1999b
Methoxychlor	4	Rat	Chronic NOAEL	1	4.0	0.35	8.79	Sample et al., 1996
Naphthalene	50.3	Mouse	Chronic LOAEL	10	5.0	0.03	5.98	ATSDR, 2005
Nickel	50	Rat	Chronic NOAEL	1	50	0.3	106	USEPA, 1999b

TABLE 6.6: SHORT-TAILED SHREW TOXICITY REFERENCE VALUES

ANALYTE	STUDY DOSE (mg/kg-BW-day)	TEST SPECIES	EFFECT	UNCERTAINTY FACTOR (j)	NOAEL (k)	BODY WEIGHT OF TEST SPECIES (kg)	SHORT-TAILED SHREW TRV (mg/kg-BW-day)	REFERENCE
Phenanthrene	700	Rodent	Acute LD50	100	7.0	0.165	12.7	Eisler, 1987b
Pyrene	75	Mouse	Subchronic NOAEL	10	7.5	0.03	8.92	USEPA, 1989
Silver	3.75	Mouse	Chronic LOAEL	10	0.38	0.03	0.446	USEPA, 1999b
Thallium	1.31	Rat	Subchronic LOAEL	20	0.066	0.3	0.139	USEPA, 1999b
Toxaphene	8	Rat	Chronic NOAEL	1	8.0	0.35	17.6	Sample et al., 1996
1,1,1-Trichloroethane	1000	Mouse	Chronic NOAEL	1	1000	0.035	1236	Sample et al., 1996
Zinc	104	Mouse	Subchronic NOAEL	10	10.4	0.03	12.4	USEPA, 1999b
Sulfate	NA	--	--	--	--	--	--	--

Notes:
(a) Pyrene used as a surrogate
(b) Benzo(a)pyrene used as a surrogate
(c) BHC mixed isomers used as a surrogate
(d) DDE used as a surrogate
(e) Fluoranthene used as a surrogate
(f) Benzene used as a surrogate
(g) 1,2-Dichloroethane used as a surrogate
(h) 1,1-Dichloroethene used as a surrogate
(i) 1,1,2,2-Tetrachloroethene used as a surrogate
(j) Uncertainty Factors (UF) accounting for differences in response due to exposure duration and endpoint obtained from the *Standard Practice for Wildlife Toxicity Reference Values Technical Guidance Document No. 254* (October 2000) published by the U.S. Army Center for Health Promotion and Preventative Medicine (CHPPM).
(k) Test Dose/UF
NA - Not applicable

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TABLE 6.7: RACCOON TOXICITY REFERENCE VALUES

ANALYTE	STUDY DOSE (mg/kg-BW-day)	TEST SPECIES	EFFECT	UNCERTAINTY FACTOR (j)	NOAEL	BODY WEIGHT OF TEST SPECIES (kg)	RACCOON TRV (mg/kg-BW-day)	REFERENCE
Aldrin	0.2	Rat	Chronic NOAEL	1	0.2	0.35	0.109	Sample et al., 1996
Anthracene	3300	Rodent	Chronic LOAEL	10	330	0.165	149	Eisler, 1987b
Antimony	0.66	Rat	Chronic LOAEL	10	0.066	0.3	0.0346	USEPA, 1999b
Arsenic	1.25	Dog	Chronic NOAEL	1	1.3	12.7	1.67	USEPA, 1999b
Barium	5.1	Rat	Chronic NOAEL	1	5.1	0.435	2.93	Sample et al., 1996
Benzo(a)anthracene	16666	Mouse	Acute LOAEL	50	333	0.03	98.2	USEPA, 1999b
Benzo(a)pyrene	10000	Mouse	Acute LOAEL	50	200	0.03	58.9	USEPA, 1999b
Benzo(b)fluoranthene	10000	Mouse	Acute LOAEL (b)	50	200	0.03	58.9	USEPA, 1999b
Benzo(b,k)fluoranthene	10000	Mouse	Acute LOAEL (b)	50	200	0.03	58.9	USEPA, 1999b
Benzo(g,h,i)perylene	10000	Mouse	Acute LOAEL (b)	50	200	0.03	58.9	USEPA, 1999b
Beryllium	0.66	Rat	Chronic NOAEL	1	0.66	0.35	0.359	USEPA, 1999b
BHC(alpha-, beta-, delta-)	4	Rat	Subchronic NOAEL (c)	10	0.4	0.35	0.218	Sample et al., 1996
alpha-BHC	4	Rat	Subchronic NOAEL (c)	10	0.4	0.35	0.218	Sample et al., 1996
beta-BHC	4	Rat	Subchronic NOAEL (c)	10	0.4	0.35	0.218	Sample et al., 1996
delta-BHC	4	Rat	Subchronic NOAEL (c)	10	0.4	0.35	0.218	Sample et al., 1996
gamma-BHC	4	Rat	Subchronic NOAEL (c)	10	0.4	0.35	0.218	Sample et al., 1996
Chlordane	4.6	Mouse	Chronic NOAEL	1	4.6	0.03	1.35	Sample et al., 1996
Chromium	3.5	Rat	Chronic NOAEL	1	3.5	0.3	1.83	USEPA, 1999b
Chrysene	99	Rodent	Chronic LOAEL	10	9.9	0.165	4.46	Eisler, 1987b
Copper	12	Mink	Chronic NOAEL	1	12	1.613	9.57	USEPA, 1999b
Cyanides (soluble salts)	24	Rat	Chronic NOAEL	1	24	0.3	12.6	USEPA, 1999b
DDD	10000	Rat	Subchronic NOAEL (d)	10	1000	0.3	524	USEPA, 1999b
DDE	10000	Rat	Subchronic NOAEL	10	1000	0.3	524	USEPA, 1999b
DDT	10000	Rat	Subchronic NOAEL (d)	10	1000	0.3	524	USEPA, 1999b
Dieldrin	0.2	Rat	Chronic LOAEL	10	0.020	0.35	0.0109	Sample et al., 1996
2,4-Dinitrotoluene	700	Dog	Chronic NOAEL	1	700	12.7	935	USEPA, 1999b
Endosulfan I	1.5	Rat	Subchronic NOAEL	10	0.15	0.35	0.0816	Sample et al., 1996
Endosulfan sulfate	1.5	Rat	Subchronic NOAEL	10	0.15	0.35	0.0816	Sample et al., 1996
Endrin	0.92	Mouse	Chronic LOAEL	10	0.092	0.03	0.0271	Sample et al., 1996
Fluoranthene	2000	Rodent	Acute LD50	100	20	0.165	9.02	Eisler, 1987b
Heptachlor	1	Mink	Chronic LOAEL	10	0.1	1	0.0708	Sample et al., 1996
Heptachlor epoxide	1	Mink	Chronic LOAEL	10	0.1	1	0.0708	Sample et al., 1996
Indeno(1,2,3-cd)pyrene	10000	Mouse	Acute LOAEL (b)	50	200	0.03	58.9	USEPA, 1999b
Lead	8	Rat	Chronic NOAEL	1	8.0	0.35	4.35	Sample et al., 1996
Mercury	1.01	Mink	Chronic NOAEL	1	1.0	1	0.715	USEPA, 1999b
Methoxychlor	4	Rat	Chronic NOAEL	1	4.0	0.35	2.18	Sample et al., 1996
Naphthalene	50.3	Mouse	Chronic LOAEL	10	5.0	0.03	1.48	ATSDR, 2005
Nickel	50	Rat	Chronic NOAEL	1	50	0.3	26.2	USEPA, 1999b
Phenanthrene	700	Rodent	Acute LD50	100	7.0	0.165	3.16	Eisler, 1987b
Pyrene	75	Mouse	Subchronic NOAEL	10	7.5	0.03	2.21	NIOSH, 1985
Silver	3.75	Mouse	Chronic LOAEL	10	0.38	0.03	0.110	USEPA, 1999b
Thallium	1.31	Rat	Subchronic LOAEL	20	0.066	0.3	0.0343	USEPA, 1999b
Toxaphene	8	Rat	Chronic NOAEL	1	8.0	0.35	4.35	Sample et al., 1996
1,1,1-Trichloroethane	1000	Mouse	Chronic NOAEL	1	1000	0.035	306	Sample et al., 1996
Zinc	104	Mouse	Subchronic NOAEL	10	10.4	0.03	3.06	USEPA, 1999b
Sulfate	NA	--	--	--	--	--	--	--

Notes:
(a) Pyrene used as a surrogate
(b) Benzo(a)pyrene used as a surrogate
(c) BHC mixed isomers used as a surrogate
(d) DDE used as a surrogate
(e) Fluoranthene used as a surrogate
(f) Benzene used as a surrogate
(g) 1,2-Dichloroethane used as a surrogate
(h) 1,1-Dichloroethene used as a surrogate
(i) 1,1,2,2-Tetrachloroethene used as a surrogate
(j) Uncertainty Factors (UF) accounting for differences in response due to exposure duration and endpoint obtained from the *Standard Practice for Wildlife Toxicity*
Reference Values Technical Guidance Document No. 254 (October 2000) published by the U.S. Army Center for Health Promotion and Preventative Medicine (CHPPM).
(k) Test Dose/UF
NA - Not applicable

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TABLE 6.8: NORTHERN BOBWHITE EXPOSURE PARAMETERS

EXPOSURE PARAMETER (a)	DESCRIPTION (a)		VALUES SELECTED FOR EXPOSURE/RISK CALCULATIONS (a)
Northern Bobwhite	Order: *Galliformes* Genus: *Colinus*	Family: *Phasiadinae* Species*:* *virginianus*	
Body Weight (BW)(kg)	Average adult weight is 0.16 kg, but ranges from 0.154 to 0.161 kg (Texas).		0.16 kg
Dietary Makeup	Northern bobwhites feed primarily on vegetation found in idle farms, woods, and brush. Some insects may also be consumed depending on availability.		Vegetation – 84% Invertebrates – 14% Soil – 2%
Ingestion Rate for Food (IR_F) (kg/day)	Food ingestion rate based on a mixed study of males and consisting of an earthworm diet (Texas). The mean food ingestion rate (0.78 g food/g BW/day) and average adult BW of 0.16 kg were used to estimate the Food Ingestion Rate. (0.78 g food/g BW/day x 160 g BW = 120 g/day)		0.12 kg/day
Ingestion Rate for Water (IR_W) (L/day)	Water ingestion rate is calculated using the average adult BW of 0.16 kg and an estimated mean ingestion rate of 0.12 g water/g BW/day). (0.12 g water/g BW/day x 160 g BW x 1.0 E-03 L/g = 0.019 L/day)		0.019 L/day
Home Range	The average home range for male and female, adults and juveniles is 6.8 acres (Tennessee).		6.8 acres
Site Foraging Frequency (SFF) (unitless)	The SFF is the ratio of the site area to home range, not to exceed a maximum value of 1.0.		SFF = 1 (Maximum exposure scenario)
Exposure Frequency (unitless) (EF)	The northern bobwhite is a year-round resident.		1

TABLE 6.8: NORTHERN BOBWHITE EXPOSURE PARAMETERS

(a) Wildlife Exposure Factors Handbook (USEPA, 1993)

$$\text{Estimated ingestion (mg/kg-day)} = \frac{SFF \times IR_F \times EF \times [(C_{SOIL} \times BCF_{INV} \times P_{INV}) + (C_{SOIL} \times BCF_V \times P_V) + (C_{SOIL} \times P_{SOIL})]}{BW} + \frac{(C_W \times IR_W \times EF)}{BW}$$

Where:
P_{INV} = Proportion of the diet comprised of invertebrates (unitless)
P_{SOIL} = Proportion of the diet comprised of soil (unitless)
P_V = Proportion of the diet comprised of vegetation (unitless)
C_W = Chemical concentration in water (mg/L)
C_{SOIL} = Chemical concentration in soil (mg/kg)
IR_F = Ingestion rate of food (kg/day)
IR_W = Ingestion rate of water (L/day)
SFF = Site foraging frequency (unitless)
EF = Exposure frequency (unitless)
BW = Body weight (kg)
BCF_{INV} = Bioconcentration factor for invertebrates (unitless)
BCF_V = Bioconcentration factor for vegetation (unitless)

kg = kilograms
% = percent
kg/day = kilograms per day
L/day = liters per day
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
mg/kg-day = milligrams per kilograms per day

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TABLE 6.9: SHORT-TAILED SHREW EXPOSURE PARAMETERS

EXPOSURE PARAMETER (a)	DESCRIPTION (a)		VALUES SELECTED FOR EXPOSURE/RISK CALCULATIONS (a)
Short-Tailed Shrew	Order: *Insectivora* Genus: *Blarina*	Family: *Soricidae* Species: *blevicauda*	
Body Weight (BW)(kg)	The average body weight for males and females in a summer study (New Hampshire).		0.015 kg
Dietary Makeup	The short-tailed shrew is primarily carnivorous. Diet consists primarily of invertebrates. Small mammals are consumed when invertebrates become less available (New York).		Invertebrates – 70% Vegetation – 13% Small mammals – 8% Soil – 9%
Ingestion Rate for Food (IR_F) (kg/day)	Food ingestion rate of the short-tailed shrew (Ohio/lab).		0.008 kg/day
Ingestion Rate for Water (IR_W) (L/day)	Water ingestion rate of the short-tailed shrew (Illinois/lab) using an average adult BW of 18 grams and an average water ingestion rate of 0.223 g water/g BW/day. (0.223 g water/g BW/day x 18 g BW x 1.04E-03 L/day)		0.0035 L/day
Home Range	The average female home range in a Manitoba tamarack bog or in Michigan bluegrass is approximately 1 acre. The maximum male home range in Michigan bluegrass is approximately 4.5 acres.		1 acre (43,560 ft^2)
Site Foraging Frequency (SFF) (unitless)	The SFF is the ratio of the site area to home range, not to exceed a maximum value of 1.0. As a conservative assumption, the river segment evaluated is considered representative of the shrew's entire home range.		1 (Maximum exposure scenario)
Exposure Frequency (unitless) (EF)	Shrews are active all year round and do not hibernate.		1

TABLE 6.9: SHORT-TAILED SHREW EXPOSURE PARAMETERS

(a) Wildlife Exposure Factors Handbook (USEPA, 1993)

$$\text{Estimated ingestion (mg/kg-day)} = \frac{SFF \times IR_F \times EF \times [(C_{SOIL} \times BCF_{INV} \times P_{INV}) + (C_{SOIL} \times BCF_V \times P_V) + (C_{SOIL} \times BCF_M \times P_M) + (C_{SOIL} \times P_{SOIL})]}{BW} + \frac{(C_W \times IR_W \times EF)}{BW}$$

Where:

P_{INV} = Proportion of the diet comprised of invertebrates (unitless)
P_{SOIL} = Proportion of the diet comprised of soil (unitless)
P_V = Proportion of the diet comprised of vegetation (unitless)
P_M = Proportion of the diet comprised of mammals (unitless)
C_{SOIL} = Chemical concentration in soil (mg/kg)
C_W = Chemical concentration in water (mg/L)
IR_F = Ingestion rate of food (kg/day)
IR_W = Ingestion rate of water (L/day)
SFF = Site foraging frequency (unitless)
EF = Exposure frequency (unitless)
BW = Body weight (kg)
BCF_{INV} = Bioconcentration factor for invertebrates (unitless)
BCF_V = Bioconcentration factor for vegetation (unitless)
BCF_M = Bioconcentration factor for mammals (unitless)

mg/L = milligrams per liter
kg = kilograms
% = percent
kg/day = kilograms per day
L/day = liters per day
mg/kg = milligrams per kilogram
ft^2 = square feet
g water/g BW/day = gram water per gram body weight per day
mg/kg-day = milligrams per kilogram per day

Prepared By: MKB 12/2/05
Checked By: EFC 12/2/05

TABLE 6.10: RACCOON EXPOSURE PARAMETERS

EXPOSURE PARAMETER (a)	DESCRIPTION (a)	VALUES SELECTED FOR EXPOSURE/RISK CALCULATIONS (a)
Raccoon	Order: *Carnivora* Family: *Procyonidae* Genus: *Procyon* Species*:* *lotor*	
Body Weight (BW)(kg)	Adult males are typically larger than adult females. The average body weight for adults is 3.99 kg, but ranges up to 8.8 kg (Alabama).	3.99 kg
Dietary Makeup	Raccoons are omnivorous and opportunistic feeders. The proportion of different foods in their diet depends on the location and season (annual average for Tennessee were used). Averaging and totaling each dietary item in the WEFH totals to 98%. The remaining 2% of dietary intake was added to vegetation. For the purposes of the risk calculation and due to the lack of crayfish and amphibians at the site, the proportion for the diet for crayfish, amphibians, and insects are assumed to be soil invertebrates.	Soil Invertebrates – 46% Birds – 3% Vegetation –47% Soil – 4%
Ingestion Rate for Food (IR_F) (kg/day)	The average BW of 3.99 kg was used to estimate the Ingestion Rate for Food using: IR_F(kg/day) = 0.0687 x $BW^{0.822}$ (kg).	0.21 kg/day
Ingestion Rate for Water (IR_W) (L/day)	The Ingestion Rate for Water was estimated using the average BW of 3.99 kg and a mean water ingestion rate of 0.0825 g/g-day. (0.0825 g water/g BW/day x 3,990 g BW x 1.0E-03 L/g = 0.33 L/day)	0.33 L/day
Home Range	Average for males and females, May to December from riparian habitat (Michigan).	386 acres
Site Foraging Frequency (SFF) (unitless)	The SFF is the ratio of the site area to home range, not to exceed a maximum value of 1.0. As a conservative assumption, the site evaluated is considered representative of the raccoon’s home range.	SFF=1 (Maximum exposure scenario)
Exposure Frequency (EF) (unitless)	Raccoons are active all year round and do not hibernate.	1

TABLE 6.10: RACCOON EXPOSURE PARAMETERS

(a) Wildlife Exposure Factors Handbook (USEPA, 1993)

Estimated ingestion (mg/kg-day) = $\frac{SFF \text{ x } IR_F \text{ x } EF \text{ x}[(C_{SED} \text{ x } P_{SED}) + (C_{SOIL} \text{ x } P_{SOIL}) + (C_{SOIL} \text{ x } BCF_{SI} \text{ x } P_{SI}) + (C_{SOIL} \text{ x } BCF_V \text{ x } P_V) + (C_{SOIL} \text{ x } BCF_B \text{ x } P_B)]}{BW} + \frac{(C_W \text{ x } IR_W \text{ x } EF)}{BW}$

Where:

P_{SED} = Proportion of the diet comprised of sediment (unitless)
P_{SOIL} = Proportion of the diet comprised of surface soil (unitless)
P_{SI} = Proportion of the diet comprised of soil invertebrates (unitless)
P_V = Proportion of the diet comprised of vegetation (unitless)
P_B = Proportion of the diet comprised of birds (unitless)
C_{SED} = Chemical concentration in sediment (mg/kg)
C_{SI} = Chemical concentration in soil invertebrates (mg/kg)
C_{SOIL} = Chemical concentration in surface soil (mg/kg)
C_W = Chemical concentration in water (mg/L)
IR_F = Ingestion rate of food (kg/day)
IR_W = Ingestion rate of water (L/day)
SFF = Site foraging frequency (unitless)
EF = Exposure frequency (unitless)
BW = Body weight (kg)
BCF_{SI} = Bioconcentration factor for soil invertebrates (unitless)
BCF_B = Bioconcentration factor for birds (unitless)
BCF_V = Bioconcentration factor for vegetation (unitless)

kg = kilograms
% = percent
kg/day = kilograms per day
L/day = liters per day
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
WEFH = Wildlife Exposure Factors Handbook
mg/kg –day = milligrams per kilogram per day

PREPARED/DATE: MKB 4/4/05
CHECKED/DATE: EFC 4/28/05

TABLE 6.11: CALCULATED BIOCONCENTRATION FACTORS

Analyte	**Kow**		**BCFv**
Acenaphthene	8.30E+03		2.10E-01
Acenapthylene	1.20E+04	(a)	1.70E-01
Aldrin	3.20E+06		6.73E-03
Anthracene	2.80E+04	(a)	1.04E-01
Benzo(g,h,i)perylene	1.30E+07		2.99E-03
BHC(alpha-, beta-, delta-)	6.50E+03	(a)	2.42E-01
alpha-BHC	6.30E+03		2.47E-01
beta-BHC	6.50E+03		2.42E-01
delta-BHC	1.40E+04	(a)	1.55E-01
gamma-BHC	5.40E+03		2.70E-01
Chlordane	1.00E+06	(a)	1.32E-02
DDD	5.80E+06		4.77E-03
DDT	3.40E+06		6.50E-03
Dieldrin	3.50E+04	(a)	9.15E-02
Endosulfan I	1.30E+04		1.62E-01
Endosulfan sulfate	1.30E+04		1.62E-01
Endrin	1.10E+05		4.72E-02
Heptachlor epoxide	1.00E+05		4.99E-02
Fluoranthene	1.70E+05	(a)	3.67E-02
Fluorene	1.60E+04		1.44E-01
Methoxychlor	1.20E+05		4.49E-02
Naphthalene	2.30E+03		4.41E-01
Phenanthrene	2.30E+04	(a)	1.17E-01
Pyrene	1.30E+05		4.29E-02
Toxaphene	2.00E+03	(a)	4.79E-01
1,1,1-Trichloroethane	3.00E+02		1.43E+00
Trichloroethene	4.00E+02	(a)	1.21E+00

Note:

Kow values are from Technical Support Document of the Hazardous Waste Identification Rule:
Risk Assessment for Human and Ecological Receptors (August 1995).

(a) Kow values are from Groundwater Chemicals Desk Reference (Montgomery and Welkom, 1989).

BCF$_V$ = Bioconcentration factor for vegetation

PREPARED/DATE: MKB 10/9/07
CHECKED/DATE: EFC 10/9/07

TABLE 6.12: RISK CALCULATION FOR THE NORTHERN BOBWHITE

Analyte	**Surface Soil Exposure Point Concentration (mg/kg)**	**Surface Water Exposure Point Concentration (mg/L)**	**Exposure Value Type**	**BCF$_V$**		**BCF$_{INV}$**		**Intake (mg/kg-day)**	**NOAEL TRVs (mg/kg-day)**	**Hazard Quotient**
Aldrin	1.40E+02		max	6.73E-03		1.40E+00	(c)	2.3E+01	6.6E-02	353
Anthracene	2.00E+00		max	1.04E-01		4.00E-02	(a)	1.7E-01	2.0E+00	0.085
Antimony	3.70E+01		max	2.00E-01		2.20E-01		6.1E+00	--	NA
Arsenic	1.55E+03	3.20E-01	max	3.60E-02		1.10E-01		7.6E+01	2.5E+00	31
Barium	2.00E+03		max	1.50E-01		2.20E-01		2.7E+02	2.1E+01	13
Benzo(a)anthracene	3.20E+01		max	2.02E-02		3.00E-02		9.9E-01	2.0E+00	0.49
Benzo(a)pyrene	3.60E+00		max	1.11E-02		7.00E-02		1.1E-01	2.0E+00	0.053
Benzo(b)fluoranthene	2.90E+00		max	1.01E-02		7.00E-02		8.3E-02	2.0E+00	0.042
Benzo(b,k)fluoranthene	1.20E+01		max	1.01E-02		7.00E-02		3.4E-01	2.0E+00	0.17
Benzo(g,h,i)perylene	2.10E+01		max	2.99E-03		7.00E-02	(b)	5.1E-01	2.0E+00	0.25
Beryllium	1.80E+00		max	1.00E-02		2.20E-01		8.0E-02	--	NA
BHC(alpha-, beta-, delta-)	4.07E+01		max	2.42E-01		1.40E+00	(c)	1.3E+01	5.6E-01	23
alpha-BHC	9.60E+02	7.50E-04	max	2.47E-01		1.40E+00	(c)	3.0E+02	5.6E-01	544
beta-BHC	9.30E+02	2.40E-03	max	2.42E-01		1.40E+00	(c)	2.9E+02	5.6E-01	522
delta-BHC	6.90E+01	6.30E-04	max	1.55E-01		1.40E+00	(c)	1.8E+01	5.6E-01	32
gamma-BHC	2.10E+00	5.20E-04	max	2.70E-01		1.40E+00	(c)	7.0E-01	5.6E-01	1.2
Chlordane	3.90E+02		max	1.32E-02		1.40E+00	(c)	6.6E+01	2.1E+00	32
Chromium	6.80E+01		max	7.50E-03		1.00E-02		1.4E+00	1.0E+00	1.4
Chrysene	3.20E+01		max	1.87E-02		4.00E-02		9.9E-01	2.0E+00	0.50
Copper	8.20E+02	7.80E-01	max	4.00E-01		4.00E-02		2.2E+02	4.7E+01	4.7
Cyanides (soluble salts)	1.80E+00		max	3.64E-01	(e)	1.12E+00		6.5E-01	4.0E-02	16
DDD	5.50E+02	2.00E-05	max	4.77E-03		1.26E+00	(d)	8.3E+01	1.7E+03	0.049
DDE	5.90E+01		max	9.37E-03		1.26E+00		9.0E+00	1.7E+03	0.0053
DDT	9.10E+03		max	6.50E-03		1.26E+00	(d)	1.4E+03	1.7E+03	0.8
Dieldrin	5.90E+02	2.00E-05	max	9.15E-02		1.40E+00	(c)	1.3E+02	7.7E-02	1683
2,4-Dinitrotoluene	7.50E+00		max	2.72E+00		3.08E+00		1.5E+01	--	NA
Endosulfan I	5.00E-03		max	1.62E-01		1.40E+00	(c)	1.3E-03	1.0E+01	0.00013
Endosulfan sulfate	1.30E+00		max	1.62E-01		1.40E+00	(c)	3.4E-01	1.0E+01	0.034
Endrin	3.80E+01		max	4.72E-02		1.40E+00	(c)	7.3E+00	3.0E-01	24
Fluoranthene	3.40E+01		max	3.67E-02		4.00E-02	(a)	1.4E+00	2.0E+00	0.72
Heptachlor	2.10E+02		max	4.89E-02		1.40E+00		4.0E+01	1.3E+02	0.31
Heptachlor epoxide	1.60E-02		max	4.89E-02		1.40E+00	(c)	3.1E-03	1.3E+02	0.000024
Indeno(1,2,3-cd)pyrene	2.00E+00		max	3.90E-03		8.00E-02		5.2E-02	2.0E+00	0.026
Lead	7.45E+03	1.40E-02	max/DL	4.50E-02		3.00E-02		3.5E+02	1.1E+00	307
Mercury	3.25E-01		max	3.75E-02		4.00E-02		1.4E-02	6.5E+00	0.0021
Methoxychlor	6.70E-02		max	4.49E-02		1.03E+03		7.2E+00	--	NA
Naphthalene	2.50E-01		max	4.41E-01		4.05E+01		1.1E+00	2.0E+00	0.57

TABLE 6.12: RISK CALCULATION FOR THE NORTHERN BOBWHITE

Analyte	Surface Soil Exposure Point Concentration (mg/kg)	Surface Water Exposure Point Concentration (mg/L)	Exposure Value Type	BCF_V	BCF_{INV}		Intake (mg/kg-day)	NOAEL TRVs (mg/kg-day)	Hazard Quotient
Nickel	1.20E+02		max	3.20E-02	2.00E-02		4.5E+00	6.5E+01	0.069
Phenanthrene	1.14E+00		max	1.17E-01	4.00E-02	(a)	1.1E-01	2.0E+00	0.053
Pyrene	3.20E+01		max	4.29E-02	4.00E-02	(a)	1.5E+00	2.0E+00	0.74
Silver	2.10E+01		max	4.00E-01	2.20E-01		6.1E+00	1.8E+02	0.034
Thallium	8.80E+00		max	4.00E-03	2.20E-01		3.6E-01	3.5E-01	1.0
Toxaphene	1.63E+03		max	4.79E-01	1.40E+00	(c)	7.6E+02	--	NA
1,1,1-Trichloroethane	9.00E-03		max	1.43E+00	6.20E-01	(f)	8.8E-03	--	NA
Zinc	3.20E+03	1.50E+01	max	1.20E-12	5.60E-01		2.4E+02	1.3E+02	1.8
Sulfate		5.10E+02	max	NA	NA		NA	NA	NA
								Hazard Index:	3595

BCF_{INV} = Bioconcentration factor for invertebrates
BCF_V = Bioconcentration factor for vegetation
NOAEL = No Observed Adverse Effects Level
TRV = Toxicity Reference Values
mg/kg = milligrams per kilograms
mg/L = milligrams per liter
max = maximum concentration of samples
mg/kg-day = milligrams per kilogram per day
Equations:
HQ = Intake / NOAEL TRV
HI = Sum of HQs

(a) BFC for chrysene used as a surrogate.
(b) BCF for benzo(b)fluoranthene used as a surrogate.
(c) BCF for heptachlor used as a surrogate.
(d) BCF for DDE used as a surrogate.
(e) The highest inorganic BCF used as a surrogate.
(f) BCF for vinyl chloride used as a surrogate.

PREPARED/DATE: EFC 1/3/03
CHECKED/DATE: CMB 12/6/05
REVISED/DATE: MKB 10/7/07
REVISED/DATE: NSR 9/9/10
CHECKED/DATE: MKB 11/16/10

TABLE 6.13: RISK CALCULATION FOR THE NORTHERN BOBWHITE (SURFACE WATER ONLY)

Analyte	Surface Water Exposure Point Concentration (mg/L)	Exposure Value Type	BCF_V		BCF_{INV}		Intake (mg/kg-day)	NOAEL TRVs (mg/kg-day)	Hazard Quotient
Aldrin		max	6.73E-03		1.40E+00	(c)	0.0E+00	6.6E-02	--
Anthracene		max	1.04E-01		4.00E-02	(a)	0.0E+00	2.0E+00	--
Antimony		max	2.00E-01		2.20E-01		0.0E+00	--	--
Arsenic	3.20E-01	max	3.60E-02		1.10E-01		3.8E-02	2.5E+00	0.015
Barium		max	1.50E-01		2.20E-01		0.0E+00	2.1E+01	--
Benzo(a)anthracene		max	2.02E-02		3.00E-02		0.0E+00	2.0E+00	--
Benzo(a)pyrene		max	1.11E-02		7.00E-02		0.0E+00	2.0E+00	--
Benzo(b)fluoranthene		max	1.01E-02		7.00E-02		0.0E+00	2.0E+00	--
Benzo(b,k)fluoranthene		max	1.01E-02		7.00E-02		0.0E+00	2.0E+00	--
Benzo(g,h,i)perylene		max	2.99E-03		7.00E-02	(b)	0.0E+00	2.0E+00	--
Beryllium		max	1.00E-02		2.20E-01		0.0E+00	--	--
BHC(alpha-, beta-, delta-)		max	2.42E-01		1.40E+00	(c)	0.0E+00	5.6E-01	--
alpha-BHC	7.50E-04	max	2.47E-01		1.40E+00	(c)	8.9E-05	5.6E-01	0.0002
beta-BHC	2.40E-03	max	2.42E-01		1.40E+00	(c)	2.9E-04	5.6E-01	0.0005
delta-BHC	6.30E-04	max	1.55E-01		1.40E+00	(c)	7.5E-05	5.6E-01	0.0001
gamma-BHC	5.20E-04	max	2.70E-01		1.40E+00	(c)	6.2E-05	5.6E-01	0.0001
Chlordane		max	1.32E-02		1.40E+00	(c)	0.0E+00	2.1E+00	--
Chromium		max	7.50E-03		1.00E-02		0.0E+00	1.0E+00	--
Chrysene		max	1.87E-02		4.00E-02		0.0E+00	2.0E+00	--
Copper	7.80E-01	max	4.00E-01		4.00E-02		9.3E-02	4.7E+01	0.0020
Cyanides (soluble salts)		max	3.64E-01	(e)	1.12E+00		0.0E+00	4.0E-02	--
DDD	2.00E-05	max	4.77E-03		1.26E+00	(d)	2.4E-06	1.7E+03	0.000000001
DDE		max	9.37E-03		1.26E+00		0.0E+00	1.7E+03	--
DDT		max	6.50E-03		1.26E+00	(d)	0.0E+00	1.7E+03	--
Dieldrin	2.00E-05	max	9.15E-02		1.40E+00	(c)	2.4E-06	7.7E-02	0.00003
2,4-Dinitrotoluene		max	2.72E+00		3.08E+00		0.0E+00	--	--
Endosulfan I		max	1.62E-01		1.40E+00	(c)	0.0E+00	1.0E+01	--
Endosulfan sulfate		max	1.62E-01		1.40E+00	(c)	0.0E+00	1.0E+01	--
Endrin		max	4.72E-02		1.40E+00	(c)	0.0E+00	3.0E-01	--
Fluoranthene		max	3.67E-02		4.00E-02	(a)	0.0E+00	2.0E+00	--
Heptachlor		max	4.89E-02		1.40E+00		0.0E+00	1.3E+02	--
Heptachlor epoxide		max	4.89E-02		1.40E+00	(c)	0.0E+00	1.3E+02	--
Indeno(1,2,3-cd)pyrene		max	3.90E-03		8.00E-02		0.0E+00	2.0E+00	--
Lead	1.40E-02	max	4.50E-02		3.00E-02		1.7E-03	1.1E+00	0.001
Mercury		max	3.75E-02		4.00E-02		0.0E+00	6.5E+00	--
Methoxychlor		max	4.49E-02		1.03E+03		0.0E+00	--	--

TABLE 6.13: RISK CALCULATION FOR THE NORTHERN BOBWHITE (SURFACE WATER ONLY)

Analyte	**Surface Water Exposure Point Concentration (mg/L)**	**Exposure Value Type**	**BCF_V**	**BCF_{INV}**		**Intake (mg/kg-day)**	**NOAEL TRVs (mg/kg-day)**	**Hazard Quotient**
Naphthalene		max	4.41E-01	4.05E+01		0.0E+00	2.0E+00	--
Nickel		max	3.20E-02	2.00E-02		0.0E+00	6.5E+01	--
Phenanthrene		max	1.17E-01	4.00E-02	(a)	0.0E+00	2.0E+00	--
Pyrene		max	4.29E-02	4.00E-02	(a)	0.0E+00	2.0E+00	--
Silver		max	4.00E-01	2.20E-01		0.0E+00	1.8E+02	--
Thallium		max	4.00E-03	2.20E-01		0.0E+00	3.5E-01	--
Toxaphene		max	4.79E-01	1.40E+00	(c)	0.0E+00	--	--
1,1,1-Trichloroethane		max	1.43E+00	6.20E-01	(f)	0.0E+00	--	--
Zinc	1.50E+01	max	1.20E-12	5.60E-01		1.8E+00	1.3E+02	0.01
Sulfate	5.10E+02	max	NA	NA		NA	NA	--
							Hazard Index:	0.033

BCF_{INV} = Bioconcentration factor for invertebrates
BCF_V = Bioconcentration factor for vegetation
NOAEL = No Observed Adverse Effects Level
TRV = Toxicity Reference Values
mg/kg = milligrams per kilograms
mg/L = milligrams per liter
max = maximum concentration of samples
mg/kg-day = milligrams per kilogram per day
Equations:
HQ = Intake / NOAEL TRV
HI = Sum of HQs

(a) BFC for chrysene used as a surrogate.
(b) BCF for benzo(b)fluoranthene used as a surrogate.
(c) BCF for heptachlor used as a surrogate.
(d) BCF for DDE used as a surrogate.
(e) The highest inorganic BCF used as a surrogate.
(f) BCF for vinyl chloride used as a surrogate.

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REVISED/DATE: LMS 10/4/07
REVISED/DATE: MKB 10/7/07
REVISED/DATE: NSR 9/9/10
CHECKED/DATE: MKB 11/16/10

TABLE 6.14: RISK CALCULATION FOR THE SHORT-TAILED SHREW

Analyte	Surface Soil Exposure Point Concentration (mg/kg)	Surface Water Exposure Point Concentration (mg/L)	Exposure Value Type	BCF_V		BCF_{INV}		$BCF_{M (i)}$		Intake (mg/kg-day)	NOAEL TRVs (mg/kg-day)	Hazard Quotient
Aldrin	1.40E+02		max	6.73E-03		1.40E+00	(c)	3.74E-06	(c)	8.0E+01	4.4E-01	182
Anthracene	2.00E+00		max	1.04E-01		4.00E-02	(a)	1.99E-05	(a)	1.4E-01	6.0E+02	0.00023
Antimony	3.70E+01		max	2.00E-01		2.20E-01		1.44E-06		5.3E+00	1.4E-01	38
Arsenic	1.55E+03	3.20E-01	max	3.60E-02		1.10E-01		2.88E-06		1.4E+02	6.7E+00	21
Barium	2.00E+03		max	1.50E-01		2.20E-01		2.16E-07		2.8E+02	1.2E+01	24
Benzo(a)anthracene	3.20E+01		max	2.02E-02		3.00E-02		1.73E-05		1.9E+00	4.0E+02	0.0
Benzo(a)pyrene	3.60E+00		max	1.11E-02		7.00E-02		4.86E-05		2.7E-01	2.4E+02	0.0
Benzo(b)fluoranthene	2.90E+00		max	1.01E-02		7.00E-02		5.75E-05		2.2E-01	2.4E+02	0.0
Benzo(b,k)fluoranthene	1.20E+01		max	1.01E-02		7.00E-02		5.73E-05		9.0E-01	2.4E+02	0.0
Benzo(g,h,i)perylene	2.10E+01		max	2.99E-03		7.00E-02	(b)	5.75E-05	(b)	1.6E+00	2.4E+02	0
Beryllium	1.80E+00		max	1.00E-02		2.20E-01		1.73E-07	(g)	2.4E-01	1.5E+00	0.16
BHC(alpha-, beta-, delta-)	4.07E+01		max	2.42E-01		1.40E+00	(c)	3.74E-06	(c)	2.4E+01	8.8E-01	27
alpha-BHC	9.60E+02	7.50E-04	max	2.47E-01		1.40E+00	(c)	3.74E-06	(c)	5.6E+02	8.8E-01	642
beta-BHC	9.30E+02	2.40E-03	max	2.42E-01		1.40E+00	(c)	3.74E-06	(c)	5.5E+02	8.8E-01	621
delta-BHC	6.90E+01	6.30E-04	max	1.55E-01		1.40E+00	(c)	3.74E-06	(c)	4.0E+01	8.8E-01	46
gamma-BHC	2.10E+00	5.20E-04	max	2.70E-01		1.40E+00	(c)	3.74E-06	(c)	1.2E+00	8.8E-01	1.4
Chlordane	3.90E+02		max	1.32E-02		1.40E+00	(c)	3.74E-06	(c)	2.2E+02	5.5E+00	41
Chromium	6.80E+01		max	7.50E-03		1.00E-02		7.91E-06		3.6E+00	7.4E+00	0.48
Chrysene	3.20E+01		max	1.87E-02		4.00E-02		1.99E-05		2.1E+00	1.8E+01	0.11
Copper	8.20E+02	7.80E-01	max	4.00E-01		4.00E-02		1.73E-07	(g)	7.5E+01	3.9E+01	1.9
Cyanides (soluble salts)	1.80E+00		max	3.64E-01	(e)	1.12E+00		1.73E-07	(g)	8.8E-01	5.1E+01	0.017
DDD	5.50E+02	2.00E-05	max	4.77E-03		1.26E+00	(d)	6.52E-05	(d)	2.9E+02	2.1E+03	0.13
DDE	5.90E+01		max	9.37E-03		1.26E+00		6.52E-05		3.1E+01	2.1E+03	0.01
DDT	9.10E+03		max	6.50E-03		1.26E+00	(d)	6.52E-05	(d)	4.7E+03	2.1E+03	2
Dieldrin	5.90E+02	2.00E-05	max	9.15E-02		1.40E+00	(c)	3.74E-06	(c)	3.4E+02	4.4E-02	7745
2,4-Dinitrotoluene	7.50E+00		max	2.72E+00		3.08E+00		3.58E-09		1.0E+01	3.8E+03	0.0028
Endosulfan I	5.00E-03		max	1.62E-01		1.40E+00	(c)	3.74E-06	(c)	2.9E-03	3.3E-01	0.0088
Endosulfan sulfate	1.30E+00		max	1.62E-01		1.40E+00	(c)	3.74E-06	(c)	7.6E-01	3.3E-01	2.3
Endrin	3.80E+01		max	4.72E-02		1.40E+00	(c)	3.74E-06	(c)	2.2E+01	1.1E-01	199
Fluoranthene	3.40E+01		max	3.67E-02		4.00E-02	(a)	1.99E-05	(a)	2.2E+00	3.6E+01	0.061
Heptachlor	2.10E+02		max	4.89E-02		1.40E+00		3.74E-06		1.2E+02	2.9E-01	422
Heptachlor epoxide	1.60E-02		max	4.89E-02		1.40E+00		3.74E-06		9.2E-03	2.9E-01	0.032
Indeno(1,2,3-cd)pyrene	2.00E+00		max	3.90E-03		8.00E-02		2.98E-04		1.6E-01	2.4E+02	0.00066
Lead	7.45E+03	1.40E-02	max	4.50E-02		3.00E-02		4.32E-07		4.6E+02	1.8E+01	26
Mercury	3.25E-01		max	3.75E-02		4.00E-02		7.52E-06	(h)	2.1E-02	2.9E+00	0.0074
Methoxychlor	6.70E-02		max	4.49E-02		1.03E+03		6.52E-05	(d)	2.6E+01	8.8E+00	2.9
Naphthalene	2.50E-01		max	4.41E-01		4.05E+01		2.98E-04	(j)	3.8E+00	6.0E+00	0.64
Nickel	1.20E+02		max	3.20E-02		2.00E-02		8.63E-06		6.9E+00	1.1E+02	0.065
Phenanthrene	1.14E+00		max	1.17E-01		4.00E-02	(a)	1.99E-05	(a)	8.1E-02	1.3E+01	0.006
Pyrene	3.20E+01		max	4.29E-02		4.00E-02	(a)	1.99E-05	(a)	2.1E+00	8.9E+00	0.2
Silver	2.10E+01		max	4.00E-01		2.20E-01		4.32E-06		3.3E+00	4.5E-01	7.4
Thallium	8.80E+00		max	4.00E-03		2.20E-01		5.75E-05		1.1E+00	1.4E-01	8

TABLE 6.14: RISK CALCULATION FOR THE SHORT-TAILED SHREW

Analyte	Surface Soil Exposure Point Concentration (mg/kg)	Surface Water Exposure Point Concentration (mg/L)	Exposure Value Type	BCF$_V$	BCF$_{INV}$		BCF$_{M\ (i)}$		Intake (mg/kg-day)	NOAEL TRVs (mg/kg-day)	Hazard Quotient
Toxaphene	1.63E+03		max	4.79E-01	1.40E+00	(c)	3.74E-06	(c)	9.9E+02	1.8E+01	56
1,1,1-Trichloroethane	9.00E-03		max	1.43E+00	6.20E-01	(f)	5.06E-10	(f)	3.4E-03	1.2E+03	0.0000028
Zinc	3.20E+03	1.50E+01	max	1.20E-12	5.60E-01		1.29E-07		8.3E+02	1.2E+01	66.8
Sulfate		5.10E+02	max	NA	NA		NA		NA	NA	--
										Hazard Index:	10186

BCF$_{INV}$ = Bioconcentration factor for invertebrates
BCF$_V$ = Bioconcentration factor for vegetation
BCF$_M$ = Bioconcentration factor for mammals
NOAEL = No Observed Adverse Effects Level
TRV = Toxicity Reference Values
mg/kg = milligrams per kilograms
mg/L = milligrams per liter
max = maximum concentration of samples
mg/kg-day = milligrams per kilogram per day
Equations:
HQ = Intake / NOAEL TRV
HI = Sum of HQs

(a) BCF for chrysene used as a surrogate.
(b) BCF for benzo(b)fluoranthene used as a surrogate.
(c) BCF for heptachlor used as a surrogate.
(d) BCF for DDE used as a surrogate.
(e) The highest inorganic BCF used as a surrogate.
(f) BCF for vinyl chloride used as a surrogate.
(g) BCF for cadmium used as a surrogate.
(h) BCF for mercuric chloride used as a surrogate
(i) BCFs for a deer mouse used as a surrogate.
(j) BCF for Indeno(1,2,3-cd)pyrene used as a surrogate.

PREPARED/DATE: CMB 12/2/05
REVISED/DATE: LMS 10/4/07
CHECKED/DATE: MKB 10/7/07
REVISED/DATE: NSR 9/9/10
CHECKED/DATE: MKB 11/16/10

TABLE 6.15: RISK CALCULATION FOR THE SHORT-TAILED SHREW (SURFACE WATER ONLY)

Analyte	**Surface Water Exposure Point Concentration (mg/L)**	**Exposure Value Type**	**BCF$_V$**		**BCF$_{INV}$**		**BCF$_{M\ (h)}$**		**Intake (mg/kg-day)**	**NOAEL TRVs (mg/kg-day)**	**Hazard Quotient**
Aldrin		max	6.73E-03		1.40E+00	(c)	3.74E-06	(c)	0.0E+00	4.4E-01	--
Anthracene		max	1.04E-01		4.00E-02	(a)	1.99E-05	(a)	0.0E+00	6.0E+02	--
Antimony		max	2.00E-01		2.20E-01		1.44E-06		0.0E+00	1.4E-01	--
Arsenic	3.20E-01	max	3.60E-02		1.10E-01		2.88E-06		7.5E-02	6.7E+00	0.0111
Barium		max	1.50E-01		2.20E-01		2.16E-07		0.0E+00	1.2E+01	--
Benzo(a)anthracene		max	2.02E-02		3.00E-02		1.73E-05		0.0E+00	4.0E+02	--
Benzo(a)pyrene		max	1.11E-02		7.00E-02		4.86E-05		0.0E+00	2.4E+02	--
Benzo(b)fluoranthene		max	1.01E-02		7.00E-02		5.75E-05		0.0E+00	2.4E+02	--
Benzo(b,k)fluoranthene		max	1.01E-02		7.00E-02		5.73E-05		0.0E+00	2.4E+02	--
Benzo(g,h,i)perylene		max	2.99E-03		7.00E-02	(b)	5.73E-05	(b)	0.0E+00	2.4E+02	--
Beryllium		max	1.00E-02		2.20E-01		1.44E-06	(g)	0.0E+00	1.5E+00	--
BHC(alpha-, beta-, delta-)		max	2.42E-01		1.40E+00	(c)	3.74E-06	(c)	0.0E+00	8.8E-01	--
alpha-BHC	7.50E-04	max	2.47E-01		1.40E+00	(c)	3.74E-06	(c)	1.8E-04	8.8E-01	0.00020
beta-BHC	2.40E-03	max	2.42E-01		1.40E+00	(c)	3.74E-06	(c)	5.6E-04	8.8E-01	0.00064
delta-BHC	6.30E-04	max	1.55E-01		1.40E+00	(c)	3.74E-06	(c)	1.5E-04	8.8E-01	0.00017
gamma-BHC	5.20E-04	max	2.70E-01		1.40E+00	(c)	3.74E-06	(c)	1.2E-04	8.8E-01	0.00014
Chlordane		max	1.32E-02		1.40E+00	(c)	3.74E-06	(c)	0.0E+00	5.5E+00	--
Chromium		max	7.50E-03		1.00E-02		7.91E-06		0.0E+00	7.4E+00	--
Chrysene		max	1.87E-02		4.00E-02		1.99E-05		0.0E+00	1.8E+01	--
Copper	7.80E-01	max	4.00E-01		4.00E-02		1.73E-07	(g)	1.8E-01	3.9E+01	0.0047
Cyanides (soluble salts)		max	3.64E-01	(e)	1.12E+00		1.73E-07	(g)	0.0E+00	5.1E+01	--
DDD	2.00E-05	max	4.77E-03		1.26E+00	(d)	6.52E-05	(d)	4.7E-06	2.1E+03	0.000000002
DDE		max	9.37E-03		1.26E+00		6.52E-05		0.0E+00	2.1E+03	--
DDT		max	6.50E-03		1.26E+00	(d)	6.52E-05	(d)	0.0E+00	2.1E+03	--
Dieldrin	2.00E-05	max	9.15E-02		1.40E+00	(c)	3.74E-06	(c)	4.7E-06	4.4E-02	0.00011
2,4-Dinitrotoluene		max	2.72E+00		3.08E+00		3.58E-09		0.0E+00	3.8E+03	--
Endosulfan I		max	1.62E-01		1.40E+00	(c)	3.74E-06	(c)	0.0E+00	3.3E-01	--
Endosulfan sulfate		max	1.62E-01		1.40E+00	(c)	3.74E-06	(c)	0.0E+00	3.3E-01	--
Endrin		max	4.72E-02		1.40E+00	(c)	3.74E-06	(c)	0.0E+00	1.1E-01	--
Fluoranthene		max	3.67E-02		4.00E-02	(a)	1.99E-05	(a)	0.0E+00	3.6E+01	--
Heptachlor		max	4.89E-02		1.40E+00		3.74E-06		0.0E+00	2.9E-01	--
Heptachlor epoxide		max	4.89E-02		1.40E+00		3.74E-06		0.0E+00	2.9E-01	--
Indeno(1,2,3-cd)pyrene		max	3.90E-03		8.00E-02		2.98E-04		0.0E+00	2.4E+02	--
Lead	1.40E-02	max	4.50E-02		3.00E-02		4.32E-07		3.3E-03	1.8E+01	0.00019
Mercury		max	3.75E-02		4.00E-02		7.52E-06		0.0E+00	2.9E+00	--
Methoxychlor		max	4.49E-02		1.03E+03		6.52E-05	(d)	0.0E+00	8.8E+00	--
Naphthalene		max	4.41E-01		4.05E+01		2.98E-04	(i)	0.0E+00	6.0E+00	--
Nickel		max	3.20E-02		2.00E-02		8.63E-06		0.0E+00	1.1E+02	--
Phenanthrene		max	1.17E-01		4.00E-02	(a)	1.99E-05	(a)	0.0E+00	1.3E+01	--

TABLE 6.15: RISK CALCULATION FOR THE SHORT-TAILED SHREW (SURFACE WATER ONLY)

Analyte	**Surface Water Exposure Point Concentration (mg/L)**	**Exposure Value Type**	**BCF_V**	**BCF_{INV}**		**$BCF_{M\ (h)}$**		**Intake (mg/kg-day)**	**NOAEL TRVs (mg/kg-day)**	**Hazard Quotient**
Pyrene		max	4.29E-02	4.00E-02	(a)	1.99E-05	(a)	0.0E+00	8.9E+00	--
Silver		max	4.00E-01	2.20E-01		4.32E-06		0.0E+00	4.5E-01	--
Thallium		max	4.00E-03	2.20E-01		5.75E-05		0.0E+00	1.4E-01	--
Toxaphene		max	4.79E-01	1.40E+00	(c)	3.74E-06	(c)	0.0E+00	1.8E+01	--
1,1,1-Trichloroethane		max	1.43E+00	6.20E-01	(f)	5.06E-10	(f)	0.0E+00	1.2E+03	--
Zinc	1.50E+01	max	1.20E-12	5.60E-01		1.29E-07		3.5E+00	1.2E+01	0.28
Sulfate	5.10E+02	max	NA	NA		NA		NA	NA	--
									Hazard Index:	0.30

BCF_{INV} = Bioconcentration factor for invertebrates
BCF_V = Bioconcentration factor for vegetation
BCF_M = Bioconcentration factor for mammals
NOAEL = No Observed Adverse Effects Level
TRV = Toxicity Reference Values
mg/kg = milligrams per kilograms
mg/L = milligrams per liter
max = maximum concentration of samples
mg/kg-day = milligrams per kilogram per day
Equations:
HQ = Intake / NOAEL TRV
HI = Sum of HQs

PREPARED/DATE: CMB 12/2/05
REVISED/DATE: LMS 10/4/07
CHECKED/DATE: MKB 10/7/07
REVISED/DATE: NSR 9/9/10
CHECKED/DATE: MKB 11/16/10

(a) BCF for chrysene used as a surrogate.
(b) BCF for benzo(b)fluoranthene used as a surrogate.
(c) BCF for heptachlor used as a surrogate.
(d) BCF for DDE used as a surrogate.
(e) The highest inorganic BCF used as a surrogate.
(f) BCF for vinyl chloride used as a surrogate.
(g) BCF for cadmium used as a surrogate.
(h) BCFs for a Deer Mouse used as a surrogate.
(i) BCF for Indeno(1,2,3-cd)pyrene used as a surrogate.

TABLE 6.16: RISK CALCULATION FOR THE RACOON

Analyte	Surface Soil Exposure Point Concentration (mg/kg)	Sediment Exposure Point Concentration (mg/kg)	Surface Water Exposure Point Concentration (mg/L)	Exposure Value Type	BCF_V		BCF_{INV}		$BCF_{BIRD\ (h)}$		Intake (mg/kg-day)	NOAEL TRVs (mg/kg-day)	Hazard Quotient
Aldrin	1.40E+02			max	6.73E-03		1.40E+00	(c)	2.45E-05	(c)	5.1E+00	1.1E-01	47
Anthracene	2.00E+00			max	1.04E-01		4.00E-02	(a)	1.30E-04	(a)	1.1E-02	1.5E+02	0.0000759
Antimony	3.70E+01			max	2.00E-01		2.20E-01		1.27E-03	(g)	4.6E-01	3.5E-02	13.3
Arsenic	1.55E+03	5.07E+01	3.20E-01	max	3.60E-02		1.10E-01		1.27E-03	(g)	8.9E+00	1.7E+00	5.3
Barium	2.00E+03			max	1.50E-01		2.20E-01		1.27E-03	(g)	2.2E+01	2.9E+00	7.6
Benzo(a)anthracene	3.20E+01			max	2.02E-02		3.00E-02		1.13E-04		1.1E-01	9.8E+01	0.001086
Benzo(a)pyrene	3.60E+00			max	1.11E-02		7.00E-02		3.19E-04		1.5E-02	5.9E+01	0.0002491
Benzo(b)fluoranthene	2.90E+00			max	1.01E-02		7.00E-02		3.78E-04		1.2E-02	5.9E+01	0.0001994
Benzo(b,k)fluoranthene	1.20E+01			max	1.01E-02		7.00E-02		3.75E-04		4.9E-02	5.9E+01	0.000825
Benzo(g,h,i)perylene	2.10E+01			max	2.99E-03		7.00E-02	(b)	3.78E-04	(b)	8.1E-02	5.9E+01	0.001382
Beryllium	1.80E+00			max	1.00E-02		2.20E-01		1.27E-03	(g)	1.4E-02	3.6E-01	0.038
BHC(alpha-, beta-, delta-)	4.07E+01			max	2.42E-01		1.40E+00	(c)	2.45E-05	(c)	1.7E+00	2.2E-01	7.85
alpha-BHC	9.60E+02	5.40E-02	7.50E-04	max	2.47E-01		1.40E+00	(c)	2.45E-05	(c)	4.0E+01	2.2E-01	186
beta-BHC	9.30E+02	6.50E-02	2.40E-03	max	2.42E-01		1.40E+00	(c)	2.45E-05	(c)	3.9E+01	2.2E-01	179
delta-BHC	6.90E+01	2.90E-02	6.30E-04	max	1.55E-01		1.40E+00	(c)	2.45E-05	(c)	2.7E+00	2.2E-01	12.6
gamma-BHC	2.10E+00	3.00E-02	5.20E-04	max	2.70E-01		1.40E+00	(c)	2.45E-05	(c)	9.0E-02	2.2E-01	0.412
Chlordane	3.90E+02	6.20E-02		max	1.32E-02		1.40E+00	(c)	2.45E-05	(c)	1.4E+01	1.4E+00	10.5
Chromium	6.80E+01			max	7.50E-03		1.00E-02		1.27E-03	(g)	1.7E-01	1.8E+00	0.094
Chrysene	3.20E+01			max	1.87E-02		4.00E-02		1.30E-04		1.1E-01	4.5E+00	0.0253
Copper	8.20E+02		7.80E-01	max	4.00E-01		4.00E-02		1.27E-03	(g)	1.1E+01	9.6E+00	1.1
Cyanides (soluble salts)	1.80E+00			max	3.64E-01	(e)	1.12E+00		1.27E-03	(g)	6.9E-02	1.3E+01	0.0055
DDD	5.50E+02	8.90E-01	2.00E-05	max	4.77E-03		1.26E+00	(d)	4.28E-04	(d)	1.8E+01	5.2E+02	0.0344
DDE	5.90E+01	3.40E-02		max	9.37E-03		1.26E+00		4.28E-04		1.9E+00	5.2E+02	0.00370
DDT	9.10E+03	3.40E-01		max	6.50E-03		1.26E+00	(d)	4.28E-04	(d)	3.0E+02	5.2E+02	0.570
Dieldrin	5.90E+02	8.80E-02	2.00E-05	max	9.15E-02		1.40E+00	(c)	2.45E-05	(c)	2.3E+01	1.1E-02	2074
2,4-Dinitrotoluene	7.50E+00			max	2.72E+00		3.08E+00		2.34E-08		1.1E+00	9.3E+02	0.0012
Endosulfan I	5.00E-03			max	1.62E-01		1.40E+00	(c)	2.45E-05	(c)	2.0E-04	8.2E-02	0.0025
Endosulfan sulfate	1.30E+00			max	1.62E-01		1.40E+00	(c)	2.45E-05	(c)	5.2E-02	8.2E-02	0.637
Endrin	3.80E+01			max	4.72E-02		1.40E+00	(c)	2.45E-05	(c)	1.4E+00	2.7E-02	52.1
Fluoranthene	3.40E+01			max	3.67E-02		4.00E-02	(a)	1.30E-04	(a)	1.4E-01	9.0E+00	0.01501
Heptachlor	2.10E+02	4.90E-03		max	4.89E-02		1.40E+00		2.45E-05		7.8E+00	7.1E-02	110
Heptachlor epoxide	1.60E-02			max	4.89E-02		1.40E+00		2.45E-05		6.0E-04	7.1E-02	0.0084
Indeno(1,2,3-cd)pyrene	2.00E+00			max	3.90E-03		8.00E-02		1.95E-03		8.3E-03	5.9E+01	0.0001406
Lead	7.45E+03	9.20E+01	1.40E-02	max	4.50E-02		3.00E-02		1.27E-03	(g)	3.0E+01	4.4E+00	6.8
Mercury	3.25E-01			max	3.75E-02		4.00E-02		2.87E-04		1.3E-03	7.1E-01	0.0018
Methoxychlor	6.70E-02			max	4.49E-02		1.03E+03		4.28E-04	(d)	1.7E+00	2.2E+00	0.77
Naphthalene	2.50E-01			max	4.41E-01		4.05E+01		1.95E-03	(i)	2.5E-01	1.5E+00	0.17
Nickel	1.20E+02			max	3.20E-02		2.00E-02		1.27E-03	(g)	4.1E-01	2.6E+01	0.016
Phenanthrene	1.14E+00			max	1.17E-01		4.00E-02	(a)	1.30E-04	(a)	6.8E-03	3.2E+00	0.002155
Pyrene	3.20E+01			max	4.29E-02		4.00E-02	(a)	1.30E-04	(a)	1.3E-01	2.2E+00	0.0599
Silver	2.10E+01			max	4.00E-01		2.20E-01		1.27E-03	(g)	3.6E-01	1.1E-01	3.30
Thallium	8.80E+00			max	4.00E-03		2.20E-01		1.27E-03	(g)	6.6E-02	3.4E-02	1.93
Toxaphene	1.63E+03			max	4.79E-01		1.40E+00	(c)	2.45E-05	(c)	7.8E+01	4.4E+00	18
1,1,1-Trichloroethane	9.00E-03			max	1.43E+00		6.20E-01	(f)	3.32E-09	(f)	4.7E-04	3.1E+02	0.0000015
Zinc	3.20E+03		1.50E+01	max	1.20E-12		5.60E-01		1.05E-04		5.1E+01	3.1E+00	16.8
Sulfate			5.10E+02	max	NA		NA		NA		NA	NA	--
												Hazard Index:	2756

TABLE 6.16: RISK CALCULATION FOR THE RACOON

Analyte	Surface Soil Exposure Point Concentration (mg/kg)	Sediment Exposure Point Concentration (mg/kg)	Surface Water Exposure Point Concentration (mg/L)	Exposure Value Type	BCF_V	BCF_{INV}	$BCF_{BIRD\ (h)}$	Intake (mg/kg-day)	NOAEL TRVs (mg/kg-day)	Hazard Quotient

BCF_{INV} = Bioconcentration factor for invertebrates
BCF_V = Bioconcentration factor for vegetation
NOAEL = No Observed Adverse Effects Level
TRV = Toxicity Reference Values
mg/kg = milligrams per kilograms
mg/L = milligrams per liter
max = maximum concentration of samples
mg/kg-day = milligrams per kilogram per day
Equations:
HQ = Intake / NOAEL TRV
HI = Sum of HQs

(a) BCF for chrysene used as a surrogate.
(b) BCF for benzo(b)fluoranthene used as a surrogate.
(c) BCF for heptachlor used as a surrogate.
(d) BCF for DDE used as a surrogate.
(e) The highest inorganic BCF used as a surrogate.
(f) BCF for vinyl chloride used as a surrogate.
(g) BCF for cadmium used as a surrogate.
(h) BCFs for a Northern Bobwhite used as a surrogate.
(i) BCF for Indeno(1,2,3-cd)pyrene used as a surrogate.

PREPARED/DATE: EFC 1/6/03
REVISED/DATE: LMS 10/4/07
CHECKED/DATE: MKB 10/7/07
REVISED/DATE: NSR 9/9/10
CHECKED/DATE: MKB 11/16/10

TABLE 6.17: RISK CALCULATION FOR THE RACOON (SURFACE WATER AND SEDIMENT ONLY)

Analyte	**Sediment Exposure Point Concentration (mg/kg)**	**Surface Water Exposure Point Concentration (mg/L)**	**Exposure Value Type**	**BCF_V**		**BCF_{INV}**		**$BCF_{BIRD\ (h)}$**		**Intake (mg/kg-day)**	**NOAEL TRVs (mg/kg-day)**	**Hazard Quotient**
Aldrin			max	6.73E-03		1.40E+00	(c)	2.45E-05	(c)	0.0E+00	1.1E-01	--
Anthracene			max	1.04E-01		4.00E-02	(a)	1.30E-04	(a)	0.0E+00	1.5E+02	--
Antimony			max	2.00E-01		2.20E-01		1.27E-03	(g)	0.0E+00	3.5E-02	--
Arsenic	5.07E+01	3.20E-01	max	3.60E-02		1.10E-01		1.27E-03	(g)	1.3E-01	1.7E+00	8.0E-02
Barium			max	1.50E-01		2.20E-01		1.27E-03	(g)	0.0E+00	2.9E+00	--
Benzo(a)anthracene			max	2.02E-02		3.00E-02		1.13E-04		0.0E+00	9.8E+01	--
Benzo(a)pyrene			max	1.11E-02		7.00E-02		3.19E-04		0.0E+00	5.9E+01	--
Benzo(b)fluoranthene			max	1.01E-02		7.00E-02		3.78E-04		0.0E+00	5.9E+01	--
Benzo(b,k)fluoranthene			max	1.01E-02		7.00E-02		3.75E-04		0.0E+00	5.9E+01	--
Benzo(g,h,i)perylene			max	2.99E-03		7.00E-02	(b)	3.78E-04	(b)	0.0E+00	5.9E+01	--
Beryllium			max	1.00E-02		2.20E-01		1.27E-03	(g)	0.0E+00	3.6E-01	--
BHC(alpha-, beta-, delta-)			max	2.42E-01		1.40E+00	(c)	2.45E-05	(c)	0.0E+00	2.2E-01	--
alpha-BHC	5.40E-02	7.50E-04	max	2.47E-01		1.40E+00	(c)	2.45E-05	(c)	1.8E-04	2.2E-01	8.1E-04
beta-BHC	6.50E-02	2.40E-03	max	2.42E-01		1.40E+00	(c)	2.45E-05	(c)	3.4E-04	2.2E-01	1.5E-03
delta-BHC	2.90E-02	6.30E-04	max	1.55E-01		1.40E+00	(c)	2.45E-05	(c)	1.1E-04	2.2E-01	5.2E-04
gamma-BHC	3.00E-02	5.20E-04	max	2.70E-01		1.40E+00	(c)	2.45E-05	(c)	1.1E-04	2.2E-01	4.9E-04
Chlordane	6.20E-02		max	1.32E-02		1.40E+00	(c)	2.45E-05	(c)	1.3E-04	1.4E+00	9.6E-05
Chromium			max	7.50E-03		1.00E-02		1.27E-03	(g)	0.0E+00	1.8E+00	--
Chrysene			max	1.87E-02		4.00E-02		1.30E-04		0.0E+00	4.5E+00	--
Copper		7.80E-01	max	4.00E-01		4.00E-02		1.27E-03	(g)	6.5E-02	9.6E+00	6.7E-03
Cyanides (soluble salts)			max	3.64E-01	(e)	1.12E+00		1.27E-03	(g)	0.0E+00	1.3E+01	--
DDD	8.90E-01	2.00E-05	max	4.77E-03		1.26E+00	(d)	4.28E-04	(d)	1.9E-03	5.2E+02	3.6E-06
DDE	3.40E-02		max	9.37E-03		1.26E+00		4.28E-04		7.2E-05	5.2E+02	1.4E-07
DDT	3.40E-01		max	6.50E-03		1.26E+00	(d)	4.28E-04	(d)	7.2E-04	5.2E+02	1.4E-06
Dieldrin	8.80E-02	2.00E-05	max	9.15E-02		1.40E+00	(c)	2.45E-05	(c)	1.9E-04	1.1E-02	1.7E-02
2,4-Dinitrotoluene			max	2.72E+00		3.08E+00		2.34E-08		0.0E+00	9.3E+02	--
Endosulfan I			max	1.62E-01		1.40E+00	(c)	2.45E-05	(c)	0.0E+00	8.2E-02	--
Endosulfan sulfate			max	1.62E-01		1.40E+00	(c)	2.45E-05	(c)	0.0E+00	8.2E-02	--
Endrin			max	4.72E-02		1.40E+00	(c)	2.45E-05	(c)	0.0E+00	2.7E-02	--
Fluoranthene			max	3.67E-02		4.00E-02	(a)	1.30E-04	(a)	0.0E+00	9.0E+00	--
Heptachlor	4.90E-03		max	4.89E-02		1.40E+00		2.45E-05		1.0E-05	7.1E-02	1.5E-04
Heptachlor epoxide			max	4.89E-02		1.40E+00		2.45E-05		0.0E+00	7.1E-02	--
Indeno(1,2,3-cd)pyrene			max	3.90E-03		8.00E-02		1.95E-03		0.0E+00	5.9E+01	--
Lead	9.20E+01	1.40E-02	max	4.50E-02		3.00E-02		1.27E-03	(g)	1.9E-01	4.4E+00	4.5E-02
Mercury			max	3.75E-02		4.00E-02		2.87E-04		0.0E+00	7.1E-01	--
Methoxychlor			max	4.49E-02		1.03E+03		4.28E-04	(d)	0.0E+00	2.2E+00	--
Naphthalene			max	4.41E-01		4.05E+01		1.95E-03	(i)	0.0E+00	1.5E+00	--
Nickel			max	3.20E-02		2.00E-02		1.27E-03	(g)	0.0E+00	2.6E+01	--
Phenanthrene			max	1.17E-01		4.00E-02	(a)	1.30E-04	(a)	0.0E+00	3.2E+00	--
Pyrene			max	4.29E-02		4.00E-02	(a)	1.30E-04	(a)	0.0E+00	2.2E+00	--
Silver			max	4.00E-01		2.20E-01		1.27E-03	(g)	0.0E+00	1.1E-01	--
Thallium			max	4.00E-03		2.20E-01		1.27E-03	(g)	0.0E+00	3.4E-02	--
Toxaphene			max	4.79E-01		1.40E+00	(c)	2.45E-05	(c)	0.0E+00	4.4E+00	--
1,1,1-Trichloroethane			max	1.43E+00		6.20E-01	(f)	3.32E-09	(f)	0.0E+00	3.1E+02	--
Zinc		1.50E+01	max	1.20E-12		5.60E-01		1.05E-04		1.2E+00	3.1E+00	4.1E-01
Sulfate		5.10E+02	max	NA		NA		NA		NA	NA	--
											Hazard Index:	0.56

TABLE 6.17: RISK CALCULATION FOR THE RACOON (SURFACE WATER AND SEDIMENT ONLY)

Analyte	**Sediment Exposure Point Concentration (mg/kg)**	**Surface Water Exposure Point Concentration (mg/L)**	**Exposure Value Type**	**BCF$_V$**	**BCF$_{INV}$**	**BCF$_{BIRD\ (h)}$**	**Intake (mg/kg-day)**	**NOAEL TRVs (mg/kg-day)**	**Hazard Quotient**

BCF$_{INV}$ = Bioconcentration factor for invertebrates
BCF$_V$ = Bioconcentration factor for vegetation
NOAEL = No Observed Adverse Effects Level
TRV = Toxicity Reference Values
mg/kg = milligrams per kilograms
mg/L = milligrams per liter
max = maximum concentration of samples
mg/kg-day = milligrams per kilogram per day
Equations:
HQ = Intake / NOAEL TRV
HI = Sum of HQs

PREPARED/DATE: EFC 1/6/03
REVISED/CHECKED DATE: LMS 10/4/07
REVISED/DATE: NSR 9/9/10
CHECKED/DATE: MKB 11/16/10

(a) BCF for chrysene used as a surrogate.
(b) BCF for benzo(b)fluoranthene used as a surrogate.
(c) BCF for heptachlor used as a surrogate.
(d) BCF for DDE used as a surrogate.
(e) The highest inorganic BCF used as a surrogate.
(f) BCF for vinyl chloride used as a surrogate.
(g) BCF for cadmium used as a surrogate.
(h) BCFs for a Northern Bobwhite used as a surrogate.
(i) BCF for Indeno(1,2,3-cd)pyrene used as a surrogate.

Table 7.1a: Risk Reduction Standards for Soil - Types 1 and 2

HSRA-regulated Substance	Maximum Detected Concentrations (mg/kg)		Risk Reduction Standards (RRS)					
			Type 1			Type 2		
	Surface (a)	Soil (b)	RRS	Ref	Status	RRS	Ref	Status
1,1,1-Trichloroethane	0.009	--	20	D	C	***	***	***
2,4-Dinitrotoluene	7.5	--	0.66	B	E	0.0068	H	E
Aldrin	140	--	0.66	B	E	0.0082	F	E
alpha-BHC	960	41	0.66	B	E	0.00079	H	E
Anthracene	2	--	500	B	C	***	***	***
Antimony	37	--	4	A	E	2.7	H	E
Arsenic	1547	3300	20	A	E	6.1	F	E
Barium	2000	270	1000	B	E	130	H	E
Benzo(a)anthracene	32	2.9	5	B	E	1.8	F	E
Benzo(a)pyrene	3.6	3.8	1.64	B	E	0.24	F	E
Benzo(b)fluoranthene	2.9	2.2	5	B	C	***	***	***
Benzo(b/k)fluoranthene	12	--	5	B	E	1.4	F	E
Benzo(g,h,i)perylene	21	0.58	500	B	C	***	***	***
Benzo(k)fluoranthene	0.99	1.3	5	B	C	***	***	***
beta-BHC	930	10.6	0.66	B	E	0.0028	H	E
Chlordane	390	466	9.2	B	E	0.16	H	E
Chrysene	32	5.5	5	B	E	42	F	C
Copper	820	330	100	A	E	46	G	E
Cyanide	1.8	--	20	D	C	***	***	***
DDD	550	57	0.66	B	E	0.84	F	E
DDE	59	78	0.66	B	E	0.59	F	E
DDT	9100	774	0.66	B	E	0.85	F	E
delta-BHC	69	0.0427	25	F	E	0.0028	H	E
Dieldrin	590	6.6	0.66	B	E	0.004	H	E
Endrin	38	--	10	B	E	0.19	H	E
Fluoranthene	34	11	500	B	C	***	***	***
gamma-BHC (lindane)	2.1	33	0.66	B	E	0.0045	H	E
Heptachlor	210	6.2	0.66	B	E	0.033	F	E
Indeno(1,2,3)pyrene	2	--	5	B	C	***	***	***
Lead	7450	65300	75	A	E	120	I	E
Methoxychlor	0.067	0.08	10	B	C	***	***	***
Nickel	120	31.5	50	A	E	20	H	E
Phenanthrene	0.71	3.9	110	B	C	***	***	***
Pyrene	32	16	500	B	C	***	***	***
Silver	21	--	2	A	E	0.85	H	E
Sulfate	1200	850	NR	NA	NA	NR	NA	NA
Thallium	8.8	--	2	A	E	0.71	G	E
Toxaphene	1633	700	11	B	E	0.77	F	E
Zinc	3200	390	100	A	E	290	H	E

Notes:

mg/kg = milligrams per kilogram
Ref = Reference source for the RRS
-- = Substance not detected
* = Default to RRS for gamma-BHC (lindane)
*** = Substance concentration meets a more restrictive RRS
(a) Surface soil; defined under HSRA as 0 to 2 feet below ground surface
(b) Soil;defined under HSRA as any point above the uppermost groundwater zone; used here to mean other than surface soil
NR = Not regulated under HSRA
NA = Not applicable

A = Table 2, Appendix III of the HSRA Regulations
B = Appendix I of the HSRA regulations
C = Substance concentration meets the respective RRS
D = Type I ground-water standard times 100
E = Substance concentration exceeds the respective RRS
F = Calculated using RAGS Equation 6 (carcinogens)
G = Calculated using RAGS Equation 7 (non-carcinogens)
H = Leaching criteria
I = IEUBK model

Prepared by/Date: R Rogero 11/19/10
Checked by/Date: L Smith 3/3/11
RNQ 3/8/11

Table 7.1b: Risk Reduction Standards for Soil - Types 3 and 4

March 16, 2011

HSRA-regulated Substance	**Maximum Detected Concentration (mg/kg)**				**Risk Reduction Standard (RRS)**											
					Type 3				**Type 4**							
	On BFEL Property		**On Railroad Property**		**Surface Soil (a)**		**Subsurface Soil (b)**		**Surface Soil (a) on BFEL property**		**Subsurface Soil (b) on BFEL property**		**Surface Soil (a) On railroad property**		**Subsurface Soil (b) On railroad property**	
	Surface Soil (a)	**Subsurface Soil (b)**	**Surface Soil (a)**	**Subsurface Soil (b)**	**RRS**	**Status**	**RRS**	**Status**	**RRS**	**Status**	**RRS**	**Status**	**RRS**	**Status**	**RRS**	**Status**
2,4-Dinitrotoluene	7.5	--	--	--	0.66	E	0.66	na	6.9	E	6.9	na	0.066	na	0.066	na
Aldrin	140	--	--	--	0.66	E	0.66	na	13	E	13	na	0.15	na	0.15	na
alpha-BHC	960	7	0.023	2.2	0.66	E	0.66	E	1.7	E	1.7	E	0.014	E	0.014	E
Antimony	30	--	37	--	10	E	10	na	46	C	46	na	9.8	E	9.8	na
Arsenic	1,100	3,300	1,547	686	38	E	41	E	22	E	22	E	22	E	22	E
Barium	2,000	270	1,300	--	1,000	E	1,000	C	21,000	C	21,000	***	4,500	C	4,500	na
Benzo(a)anthracene	32	2.9	1.4	--	5	E	5	C	590	C	870	***	7.4	C	7.4	na
Benzo(a)pyrene	14	3.8	0.90	--	1.6	E	1.6	E	59	C	290	C	2.5	C	2.5	na
Benzo(b/k)fluoranthene	22	0.13	1.7	--	5	E	5	C	590	C	2,900	***	25	C	25	na
beta-BHC	930	11	0.4	--	0.66	E	0.66	E	5.8	E	5.8	E	0.049	E	0.049	na
Chlordane	390	5.3	67	466	9.2	E	9.2	C	87	E	87	***	2.9	E	2.9	E
Copper	800	330	820	--	1,500	C	1,500	C	3,500	***	3,500	***	770	E	770	na
DDD	550	2.3	3.7	3.8	0.66	E	0.66	E	1,800	C	1,800	C	15	C	15	C
DDE	94	4.3	24	78	0.66	E	0.66	E	1,200	C	1,200	C	11	E	11	E
DDT	9,100	555	11	774	0.66	E	0.66	E	310	E	430	E	15	C	15	E
delta-BHC	69	0.043	0.012	--	25	E	25	C	5.8	E	5.8	***	0.049	C	0.049	na
Dieldrin	590	6.6	0.51	0.22	0.66	E	0.66	E	4.5	E	4.5	E	0.038	E	0.038	***
Endrin	38	--	--	--	10	E	10	na	31	E	31	na	6.6	na	6.6	na
gamma-BHC (lindane)	14	3.3	1.8	18	0.66	E	0.66	E	4.5	E	4.5	C	0.08	E	0.08	E
Heptachlor	210	3.1	0.30	1.3	0.66	E	0.66	E	33	E	33	C	0.28	E	0.28	E
Lead	7,450	65,300	4,000	200	400	E	400	E	120	E	120	E	120	E	120	***
Nickel	120	32	82	--	420	C	420	C	3,300	***	3,300	***	700	C	700	na
Silver	14	--	21	--	10	E	10	na	110	C	110	na	23	C	23	na
Sulfate	1,200	850	--	--	25,000	C	25,000	C	25,000	***	25,000	***	25,000	na	25,000	na
Thallium	8.8	--	6.3	--	10	C	10	na	0.71	***	0.71	na	0.71	E	0.71	na
Toxaphene	1,633	38	190	700	11	E	11	E	250	E	250	C	2.1	E	2.1	E
Zinc	3200	390	1500	--	2800	E	2800	C	48000	C	48000	***	10,000	C	10,000	na

<u>Notes:</u>
mg/kg = milligrams per kilogram
Ref = Reference source for the RRS
-- = Substance not detected
na = not applicable since substance not detected above the detection limit
* = Default to RRS for gamma-BHC
*** = Substance concentration meets a more restrictive RRS
(a) Surface soil; defined under HSRA as 0 to 2 feet below ground surface
(b) Soil; defined under HSRA as any point above the uppermost groundwater zone; used here to mean other than surface soil

Prepared by/Date: <u>R Rogero 11/19/10</u>
Checked by/Date: <u>L Smith 3/3/11</u>
RNQ 3/8/11

Table 7.2: Risk Reduction Standards for Ground Water

HSRA Regulated Substance	**2010 Maximum Detected Conc. (mg/L)**	**Location**	**Risk Reduction Standards (RRS)**											
			Types 1 and 3			**Type 2**			**Type 4 (On BFEL Property)**			**Type 4 (On Railroad Property)**		
			RRS	**Ref**	**Status**	**RRS**	**Ref**	**Status**	**RRS**	**Ref**	**Status**	**RRS**	**Ref**	**Status**
alpha-BHC	0.014 D	MW-111-091410	0.00005	B	E	0.00014	D	E	0.28	D	C	0.0024	D	E
Arsenic	0.061	MW-109-091410	0.01	A	E	0.00057	D	E	0.77	F	C	0.01	D	E
beta-BHC	0.031 D	MW-112 (07/28/10)	0.00005	B	E	0.00047	D	E	0.99	D	C	0.0085	D	E
Copper	15	MW-113-091510	1.3	A	E	0.63	F	E	100	F	C	22	F	C
delta-BHC	0.030 D	MW-111-091410	0.00005	B	E	0.00047	D	E	0.99	D	C	0.0085	D	E
Dieldrin	0.00014	MW-111-091410	0.0001	B	E	0.000053	D	E	0.11	D	C	0.001	D	C
gamma-BHC (lindane)	0.0051	MW-106D-091510	0.0002	A	E	0.00077	D	E	0.77	F	C	0.014	D	C
Lead	0.61	MW-109-091410	0.015	A	E	0.015	A	E	0.015	A	E	0.015	A	E
Nitrate	91	MW-116-091310	10 (NR)	MCL	--	25	F	--	4088	F	--	870	F	--
Sulfate	2100	MW-113-091510	250 (NR)	SMCL	--	--	--	--	--	--	--	--	--	--
Zinc	95	MW-113-091510	2	A	E	4.7	F	E	770	F	C	160	F	C

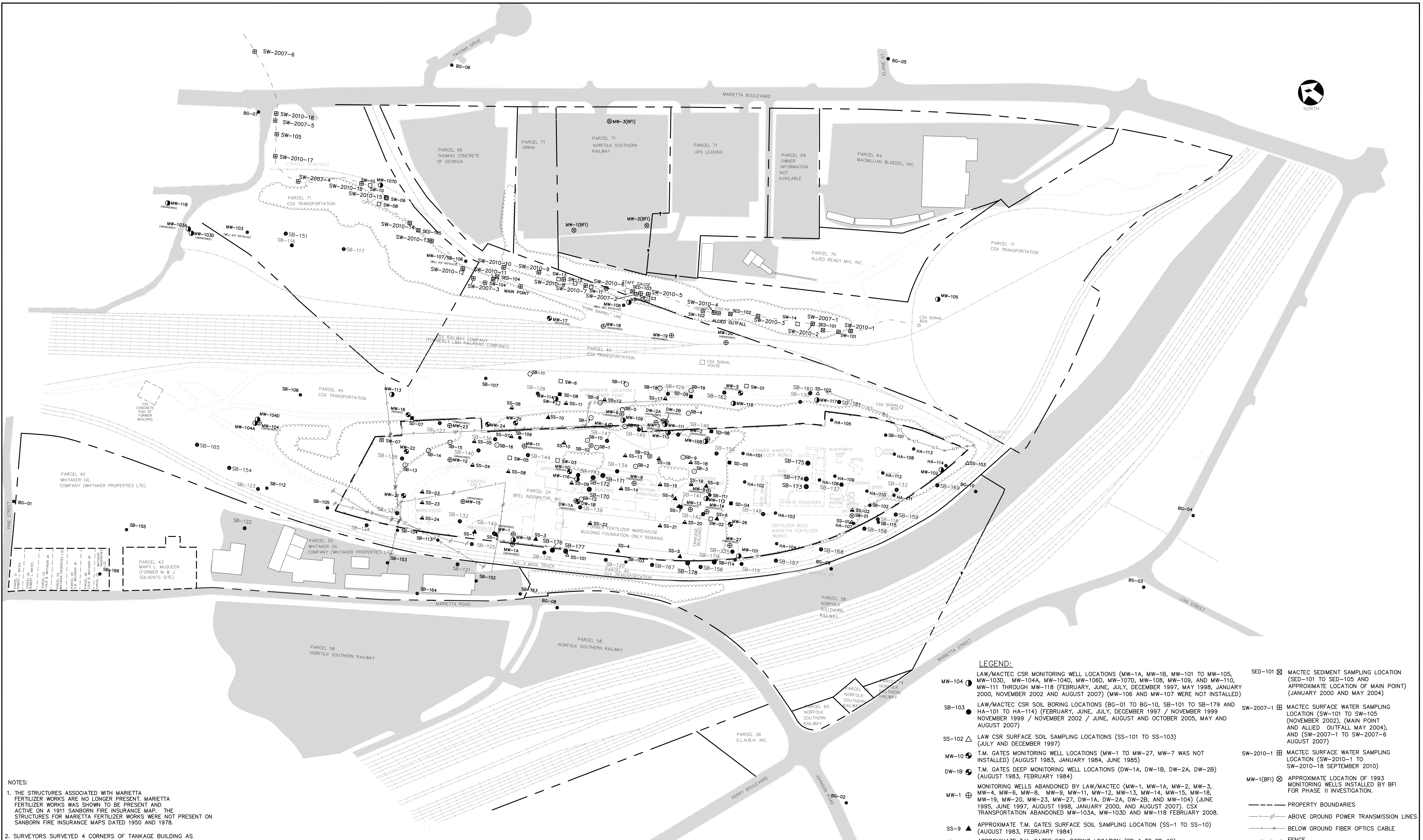
Notes:

mg/L = milligrams per liter
Ref = reference source for the RRS
ND = not detected above its respective detection limit
Conc. = concentration
NR = Not Regulated under HSRA
D = Sample diluted prior to analysis
-- = Not applicable
MCL = Maximum Contaminant Level
SMCL = Secondary Maximum Contaminant Level
J = Estimated concentration

A = Table 1, Appendix III of the HSRA Regulations
B = Detection limit
C = Substance concentration meets the respective RRS
D = Calculated using RAGS Equation 1 for carcinogens
E = Substance concentration exceeds the respective RRS
F = Calculated using RAGS Equation 2 for non-carcinogens

Prepared by/Date: R Rogero 11/19/10
Checked by/Date: L Smith 3/3/11
RNQ 3/8/2011

FIGURES



LEGEND:

MW-104	◑	LAW/MACTEC CSR MONITORING WELL LOCATIONS (MW-1A, MW-1B, MW-101 TO MW-105, MW-103D, MW-104A, MW-104D, MW-106D, MW-107D, MW-108, MW-109, AND MW-110, MW-111 THROUGH MW-118 (FEBRUARY, JUNE, JULY, DECEMBER 1997, MAY 1998, JANUARY 2000, NOVEMBER 2002 AND AUGUST 2007) (MW-106 AND MW-107 WERE NOT INSTALLED)
SB-103	●	LAW/MACTEC CSR SOIL BORING LOCATIONS (BG-01 TO BG-10, SB-101 TO SB-179 AND HA-101 TO HA-114) (FEBRUARY, JUNE, JULY, DECEMBER 1997 / NOVEMBER 1999 NOVEMBER 1999 / NOVEMBER 2002 / JUNE, AUGUST AND OCTOBER 2005, MAY AND AUGUST 2007)
SS-102	△	LAW CSR SURFACE SOIL SAMPLING LOCATIONS (SS-101 TO SS-103) (JULY AND DECEMBER 1997)
MW-10	◕	T.M. GATES MONITORING WELL LOCATIONS (MW-1 TO MW-27, MW-7 WAS NOT INSTALLED) (AUGUST 1983, JANUARY 1984, JUNE 1985)
DW-1B	◕	T.M. GATES DEEP MONITORING WELL LOCATIONS (DW-1A, DW-1B, DW-2A, DW-2B) (AUGUST 1983, FEBRUARY 1984)
MW-1	⊕	MONITORING WELLS ABANDONED BY LAW/MACTEC (MW-1, MW-1A, MW-2, MW-3, MW-4, MW-6, MW-8, MW-9, MW-11, MW-12, MW-13, MW-14, MW-15, MW-18, MW-19, MW-20, MW-23, MW-27, DW-1A, DW-2A, DW-2B, AND MW-104) (JUNE 1995, JUNE 1997, AUGUST 1998, JANUARY 2000, AND AUGUST 2007). CSX TRANSPORTATION ABANDONED MW-103A, MW-103D AND MW-118 FEBRUARY 2008.
SS-9	▲	APPROXIMATE T.M. GATES SURFACE SOIL SAMPLING LOCATION (SS-1 TO SS-10) (AUGUST 1983, FEBRUARY 1984)
SB-18	⊙	APPROXIMATE T.M. GATES SOIL BORING LOCATION (SB-1 TO SB-19) (AUGUST 1983, FEBRUARY 1984)
SB-01	◎	APPROXIMATE NUS SOIL BORING LOCATION (SB-01 TO SB-03) (FEBRUARY 1988)
SS-4	▲	APPROXIMATE NUS SURFACE SOIL SAMPLING LOCATION (SS-01 TO SS-24) (FEBRUARY 1988)
SD-4	■	APPROXIMATE NUS SEDIMENT SAMPLING LOCATION (SD-01 TO SD-03 OFF-SITE, SD-04 TO SD-09 ON-SITE) (FEBRUARY 1988)
SW-4	☐	APPROXIMATE T.M. GATES SURFACE WATER SAMPLING LOCATION (SW-01 TO SW-14 ON-SITE, SW-15 TO SW-17 OFF-SITE) (APRIL 1985)
	○	STAFF GAUGE
SED-101	☒	MACTEC SEDIMENT SAMPLING LOCATION (SED-101 TO SED-105 AND APPROXIMATE LOCATION OF MAIN POINT) (JANUARY 2000 AND MAY 2004)
SW-2007-1	⊞	MACTEC SURFACE WATER SAMPLING LOCATION (SW-101 TO SW-105 (NOVEMBER 2002), (MAIN POINT AND ALLIED OUTFALL MAY 2004), AND (SW-2007-1 TO SW-2007-6 AUGUST 2007)
SW-2010-1	⊞	MACTEC SURFACE WATER SAMPLING LOCATION (SW-2010-1 TO SW-2010-18 SEPTEMBER 2010)
MW-1(BFI)	⊗	APPROXIMATE LOCATION OF 1993 MONITORING WELLS INSTALLED BY BFI FOR PHASE II INVESTIGATION.
	— — —	PROPERTY BOUNDARIES
	—P—	ABOVE GROUND POWER TRANSMISSION LINES
	—UT—	BELOW GROUND FIBER OPTICS CABLE
	—×—×—	FENCE
	▭	EXISTING STRUCTURE
	▭	FORMER STRUCTURE
	⌒⌒⌒	TREE LINE
	— · · —	STREAM

SCALE IN FEET

0 100 200

NOTES:

1. THE STRUCTURES ASSOCIATED WITH MARIETTA FERTILIZER WORKS ARE NO LONGER PRESENT. MARIETTA FERTILIZER WORKS WAS SHOWN TO BE PRESENT AND ACTIVE ON A 1911 SANBORN FIRE INSURANCE MAP. THE STRUCTURES FOR MARIETTA FERTILIZER WORKS WERE NOT PRESENT ON SANBORN FIRE INSURANCE MAPS DATED 1950 AND 1978.
2. SURVEYORS SURVEYED 4 CORNERS OF TANKAGE BUILDING AS REFERENCE TO TIE THE SITE PLAN IN W/ SURVEYED POINTS
3. ALL SOIL BORINGS AND MONITORING WELLS NEAR ACTIVE RAILROAD TRACKS MUST BE MORE THAN 25 FEET AWAY FROM THE TRACKS.

SOURCES:

1. T.M. GATES REPORTS 1986
2. NUS CORPORATION SITE INVESTIGATION REPORT, AUGUST 1988.
3. TOPOGRAPHIC SURVEY MAP PREPARED FOR BFEL BY TRAVIS PRUITT AND ASSOCIATES, DECEMBER 19, 1989.
4. AERIAL PHOTOGRAPH AND COMPOSITE PLAT BY BLUE RIDGE ENGINEERING, DECEMBER 10, 1996.
5. BOUNDARY SURVEY BY W.L. JORDEN AND COMPANY, APRIL 2, 1997. LAW CSR SOIL BORINGS AND MONITORING WELLS SURVEYED BY W.L. JORDEN IN 1997, 1998, 1999, AND 2000.
6. MARIETTA FERTILIZER WORKS STRUCTURES FROM SANBORN FIRE INSURANCE MAP 1911.
7. MACTEC/LAW CSR SOIL BORINGS AND MONITORING WELLS (2002-2007) AND SURFACE WATER LOCATIONS SURVEYED BY MACTEC ENGINEERING AND CONSULTING INC.
8. PROPERTY OWNERS SHOWN ARE BASED ON 1996 FULTON COUNTY TAX RECORDS
9. WHITAKER AND MARY L. McQUEEN PROPERTY BOUNDARIES WERE REVISED AND ARE APPROXIMATE AND ARE BASED ON FULTON COUNTY BOARD OF ASSESSORS RECORDS 2004-2005 AT www.fultonassessor.org

CADD NOTE: DRAWING XREFS ROTATED @ 0,0; 55° FROM SURVEY FILE COORDINATE POSITION.

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REV	DATE	BY	SUB	APP	DESCRIPTION	REV	DATE	BY	SUB	APP	DESCRIPTION

DESIGNED M. BARTENFIELD
DRAWN T. GLADSTONE
CHECKED R. QUINN
IN CHARGE L. NEAL
DATE 3/8/2011

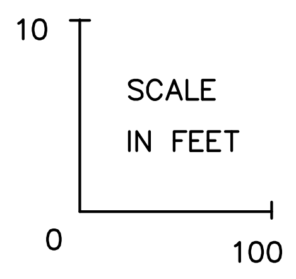
FORMER ESTECH GENERAL CHEMICALS SITE

ATLANTA,GEORGIA

MACTEC Engineering and Consulting, Inc.
3200 TOWN POINT DRIVE, SUITE 100
KENNESAW, GEORGIA 30144 (770) 421-3400

SITE SAMPLING LOCATIONS

SCALE AS SHOWN
CONTRACT 6122-08-0154
DWG. NO. 2.3
REV 4
PAGE NO



LEGEND:

▨	FILL
▨	SANDY CLAY
▨	SILTY CLAY TO CLAYEY SILT
▨	SANDY SILT AND SILTY SAND
▨	AMPHIBOLITE GNEISS AND BIOTITE GNEISS
———	GEOLOGIC CONTACT
— — ? — — —	INTERPRETED GEOLOGIC CONTACT
— — ▼	POTENTIOMETRIC SURFACE
▼	WATER LEVEL MEASURED ON 9/14/10
B.T. @ 80.0 FT. BGS	BORING TERMINATED AT 80.0 FT. BELOW GROUND SURFACE

GROUND WATER RESULTS LISTED FOR WELLS MW-2, MW-6 AND DW-2A WERE COLLECTED IN JUNE 1985.

LAST GROUND WATER RESULTS FOR WELLS MW-103A, MW-103D AND MW-118 ARE FROM 8/14/07 AND 9/20/07. CSX ABANDONED THESE WELLS ON 2/15/08 FOR CONSTRUCTION OF CSX TRAINING CENTER.

(19/NA)	TOTAL ARSENIC/LEAD/COPPER/ZINC CONCENTRATIONS IN SOIL (mg/kg)
116.65	TOTAL PESTICIDES CONCENTRATIONS IN SOIL (mg/kg)
mg/kg	MILLIGRAMS PER KILOGRAM
mg/L	MILLIGRAMS PER LITER
NA	NOT ANALYZED
BDL	BELLOW DETECTION LEVEL
*	DW-2A SOIL ANALYTICAL DATA IS FROM ADJACENT WELL DW-2B
* *	MW-103A SOIL ANALYTICAL DATA FROM BORING MW-103
(0.15/0.02/0.079/25)	TOTAL ARSENIC/LEAD/COPPER/ZINC CONCENTRATIONS IN GROUND WATER (mg/L)
0.82	TOTAL PESTICIDES CONCENTRATIONS IN GROUND WATER mg/L
(0.04/0.06)	NITRATE/SULFATE CONCENTRATIONS IN GROUNDWATER (mg/L)
	MOST RECENT GROUND-WATER RESULTS WERE USED UNLESS NOTED OTHERWISE

▯	SCREENED INTERVAL OF MONITORING WELL
🟩	VERTICAL EXTENT OF PESTICIDES, ARSENIC AND LEAD IN SOIL ABOVE GROUND WATER
🟩	PESTICIDES, ARSENIC AND LEAD IN SOIL ARE DELINEATED PER THE VRP DELINEATION CRITERIA 12-8-108(1)(A) WHICH IS SITE BACKGROUND CONCENTRATIONS. SITE BACKGROUND CONCENTRATIONS FOR PESTICIDES ARE DEFINED AS THE NON-DETECTION OF CONSTITUENTS ABOVE LABORATORY QUANTITATION LIMITS. SITE BACKGROUND CONCENTRATIONS FOR ARSENIC AND LEAD IN SOIL ARE:

ARSENIC	10 MG/KG
LEAD	84 MG/KG

IN SOME LOCATIONS, PESTICIDES, ARSENIC AND LEAD CONCENTRATIONS IN SOIL THAT ARE ABOVE SITE BACKGROUND CONCENTRATIONS EXTEND DOWN TO GROUND WATER

🟦	VERTICAL EXTENT OF PESTICIDES, ARSENIC AND LEAD IN GROUND WATER
🟦	PESTICIDES, IN GROUND WATER ARE DELINEATED PER THE VRP DELINEATION CRITERIA 12-8-108(1)(A) WHICH IS SITE BACKGROUND CONCENTRATIONS. SITE BACKGROUND CONCENTRATIONS FOR PESTICIDES ARE DEFINED AS THE NON-DETECTION OF CONSTITUENTS ABOVE LABORATORY QUANTITATION LIMITS. ARSENIC, LEAD, COPPER, ZINC, NITRATE AND SULFATE IN GROUNDWATER ARE DELINEATED PER THE VRP DELINEATION CRITERIA 12-8-108(E) DEFAULT RESIDENTIAL CLEANUP STANDARDS (TYPE I RRS)

ARSENIC	0.01 MG/L
LEAD	0.015 MG/L
COPPER	1.3 MG/L
ZINC	2 MG/L
NITRATE	10 MG/L
SULFATE	250 MG/L

REV	DATE	BY	SUB	APP	DESCRIPTION	REV	DATE	BY	SUB	APP	DESCRIPTION

DESIGNED
T. PARKER
DRAWN
T. GLADSTONE
CHECKED
R.QUINN
IN CHARGE
L. NEAL
DATE 2/24/2011

FORMER ESTECH GENERAL CHEMICALS SITE
ATLNNTA, GEORGIA

MACTEC
MACTEC Engineering and Consulting, Inc.
3200 TOWN POINT DRIVE, SUITE 100
KENNESAW, GEORGIA 30144 (770) 421-3400

HYDROGEOLOGIC PROFILE
A–A'

SCALE
AS SHOWN
CONTRACT
6122-08-0154
DWG. NO.
4.2
REV
PAGE NO
4

LEGEND:

▦	FILL
▨	SANDY CLAY
▯	SILTY CLAY TO CLAYEY SILT
▤	SANDY SILT AND SILTY SAND
▨	AMPHIBOLITE GNEISS AND BIOTITE GNEISS
———	GEOLOGIC CONTACT
– – –?– – –	INTERPRETED GEOLOGIC CONTACT
— — ▼	POTENTIOMETRIC SURFACE
▼	WATER LEVEL MEASURED ON 9/14/2010
B.T. @ 80.0 FT. BGS	BORING TERMINATED AT 80.0 FT. BELOW GROUND SURFACE

** GROUND WATER RESULTS LISTED FOR WELL MW-1A, WERE COLLECTED IN DECEMBER 1997. GROUND WATER RESULT LISTED FOR WELL MW-21 WERE COLLECTED IN DECEMBER 1999. WELL WAS DRY IN 2010.

* SOILS DATA FROM MW-104

☷	SCREENED INTERVAL OF MONITORING WELL
(19/NA/BDL/6.2)	TOTAL ARSENIC/LEAD/COPPER/ZINC CONCENTRATIONS IN SOIL (mg/kg)
116.65	TOTAL PESTICIDES CONCENTRATIONS IN SOIL (mg/kg)
mg/kg	MILLIGRAMS PER KILOGRAM
mg/L	MILLIGRAMS PER LITER
NA	NOT ANALYZED
BDL	BELOW DETECTION LIMIT
(0.15/0.02/0.022/0.66)	TOTAL ARSENIC/LEAD/COPPER/ZINC CONCENTRATIONS IN GROUND WATER (mg/L)
0.62	TOTAL PESTICIDES CONCENTRATIONS IN GROUND WATER (mg/L)
(0.04/0.06)	NITRATE/SULFATE CONCENTRATIONS IN GROUNDWATER (mg/L)
🟩	VERTICAL EXTENT OF PESTICIDES, ARSENIC AND LEAD IN SOIL ABOVE GROUND WATER
🟩	PESTICIDES, ARSENIC AND LEAD IN SOIL ARE DELINEATED PER THE VRP DELINEATION CRITERIA 12-8-108(1)(A) WHICH IS SITE BACKGROUND CONCENTRATIONS. SITE BACKGROUND CONCENTRATIONS FOR PESTICIDES ARE DEFINED AS THE NON-DETECTION OF CONSTITUENTS ABOVE LABORATORY QUANTITATION LIMITS. SITE BACKGROUND CONCENTRATIONS FOR ARSENIC AND LEAD IN SOIL ARE:

ARSENIC	10 MG/KG
LEAD	84 MG/KG

IN SOME LOCATIONS, PESTICIDES, ARSENIC AND LEAD CONCENTRATIONS IN SOIL THAT ARE ABOVE SITE BACKGROUND CONCENTRATIONS EXTEND DOWN TO GROUND WATER

🟦	VERTICAL EXTENT OF PESTICIDES, ARSENIC, LEAD, COPPER AND ZINC IN GROUND WATER
🟦	PESTICIDES, IN GROUND WATER ARE DELINEATED PER THE VRP DELINEATION CRITERIA 12-8-108(1)(A) WHICH IS SITE BACKGROUND CONCENTRATIONS. SITE BACKGROUND CONCENTRATIONS FOR PESTICIDES ARE DEFINED AS THE NON-DETECTION OF CONSTITUENTS ABOVE LABORATORY QUANTITATION LIMITS. ARSENIC, LEAD, COPPER, ZINC, NITRATE AND SULFATE IN GROUNDWATER ARE DELINEATED PER THE VRP DELINEATION CRITERIA 12-8-108(E) DEFAULT RESIDENTIAL CLEANUP STANDARDS (TYPE I RRS)

ARSENIC	0.01 MG/L
LEAD	0.015 MG/L
COPPER	1.3 MG/L
ZINC	2 MG/L
NITRATE	10 MG/L
SULFATE	250 MG/L

10

SCALE
IN FEET

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REV	DATE	BY	SUB	APP	DESCRIPTION	REV	DATE	BY	SUB	APP	DESCRIPTION

DESIGNED T. PARKER
DRAWN T. GLADSTONE
CHECKED R. QUINN
IN CHARGE L. NEAL
DATE 2/24/2011

FORMER ESTECH GENERAL CHEMICALS SITE
ATLANTA, GEORGIA

MACTEC
MACTEC Engineering and Consulting, Inc.
3200 TOWN POINT DRIVE, SUITE 100
KENNESAW, GEORGIA 30144 (770) 421-3400

HYDROGEOLOGIC PROFILE B-B'

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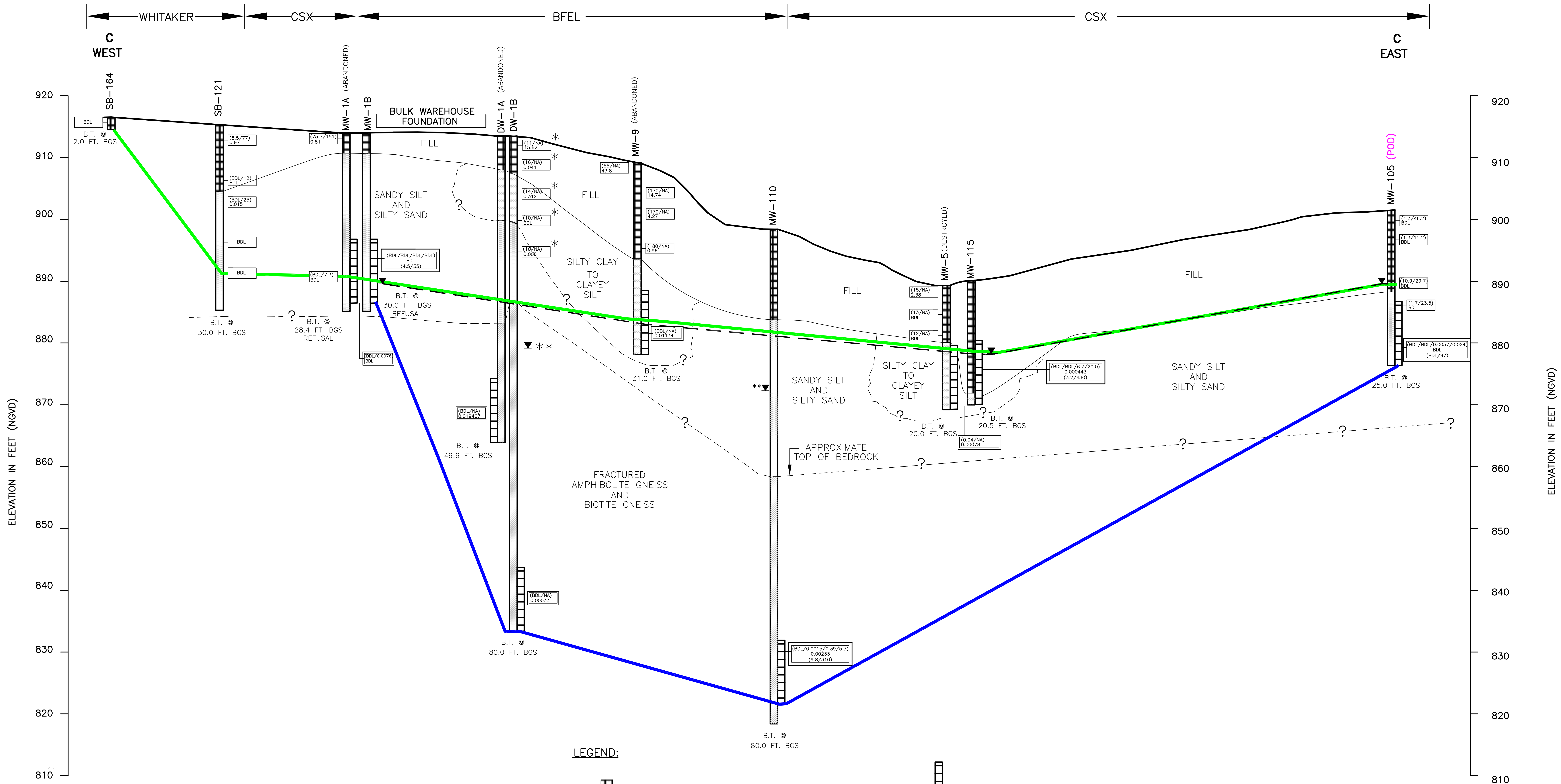


LEGEND:

▦	FILL
░	SANDY CLAY
░	SILTY CLAY TO CLAYEY SILT
░	SANDY SILT AND SILTY SAND
▨	AMPHIBOLITE GNEISS AND BIOTITE GNEISS
———	GEOLOGIC CONTACT
- - ? - -	INTERPRETED GEOLOGIC CONTACT
— — ▼	POTENTIOMETRIC SURFACE
▼	WATER LEVEL MEASURED ON 9/14/2010
B.T. @ 80.0 FT. BGS	BORING TERMINATED AT 80.0 FT. BELOW GROUND SURFACE
(POD)	POINT OF DEMONSTRATION WELL

GROUNDWATER RESULTS LISTED FOR WELLS DW-1A, DW-1B, MW-5 AND MW-9 WERE COLLECTED IN JUNE/JULY 1985; WELL MW-1A WAS COLLECTED IN DECEMBER 1997.

☰	SCREENED INTERVAL OF MONITORING WELL
(19/NA)	TOTAL ARSENIC/LEAD CONCENTRATIONS IN SOIL (mg/kg)
116.65	TOTAL PESTICIDES CONCENTRATIONS IN SOIL (mg/kg)
mg/kg	MILLIGRAMS PER KILOGRAM
mg/L	MILLIGRAMS PER LITER
NA	NOT ANALYZED
BDL	BELOW DETECTION LIMIT
*	DW-1B SOIL ANALYTICAL DATA IS FROM ADJACENT BORING SB-12
**	WATER LEVEL IN BEDROCK WELL
(0.15/0.02/0.39/5.7)	TOTAL ARSENIC/LEAD/COPPER/ZINC CONCENTRATIONS IN GROUND WATER (mg/L)
116.65	TOTAL PESTICIDES CONCENTRATIONS IN GROUND WATER (mg/L)
(0.04/0.06)	NITRATE/SULFATE CONCENTRATIONS IN GROUNDWATER (mg/L)

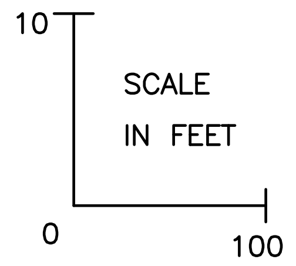
🟩	VERTICAL EXTENT OF PESTICIDES, ARSENIC AND LEAD IN SOIL ABOVE GROUND WATER
🟩	PESTICIDES, ARSENIC AND LEAD IN SOIL ARE DELINEATED PER THE VRP DELINEATION CRITERIA 12-8-108(1)(A) WHICH IS SITE BACKGROUND CONCENTRATIONS. SITE BACKGROUND CONCENTRATIONS FOR PESTICIDES ARE DEFINED AS THE NON-DETECTION OF CONSTITUENTS ABOVE LABORATORY QUANTITATION LIMITS. SITE BACKGROUND CONCENTRATIONS FOR ARSENIC AND LEAD IN SOIL ARE:

ARSENIC	10 MG/KG
LEAD	84 MG/KG

IN SOME LOCATIONS, PESTICIDES, ARSENIC AND LEAD CONCENTRATIONS IN SOIL THAT ARE ABOVE SITE BACKGROUND CONCENTRATIONS EXTEND DOWN TO GROUND WATER

🟦	VERTICAL EXTENT OF PESTICIDES, ARSENIC AND LEAD IN GROUND WATER
🟦	PESTICIDES IN GROUNDWATER ARE DELINEATED PER THE VRP DELINEATION CRITERIA 12-8-108(1)(A) WHICH IS SITE BACKGROUND CONCENTRATIONS. SITE BACKGROUND CONCENTRATIONS FOR PESTICIDES ARE DEFINED AS THE NON-DETECTION OF CONSTITUENTS ABOVE LABORATORY QUANTITATION LIMITS. ARSENIC, LEAD, COPPER, ZINC, NITRATE AND SULFATE IN GROUNDWATER ARE DELINEATED PER THE VRP DELINEATION CRITERIA 12-8-108(E) DEFAULT RESIDENTIAL CLEANUP STANDARDS (TYPE I RRS)

ARSENIC	0.01 MG/L
LEAD	0.015 MG/L
COPPER	1.3 MG/L
ZINC	2 MG/L
NITRATE	10 MG/L
SULFATE	250 MG/L



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DESIGNED T. PARKER
DRAWN T. GLADSTONE
CHECKED R. QUINN
IN CHARGE L. NEAL
DATE 2/24/2011

FORMER ESTECH GENERAL CHEMICALS SITE
ATLANTA, GEORGIA

MACTEC
MACTEC Engineering and Consulting, Inc.
3200 TOWN POINT DRIVE, SUITE 100
KENNESAW, GEORGIA 30144 (770) 421-3400

HYDROGEOLOGIC PROFILE
C-C'

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PAGE NO

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LEGEND:

▨	FILL
▨	SANDY CLAY
▨	SILTY CLAY TO CLAYEY SILT
▨	SANDY SILT AND SILTY SAND
▨	AMPHIBOLITE GNEISS AND BIOTITE GNEISS
———	GEOLOGIC CONTACT
– – –?– – –	INTERPRETED GEOLOGIC CONTACT
— — ▼	POTENTIOMETRIC SURFACE
▼	WATER LEVEL MEASURED ON 9/14/10
B.T. @ 80.0 FT. BGS	BORING TERMINATED AT 80.0 FT. BELOW GROUND SURFACE

GROUNDWATER RESULTS LISTED FOR WELLS MW–12, AND MW–18 WERE COLLECTED IN JUNE 1985; MW–2(BFI) AND MW–3 (BFI) COLLECTED 1993. MONITORING WELL MW–21 RESULTS ARE FROM DECEMBER 1999.

*DEPTH TO GROUNDWATER FROM PHASE II INVESTIGATION OF CSX SITE LOCATED AT MARIETTA BLVD., ATLANTA, GA., JORDAN, JONES, & GOULDING, INC., JUNE 1993.

☐	SCREENED INTERVAL OF MONITORING WELL
(19/NA)	TOTAL ARSENIC/LEAD CONCENTRATIONS IN SOIL (mg/kg)
116.65	TOTAL PESTICIDES CONCENTRATIONS IN SOIL (mg/kg)
mg/kg	MILLIGRAMS PER KILOGRAM
mg/L	MILLIGRAMS PER LITER
NA	NOT ANALYZED
BDL	BELOW DETECTION LIMIT
(0.15/0.02/0.32/2.9)	TOTAL ARSENIC/LEAD/COPPER/ZINC CONCENTRATIONS IN GROUND WATER (mg/L)
(0.04/0.06)	NITRATE/SULFATE CONCENTRATIONS IN GROUNDWATER (mg/L)
POD	POINT OF DEMONSTRATION WELL

🟩 VERTICAL EXTENT OF PESTICIDES, ARSENIC AND LEAD IN SOIL ABOVE GROUND WATER

🟩 PESTICIDES, ARSENIC AND LEAD IN SOIL ARE DELINEATED PER THE VRP DELINEATION CRITERIA 12–8–108(1)(A) WHICH IS SITE BACKGROUND CONCENTRATIONS. SITE BACKGROUND CONCENTRATIONS FOR PESTICIDES ARE DEFINED AS THE NON–DETECTION OF CONSTITUENTS ABOVE LABORATORY QUANTITATION LIMITS. SITE BACKGROUND CONCENTRATIONS FOR ARSENIC AND LEAD IN SOIL ARE:

ARSENIC	10 MG/KG
LEAD	84 MG/KG

IN SOME LOCATIONS, PESTICIDES, ARSENIC AND LEAD CONCENTRATIONS IN SOIL THAT ARE ABOVE SITE BACKGROUND CONCENTRATIONS EXTEND DOWN TO GROUND WATER

🟦 VERTICAL EXTENT OF PESTICIDES, ARSENIC AND LEAD IN GROUND WATER

🟦 PESTICIDES, IN GROUND WATER ARE DELINEATED PER THE VRP DELINEATION CRITERIA 12–8–108(1)(A) WHICH IS SITE BACKGROUND CONCENTRATIONS. SITE BACKGROUND CONCENTRATIONS FOR PESTICIDES ARE DEFINED AS THE NON–DETECTION OF CONSTITUENTS ABOVE LABORATORY QUANTITATION LIMITS. ARSENIC, LEAD, COPPER, ZINC, NITRATE AND SULFATE IN GROUNDWATER ARE DELINEATED PER THE VRP DELINEATION CRITERIA 12–8–108(E) DEFAULT RESIDENTIAL CLEANUP STANDARDS (TYPE I RRS)

ARSENIC	0.01 MG/L
LEAD	0.015 MG/L
COPPER	1.3 MG/L
ZINC	2 MG/L
NITRATE	10 MG/L
SULFATE	250 MG/L

10
SCALE
IN FEET
0
100

REV	DATE	BY	SUB	APP	DESCRIPTION	REV	DATE	BY	SUB	APP	DESCRIPTION

DESIGNED T. PARKER
DRAWN T. GLADSTONE
CHECKED R. QUINN
IN CHARGE L. NEAL
DATE 2/25/2011

FORMER ESTECH GENERAL CHEMICALS SITE
ATLANTA, GEORGIA

MACTEC
MACTEC Engineering and Consulting, Inc.
3200 TOWN POINT DRIVE, SUITE 100
KENNESAW, GEORGIA 30144 (770) 421–3400

HYDROGEOLOGIC PROFILE
D–D'

SCALE AS SHOWN
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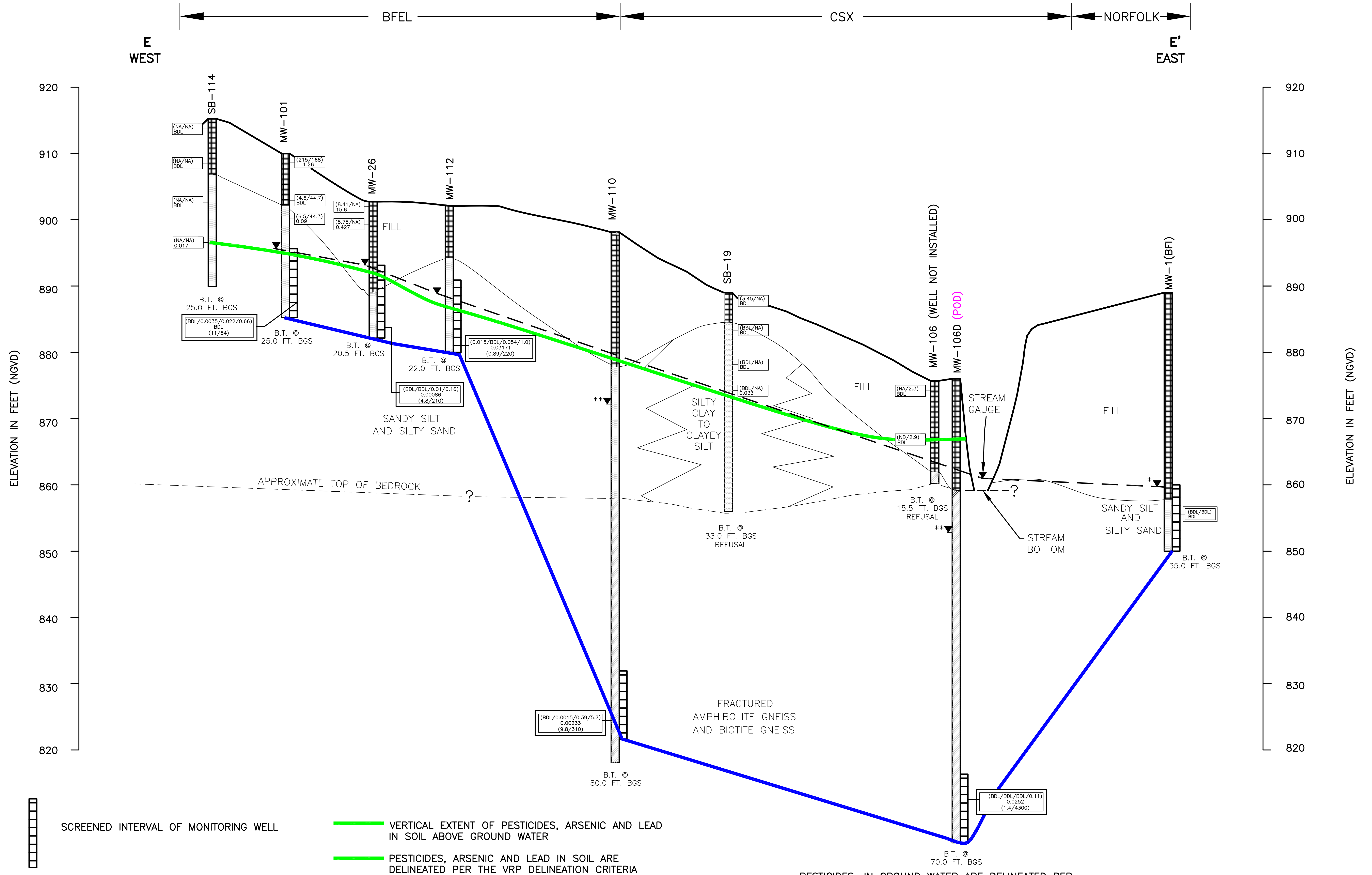


LEGEND:

▩	FILL
▨	SANDY CLAY
▯	SILTY CLAY TO CLAYEY SILT
▯	SANDY SILT AND SILTY SAND
▨	AMPHIBOLITE GNEISS AND BIOTITE GNEISS
———	GEOLOGIC CONTACT
– –?– – –	INTERPRETED GEOLOGIC CONTACT
— — ▼	POTENTIOMETRIC SURFACE
▼	WATER LEVEL MEASURED ON 9/14/10
**	WATER LEVEL IN BEDROCK MONITORING WELL
B.T. @ 80.0 FT. BGS	BORING TERMINATED AT 80.0 FT. BELOW GROUND SURFACE

GROUNDWATER RESULTS LISTED FOR WELL MW-1 (BFI) ARE FROM 1993.

*DEPTH TO GROUNDWATER FROM PHASE II INVESTIGATION OF CSX SITE LOCATIED AT MARIETTA BLVD., ATLANTA, GA., JORDAN, JONES, & GOULDING, INC., JUNE 1993.

☐	SCREENED INTERVAL OF MONITORING WELL
(19/NA)	TOTAL ARSENIC/LEAD CONCENTRATIONS IN SOIL (mg/kg)
116.65	TOTAL PESTICIDES CONCENTRATIONS IN SOIL (mg/kg)
mg/kg	MILLIGRAMS PER KILOGRAM
mg/L	MILLIGRAMS PER LITER
NA	NOT ANALYZED
BDL	BELOW DETECTION LIMIT
(0.15/0.02/0.01/0.16)	TOTAL ARSENIC/LEAD/COPPER/ZINC CONCENTRATIONS IN GROUND WATER (mg/L)
0.62	TOTAL PESTICIDES CONCENTRATIONS IN GROUND WATER (mg/L)
(0.04/0.06)	NITRATE/SULFATE CONCENTRATIONS IN GROUNDWATER (mg/L)
POD	POINT OF DEMONSTRATION WELL

🟩 VERTICAL EXTENT OF PESTICIDES, ARSENIC AND LEAD IN SOIL ABOVE GROUND WATER

🟩 PESTICIDES, ARSENIC AND LEAD IN SOIL ARE DELINEATED PER THE VRP DELINEATION CRITERIA 12–8–108(1)(A) WHICH IS SITE BACKGROUND CONCENTRATIONS. SITE BACKGROUND CONCENTRATIONS FOR PESTICIDES ARE DEFINED AS THE NON–DETECTION OF CONSTITUENTS ABOVE LABORATORY QUANTITATION LIMITS. SITE BACKGROUND CONCENTRATIONS FOR ARSENIC AND LEAD IN SOIL ARE:

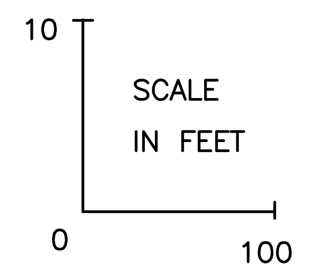
ARSENIC	10 MG/KG
LEAD	84 MG/KG

IN SOME LOCATIONS, PESTICIDES, ARSENIC AND LEAD CONCENTRATIONS IN SOIL THAT ARE ABOVE SITE BACKGROUND CONCENTRATIONS EXTEND DOWN TO GROUND WATER

🟦 VERTICAL EXTENT OF PESTICIDES, ARSENIC AND LEAD IN GROUND WATER

🟦 PESTICIDES, IN GROUND WATER ARE DELINEATED PER THE VRP DELINEATION CRITERIA 12–8–108(1)(A) WHICH IS SITE BACKGROUND CONCENTRATIONS. SITE BACKGROUND CONCENTRATIONS FOR PESTICIDES ARE DEFINED AS THE NON–DETECTION OF CONSTITUENTS ABOVE LABORATORY QUANTITATION LIMITS. ARSENIC, LEAD, COPPER, ZINC, NITRATE AND SULFATE IN GROUNDWATER ARE DELINEATED PER THE VRP DELINEATION CRITERIA 12–8–108(E) DEFAULT RESIDENTIAL CLEANUP STANDARDS (TYPE I RRS)

ARSENIC	0.01 MG/L
LEAD	0.015 MG/L
COPPER	1.3 MG/L
ZINC	2 MG/L
NITRATE	10 MG/L
SULFATE	250 MG/L



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REV	DATE	BY	SUB	APP	DESCRIPTION	REV	DATE	BY	SUB	APP	DESCRIPTION

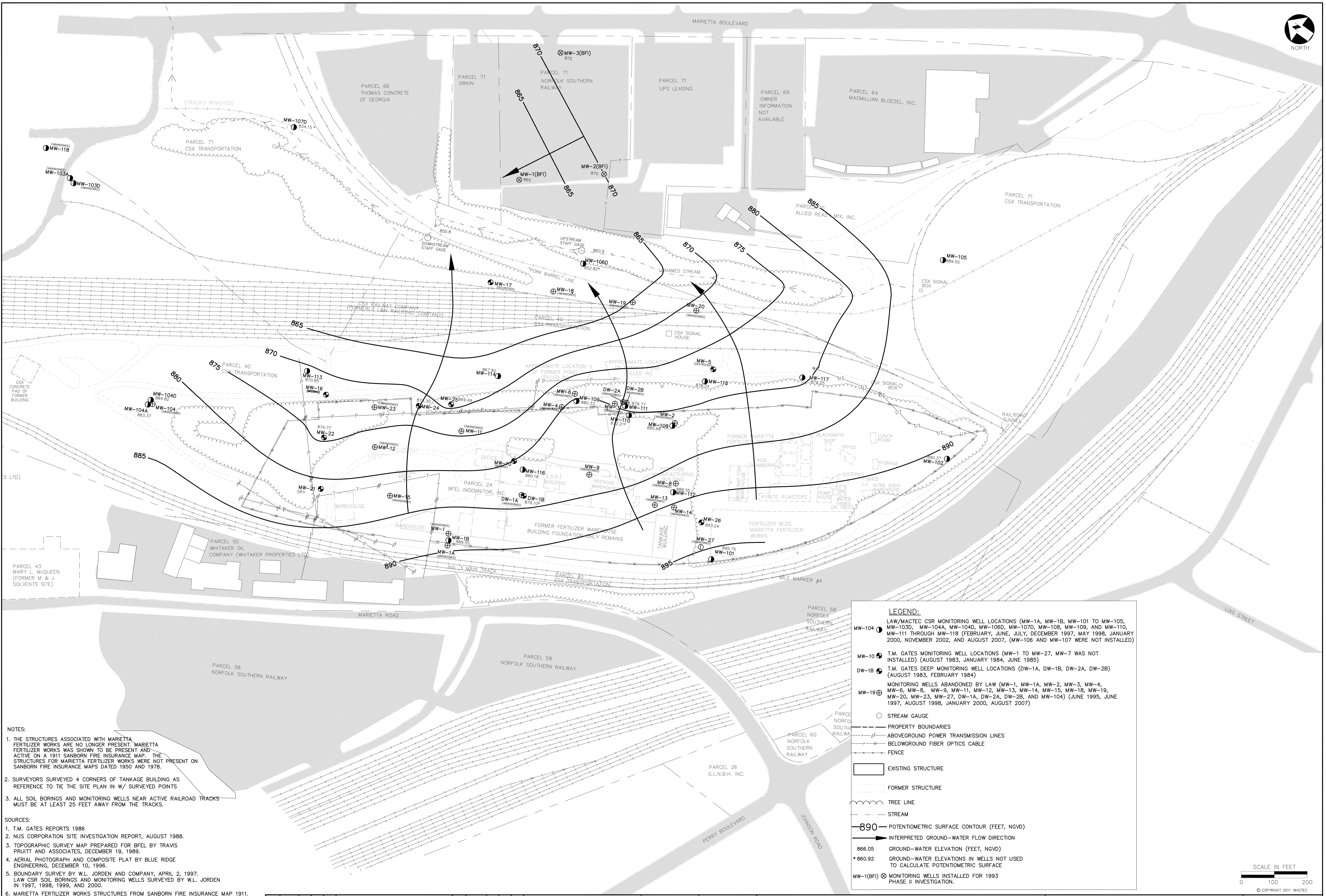
DESIGNED T. PARKER
DRAWN T. GLADSTONE
CHECKED R. QUINN
IN CHARGE L. NEAL
DATE 2/24/2011

FORMER ESTECH GENERAL CHEMICALS SITE
ATLANTA, GEORGIA

MACTEC
MACTEC Engineering and Consulting, Inc.
3200 TOWN POINT DRIVE, SUITE 100
KENNESAW, GEORGIA 30144 (770) 421–3400

HYDROGEOLOGIC PROFILE E–E'

SCALE AS SHOWN
CONTRACT 6122–08–0154
DWG. NO. 4.6
REV 1
PAGE NO



LEGEND:

MW-104 ◐	LAW/MACTEC CSR MONITORING WELL LOCATIONS (MW-1A, MW-1B, MW-101 TO MW-105, MW-103D, MW-104A, MW-104D, MW-106D, MW-107D, MW-108, MW-109, AND MW-110, MW-111 THROUGH MW-118 (FEBRUARY, JUNE, JULY, DECEMBER 1997, MAY 1998, JANUARY 2000, NOVEMBER 2002, AND AUGUST 2007, (MW-106 AND MW-107 WERE NOT INSTALLED)
MW-10 ⊕	T.M. GATES MONITORING WELL LOCATIONS (MW-1 TO MW-27, MW-7 WAS NOT INSTALLED) (AUGUST 1983, JANUARY 1984, JUNE 1985)
DW-1B ⊕	T.M. GATES DEEP MONITORING WELL LOCATIONS (DW-1A, DW-1B, DW-2A, DW-2B) (AUGUST 1983, FEBRUARY 1984)
MW-19 ⊕	MONITORING WELLS ABANDONED BY LAW (MW-1, MW-1A, MW-2, MW-3, MW-4, MW-6, MW-8, MW-9, MW-11, MW-12, MW-13, MW-14, MW-15, MW-18, MW-19, MW-20, MW-23, MW-27, DW-1A, DW-2A, DW-2B, AND MW-104) (JUNE 1995, JUNE 1997, AUGUST 1998, JANUARY 2000, AUGUST 2007)
○	STREAM GAUGE
— — —	PROPERTY BOUNDARIES
—P—	ABOVEGROUND POWER TRANSMISSION LINES
—UT—	BELOWGROUND FIBER OPTICS CABLE
—×—×—	FENCE
▭	EXISTING STRUCTURE
┆	FORMER STRUCTURE
⌒⌒⌒	TREE LINE
—·—	STREAM
—890—	POTENTIOMETRIC SURFACE CONTOUR (FEET, NGVD)
——►	INTERPRETED GROUND-WATER FLOW DIRECTION
866.05	GROUND-WATER ELEVATION (FEET, NGVD)
* 860.92	GROUND-WATER ELEVATIONS IN WELLS NOT USED TO CALCULATE POTENTIOMETRIC SURFACE
MW-1(BFI) ⊗	MONITORING WELLS INSTALLED FOR 1993 PHASE II INVESTIGATION.

NOTES:

1. THE STRUCTURES ASSOCIATED WITH MARIETTA FERTILIZER WORKS ARE NO LONGER PRESENT. MARIETTA FERTILIZER WORKS WAS SHOWN TO BE PRESENT AND ACTIVE ON A 1911 SANBORN FIRE INSURANCE MAP. THE STRUCTURES FOR MARIETTA FERTILIZER WORKS WERE NOT PRESENT ON SANBORN FIRE INSURANCE MAPS DATED 1950 AND 1978.
2. SURVEYORS SURVEYED 4 CORNERS OF TANKAGE BUILDING AS REFERENCE TO TIE THE SITE PLAN IN W/ SURVEYED POINTS
3. ALL SOIL BORINGS AND MONITORING WELLS NEAR ACTIVE RAILROAD TRACKS MUST BE AT LEAST 25 FEET AWAY FROM THE TRACKS.

SOURCES:

1. T.M. GATES REPORTS 1986
2. NUS CORPORATION SITE INVESTIGATION REPORT, AUGUST 1988.
3. TOPOGRAPHIC SURVEY MAP PREPARED FOR BFEL BY TRAVIS PRUITT AND ASSOCIATES, DECEMBER 19, 1989.
4. AERIAL PHOTOGRAPH AND COMPOSITE PLAT BY BLUE RIDGE ENGINEERING, DECEMBER 10, 1996.
5. BOUNDARY SURVEY BY W.L. JORDEN AND COMPANY, APRIL 2, 1997. LAW CSR SOIL BORINGS AND MONITORING WELLS SURVEYED BY W.L. JORDEN IN 1997, 1998, 1999, AND 2000.
6. MARIETTA FERTILIZER WORKS STRUCTURES FROM SANBORN FIRE INSURANCE MAP 1911.
7. MACTEC/LAW CSR SOIL BORINGS AND MONITORING WELLS (2002-2007) AND SURFACE WATER LOCATIONS SURVEYED BY MACTEC ENGINEERING AND CONSULTING INC.
8. PROPERTY OWNERS SHOWN ARE BASED ON 1996 FULTON COUNTY TAX RECORDS
9. WHITAKER AND MARY L. McQUEEN PROPERTY BOUNDARIES WERE REVISED AND ARE APPROXIMATE AND ARE BASED ON FULTON COUNTY BOARD OF ASSESSORS RECORDS 2004-2005 AT www.fultonassessor.org

CADD NOTE: DRAWING XREFS ROTATED @ 0,0; 55° FROM SURVEY FILE COORDINATE POSITION.

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REV	DATE	BY	SUB	APP	DESCRIPTION	REV	DATE	BY	SUB	APP	DESCRIPTION

DESIGNED A. ROGERO
DRAWN T. GLADSTONE
CHECKED R. QUINN
IN CHARGE L. NEAL
DATE 11/9/2010

FORMER ESTECH GENERAL CHEMICALS SITE
ATLANTA,GEORGIA

MACTEC Engineering and Consulting, Inc.
3200 TOWN POINT DRIVE, SUITE 100
KENNESAW, GEORGIA 30144 (770) 421-3400

POTENTIOMETRIC SURFACE MAP
SEPTEMBER 14, 2010

SCALE AS SHOWN
CONTRACT 6122-08-0154
DWG. NO. 4.7
REV 1
PAGE NO

SW2010-18	9/23/2010
alpha-BHC	0.00045
beta-BHC	0.00064
delta-BHC	0.0003 p
gamma-BHC (Lindane)	0.00017

SW2010-17	9/23/2010
alpha-BHC	0.00031
beta-BHC	0.00048
delta-BHC	0.00021 p
gamma-BHC (Lindane)	0.00011

SW2010-16	9/23/2010
alpha-BHC	0.00037
beta-BHC	0.0006
delta-BHC	0.00033 p
Dieldrin	0.000012 J
gamma-BHC (Lindane)	0.00015

SW2010-15	9/23/2010
alpha-BHC	0.00062
beta-BHC	0.00075
delta-BHC	0.00044 p
Dieldrin	0.000017 J
gamma-BHC (Lindane)	0.00022

SW2010-14	9/23/2010
alpha-BHC	0.00062
beta-BHC	0.00073
delta-BHC	0.00048 p
Dieldrin	0.000015 J
gamma-BHC (Lindane)	0.00022

SW2010-10	9/23/2010
alpha-BHC	0.00013
beta-BHC	0.00018
delta-BHC	0.00011 p
Dieldrin	0.000011 J
gamma-BHC (Lindane)	0.000084

SW2010-13	9/23/2010
alpha-BHC	0.0005
beta-BHC	0.00063
delta-BHC	0.00032 p
Dieldrin	0.000015 J
gamma-BHC (Lindane)	0.0002

SW2010-12	9/23/2010
alpha-BHC	0.00025
beta-BHC	0.00046
delta-BHC	0.00015 p
Dieldrin	0.000012 J
gamma-BHC (Lindane)	0.00013

SW2010-11	9/23/2010
alpha-BHC	0.00019
beta-BHC	0.00045
delta-BHC	0.00013 p
Dieldrin	0.000012 J
gamma-BHC (Lindane)	0.00011

SW2010-7	9/23/2010
alpha-BHC	0.00009
beta-BHC	0.00016
delta-BHC	0.000091 p
gamma-BHC (Lindane)	0.000029 Jp
DDD	0.000014 J

SW2010-6	9/23/2010
alpha-BHC	0.000094
beta-BHC	0.00015
delta-BHC	0.00014
gamma-BHC (Lindane)	0.000043 J

SW2010-5	9/23/2010
alpha-BHC	0.00013
beta-BHC	0.00023
delta-BHC	0.0002
gamma-BHC (Lindane)	0.000037 Jp

SW2010-8	9/23/2010
alpha-BHC	0.00018
beta-BHC	0.00019 p
delta-BHC	0.00019 p
Dieldrin	0.000014 J
gamma-BHC (Lindane)	0.00012

SW2010-9	9/23/2010
alpha-BHC	0.00016
beta-BHC	0.00014 p
delta-BHC	0.0002
gamma-BHC (Lindane)	0.0001

MW-106D	09/15/2010
alpha-BHC	0.0082
beta-BHC	0.0019
delta-BHC	0.01
gamma-BHC (Lindane)	0.0051

SW2010-4	9/23/2010
alpha-BHC	0.000039 J
beta-BHC	0.00014
delta-BHC	0.00011 p
gamma-BHC (Lindane)	0.000028 Jp

SW2010-3	9/23/2010
alpha-BHC	0.000057
beta-BHC	0.00015
delta-BHC	0.00013 p
gamma-BHC (Lindane)	0.00006

SW2010-2	9/23/2010
alpha-BHC	0.00013
beta-BHC	0.00016 p
delta-BHC	0.00022 p
gamma-BHC (Lindane)	0.000058 p

SW2010-1	9/23/2010
alpha-BHC	<0.0000057
beta-BHC	<0.0000067
delta-BHC	<0.0000048
Dieldrin	<0.0000091
gamma-BHC (Lindane)	<0.0000059

MW-114	9/14/2010
alpha-BHC	0.00024
beta-BHC	0.0046
delta-BHC	0.00011 P
gamma-BHC (Lindane)	0.00027

MW-113	09/15/2010
alpha-BHC	0.0014
beta-BHC	0.0018
delta-BHC	0.0016
gamma-BHC (Lindane)	0.0012

MW-25	09/14/2010
alpha-BHC	0.00019
beta-BHC	0.00095
delta-BHC	0.00013
gamma-BHC (Lindane)	0.00012

MW-111	9/14/2010
alpha-BHC	0.014
beta-BHC	<0.01
delta-BHC	0.03
Dieldrin	0.00014
gamma-BHC (Lindane)	<0.01

MW-115	9/14/2010
alpha-BHC	0.00024
beta-BHC	0.00013
delta-BHC	<0.000047
gamma-BHC (Lindane)	0.000073

MW-109	9/14/2010
alpha-BHC	0.0028
beta-BHC	<0.00048
delta-BHC	<0.00048
gamma-BHC (Lindane)	0.0019

MW-110	07/29/2010
alpha-BHC	0.00047
beta-BHC	0.00043
delta-BHC	0.00088
gamma-BHC (Lindane)	0.00055

MW-108	07/29/2010
alpha-BHC	0.0058
beta-BHC	0.0024
delta-BHC	0.0018
Dieldrin	0.000098 P
gamma-BHC (Lindane)	0.0002 P

MW-22	07/28/2010
alpha-BHC	0.00079
beta-BHC	0.00096
delta-BHC	0.00026
gamma-BHC (Lindane)	0.00047

MW-116	07/28/2010
alpha-BHC	0.00019
beta-BHC	0.00063
delta-BHC	<0.000048
gamma-BHC (Lindane)	0.00027

MW-26	07/28/2010
alpha-BHC	0.00011
beta-BHC	0.00054
delta-BHC	0.00014
gamma-BHC (Lindane)	0.00007

MW-112	07/28/2010
alpha-BHC	<0.0025
beta-BHC	0.031
delta-BHC	<0.0025
Dieldrin	0.00012
gamma-BHC (Lindane)	0.00059

LEGEND:

MW-104 ◑	LAW/MACTEC CSR MONITORING WELL LOCATIONS (MW-1A, MW-1B, MW-101 TO MW-105, MW-103D, MW-104A, MW-104D, MW-106D, MW-107D, MW-108, MW-109, AND MW-110, MW-111 THROUGH MW-118 (FEBRUARY, JUNE, JULY, DECEMBER 1997, MAY 1998, JANUARY 2000, NOVEMBER 2002 AND AUGUST 2007) (MW-106 AND MW-107 WERE NOT INSTALLED)
MW-10 ⊕	T.M. GATES MONITORING WELL LOCATIONS (MW-1 TO MW-27, MW-7 WAS NOT INSTALLED) (AUGUST 1983, JANUARY 1984, JUNE 1985)
DW-1B ⊕	T.M. GATES DEEP MONITORING WELL LOCATIONS (DW-1A, DW-1B, DW-2A, DW-2B) (AUGUST 1983, FEBRUARY 1984)
MW-1 ⊕	MONITORING WELLS ABANDONED BY LAW (MW-1, MW-1A, MW-2, MW-3, MW-4, MW-6, MW-8, MW-9, MW-11, MW-12, MW-13, MW-14, MW-15, MW-18, MW-19, MW-20, MW-23, MW-27, DW-1A, DW-2A, DW-2B, AND MW-104) (JUNE 1995, JUNE 1997, AUGUST 1998, JANUARY 2000, AND AUGUST 2007)
P	THE LOWER OF THE TWO VALUES IS REPORTED WHEN THE % DIFFERENCE BETWEEN THE RESULTS OF THE TWO GC COLUMNS IS GREATER THAN 40%
SW-2010-1 ■	MACTEC SURFACE WATER SAMPLING LOCATIONS (SW-2010-1 TO SW-2010-18)
MW-1(BFI) ⊗	APPROXIMATE LOCATION OF MONITORING WELLS INSTALLED FOR 1993 DUE PHASE II INVESTIGATION.
POD	POINT OF DEMONSTRATION WELL
— — —	PROPERTY BOUNDARIES
—P—	ABOVEGROUND POWER TRANSMISSION LINES
—UT—	BELOWGROUND FIBER OPTICS CABLE
—×—×—	FENCE
☐	EXISTING STRUCTURE
⬚	FORMER STRUCTURE
⌒⌒⌒	TREE LINE
—··—	STREAM
🟦	PESTICIDES, IN GROUND WATER ARE DELINEATED PER THE VRP DELINEATION CRITERIA 12-8-108(1)(A) WHICH IS SITE BACKGROUND CONCENTRATIONS. SITE BACKGROUND CONCENTRATIONS FOR PESTICIDES ARE DEFINED AS THE NON-DETECTION OF CONSTITUENTS ABOVE LABORATORY QUANTITATION LIMITS.
🟩	HORIZONTAL DELINEATION OF GROUND-WATER CONTAMINATION

ALL CONCENTRATIONS EXPRESSED IN MILLIGRAMS PER LITER (mg/L)

SCALE IN FEET
0 100 200

REV | DATE | BY | SUB | APP | DESCRIPTION

DESIGNED R. QUINN
DRAWN T. GLADSTONE
CHECKED M. ANDREWS
IN CHARGE L. NEAL
DATE 2/25/2011

FORMER ESTECH GENERAL CHEMICALS SITE
ATLANTA, GEORGIA

MACTEC
MACTEC Engineering and Consulting, Inc.
3200 TOWN POINT DRIVE, SUITE 100
KENNESAW, GEORGIA 30144 (770) 421-3400

DISTRIBUTION AND DELINEATION OF PESTICIDES DETECTED IN GROUND WATER

SCALE AS SHOWN
CONTRACT 6122-08-0154
DWG. NO. 4.11A
REV 5
PAGE NO

J:\BFEL ATLANTA\SEPT 2010\FIGURE 411A.dwg – Layout1 03/15/2011 11:44pm tgladsto

SW2010-18	9/23/2010
Total Metals	
Arsenic	0.0032
Copper	0.052
Lead	<0.0005
Zinc	2
Dissolved	
Arsenic	0.0014 J
Copper	0.02
Lead	<0.0002
Zinc	1.7

SW2010-17	9/23/2010
Total Metals	
Arsenic	0.0029
Copper	0.054
Lead	<0.0005
Zinc	1.9
Dissolved	
Arsenic	<0.0013
Copper	0.024
Lead	<0.0002
Zinc	1.6

SW2010-16	9/23/2010
Total Metals	
Arsenic	0.0055
Copper	0.12
Lead	0.0047
Zinc	2.8
Dissolved	
Arsenic	<0.0013
Copper	0.03
Lead	<0.0002
Zinc	2.3

SW2010-15	9/23/2010
Total Metals	
Arsenic	0.0025
Copper	0.084
Lead	<0.0005
Zinc	2.4
Dissolved	
Arsenic	<0.0013
Copper	0.038
Lead	<0.0002
Zinc	2.2

SW2010-14	9/23/2010
Total Metals	
Arsenic	0.028
Copper	0.78
Lead	0.014
Zinc	15
Dissolved	
Arsenic	<0.0013
Copper	0.048
Lead	<0.0002
Zinc	2.5

SW2010-13	9/23/2010
Total Metals	
Arsenic	0.0029
Copper	0.11
Lead	<0.0005
Zinc	2.3
Dissolved	
Arsenic	<0.0013
Copper	0.053
Lead	<0.0002
Zinc	2.1

SW2010-12	9/23/2010
Total Metals	
Arsenic	0.0067
Copper	0.31
Lead	0.0019
Zinc	3.2
Dissolved	
Arsenic	0.0016 J
Copper	0.092
Lead	<0.0002
Zinc	2.6

SW2010-10	9/23/2010
Total Metals	
Arsenic	0.0014
Copper	0.01
Lead	<0.0005
Zinc	0.5
Dissolved	
Arsenic	0.0023
Copper	0.0054
Lead	<0.0002
Zinc	0.44

SW2010-11	9/23/2010
Total Metals	
Arsenic	0.0059
Copper	0.22
Lead	0.012
Zinc	3
Dissolved	
Arsenic	0.0016 J
Copper	0.097
Lead	<0.0002
Zinc	2.7

SW2010-9	9/23/2010
Total Metals	
Arsenic	0.0049
Copper	0.011
Lead	0.00064 J
Zinc	0.62
Dissolved	
Arsenic	0.0023 J
Copper	0.0059
Lead	<0.0002
Zinc	0.54

SW2010-8	9/23/2010
Total Metals	
Arsenic	0.0053
Copper	0.013
Lead	0.0022
Zinc	0.65
Dissolved	
Arsenic	0.002 J
Copper	0.0055
Lead	<0.0002
Zinc	0.5

SW2010-7	9/23/2010
Total Metals	
Arsenic	0.0082
Copper	0.015
Lead	0.0032
Zinc	0.81
Dissolved	
Arsenic	0.0019 J
Copper	0.006
Lead	<0.0002
Zinc	0.76

SW2010-6	9/23/2010
Total Metals	
Arsenic	0.0059
Copper	0.012
Lead	0.00055 J
Zinc	0.087
Dissolved	
Arsenic	0.0018 J
Copper	0.0056
Lead	<0.0002
Zinc	0.72

SW2010-5	9/23/2010
Total Metals	
Arsenic	0.008
Copper	0.016
Lead	0.00067 J
Zinc	0.97
Dissolved	
Arsenic	0.0015 J
Copper	0.0074
Lead	<0.0002
Zinc	0.89

SW2010-4	9/23/2010
Total Metals	
Arsenic	0.016
Copper	0.016
Lead	0.0046
Zinc	0.54
Dissolved	
Arsenic	<0.0013
Copper	0.0073
Lead	<0.0002
Zinc	0.56

SW2010-3	9/23/2010
Total Metals	
Arsenic	0.025
Copper	0.0071
Lead	0.00096 J
Zinc	0.084
Dissolved	
Arsenic	0.0014 J
Copper	0.0031 J
Lead	<0.0002
Zinc	0.038

SW2010-2	9/23/2010
Total Metals	
Arsenic	0.043
Copper	0.0065
Lead	0.0015
Zinc	0.027
Dissolved	
Arsenic	0.0074
Copper	0.0034 J
Lead	<0.0002
Zinc	0.012 J

SW2010-1	9/23/2010
Total Metals	
Arsenic	0.09
Copper	0.0043 J
Lead	0.0024
Zinc	0.016 J
Dissolved	
Arsenic	0.025
Copper	0.0012 J
Lead	<0.0002
Zinc	<0.0083

MW-118	8-17-07& 9-20-07
Arsenic	<0.0025
Lead	<0.0015
Copper	0.018
Zinc	0.053

MW-103A	8/14/2007
Arsenic	<0.0025
Lead	0.012

MW-103B	8/14/2007
Arsenic	<0.0025
Lead	0.0022

MW-107D	09/15/2010
Arsenic	<0.0025
Copper	<0.005
Lead	<0.0015
Zinc	<0.02

MW-106D	09/15/2010
Arsenic	<0.0025
Lead	<0.0015
Copper	<0.005
Zinc	0.11

MW-105	09/15/2010
Arsenic	<0.0025
Lead	<0.0015
Copper	0.0057
Zinc	0.024

MW-114	09/14/2010
Arsenic	<0.0025
Lead	0.004
Copper	2.2
Zinc	8.7

MW-109	09/14/2010
Arsenic	0.061
Copper	0.079
Lead	0.61
Zinc	25

MW-111	09/14/2010
Arsenic	<0.0025
Lead	<0.0015
Copper	0.039
Zinc	4.4

MW-110	07/29/2010 & 09/14/2010
Arsenic	<0.0025
Lead	0.0015
Copper	0.39
Zinc	5.7

MW-115	09/14/2010
Arsenic	<0.0025
Lead	<0.0015
Copper	6.7
Zinc	20

MW-117	09/14/2010
Arsenic	<0.0025
Copper	0.038
Lead	<0.0015
Zinc	1.6

MW-113	09/15/2010
Arsenic	0.023
Lead	0.0019
Copper	15
Zinc	95

MW-104D	09/15/2010
Arsenic	0.0042
Lead	<0.0015
Copper	<0.005
Zinc	<0.02

MW-104A	09/15/2010
Arsenic	<0.0025
Lead	<0.0015
Copper	<0.005
Zinc	<0.02

MW-25	09/14/2010
Arsenic	0.0027
Lead	0.02
Copper	0.32
Zinc	2.9

MW-22	07/28/2010 & 9/13/2010
Arsenic	0.0038
Lead	0.004
Copper	4.0
Zinc	8.3

MW-108	07/29/2010 & 09/14/2010
Arsenic	<0.0025
Lead	<0.0015
Copper	0.3
Zinc	3.6

MW-102	07/29/2010 & 09/14/2010
Arsenic	<0.0025
Lead	0.0025
Copper	<0.005
Zinc	<0.02

MW-112	07/28/2010 & 09/13/2010
Arsenic	0.015
Lead	<0.0015
Copper	0.054
Zinc	1

MW-116	7/28/2010 & 09/13/2010
Arsenic	<0.0025
Lead	0.0073
Copper	4.1
Zinc	12

MW-26	07/28/2010 & 09/13/2010
Arsenic	<0.0025
Lead	<0.0015
Copper	0.01
Zinc	0.16

MW-1B	7/29/2010 & 09/13/2010
Arsenic	<0.0025
Lead	<0.0015
Copper	<0.005
Zinc	<0.02

MW-101	07/28/2010 & 09/13/2010
Arsenic	<0.0025
Lead	0.0035
Copper	0.022
Zinc	0.66

LEGEND:

MW-104 ◑	LAW/MACTEC CSR MONITORING WELL LOCATIONS (MW-1A, MW-1B, MW-101 TO MW-105, MW-103D, MW-104A, MW-104D, MW-106D, MW-107D, MW-108, MW-109, AND MW-110, MW-111 THROUGH MW-118 (FEBRUARY, JUNE, JULY, DECEMBER 1997, MAY 1998, JANUARY 2000, NOVEMBER 2002 AND AUGUST 2007) (MW-106 AND MW-107 WERE NOT INSTALLED)
MW-10 ⊕	T.M. GATES MONITORING WELL LOCATIONS (MW-1 TO MW-27, MW-7 WAS NOT INSTALLED) (AUGUST 1983, JANUARY 1984, JUNE 1985)
DW-1B ⊕	T.M. GATES DEEP MONITORING WELL LOCATIONS (DW-1A, DW-1B, DW-2A, DW-2B) (AUGUST 1983, FEBRUARY 1984)
MW-1 ⊕	MONITORING WELLS ABANDONED BY LAW (MW-1, MW-1A, MW-2, MW-3, MW-4, MW-6, MW-8, MW-9, MW-11, MW-12, MW-13, MW-14, MW-15, MW-18, MW-19, MW-20, MW-23, MW-27, DW-1A, DW-2A, DW-2B, AND MW-104) (JUNE 1995, JUNE 1997, AUGUST 1998, JANUARY 2000, AND AUGUST 2007)
SW-2010-1 ■	MACTEC SURFACE WATER SAMPLING LOCATIONS (SW-2010-1 TO SW-2010-18)
MW-1(BFI) ⊗	APPROXIMATE LOCATION OF MONITORING WELLS INSTALLED FOR 1993 PHASE II INVESTIGATION.
(POD)	POINT OF DEMONSTRATION WELL
▬	ARSENIC, LEAD, COPPER, AND ZINC IN GROUNDWATER ARE DELINEATED PER THE VRP DELINEATION CRITERIA 12-8-108(E) DEFAULT RESIDENTIAL CLEANUP STANDARDS (TYPE I RRS)

ARSENIC	0.01 MG/L
LEAD	0.015 MG/L
COPPER	1.3 MG/L
ZINC	2 MG/L

🟩	HORIZONTAL DELINEATION OF GROUND-WATER CONTAMINATION
— — —	PROPERTY BOUNDARIES
—P—	ABOVEGROUND POWER TRANSMISSION LINES
—UT—	BELOWGROUND FIBER OPTICS CABLE
—×—×—	FENCE
▭	EXISTING STRUCTURE
▭	FORMER STRUCTURE
⌒⌒⌒	TREE LINE
— ·· —	STREAM
NA	CONSTITUENT NOT ANALYZED

ALL CONCENTRATIONS EXPRESSED IN MILLIGRAMS PER LITER (mg/L)

SCALE IN FEET
0 100 200

REV	DATE	BY	SUB	APP	DESCRIPTION	REV	DATE	BY	SUB	APP	DESCRIPTION

DESIGNED R. QUINN
DRAWN T. GLADSTONE
CHECKED M. ANDREWS
IN CHARGE L. NEAL
DATE 2/25/2011

FORMER ESTECH GENERAL CHEMICALS SITE
ATLANTA, GEORGIA

MACTEC Engineering and Consulting, Inc.
3200 TOWN POINT DRIVE, SUITE 100
KENNESAW, GEORGIA 30144 (770) 421-3400

DISTRIBUTION AND DELINEATION OF ARSENIC, LEAD, COPPER AND ZINC DETECTED IN GROUND WATER

SCALE AS SHOWN
CONTRACT 6306-04-0016
DWG. NO. 4.11B
REV 5
PAGE NO

J:\BFEL ATLANTA\SEPT 2010\FIGURE 411B.dwg – Layout1 03/14/2011 3:04pm tgladsto

LEGEND:

MW-104 ◑	LAW/MACTEC CSR MONITORING WELL LOCATIONS (MW-1A, MW-1B, MW-101 TO MW-105, MW-103D, MW-104A, MW-104D, MW-106D, MW-107D, MW-108, MW-109, AND MW-110, MW-111 THROUGH MW-118 (FEBRUARY, JUNE, JULY, DECEMBER 1997, MAY 1998, JANUARY 2000, NOVEMBER 2002 AND AUGUST 2007) (MW-106 AND MW-107 WERE NOT INSTALLED)
MW-10 ◕	T.M. GATES MONITORING WELL LOCATIONS (MW-1 TO MW-27, MW-7 WAS NOT INSTALLED) (AUGUST 1983, JANUARY 1984, JUNE 1985)
DW-1B ◕	T.M. GATES DEEP MONITORING WELL LOCATIONS (DW-1A, DW-1B, DW-2A, DW-2B) (AUGUST 1983, FEBRUARY 1984)
MW-1 ⊕	MONITORING WELLS ABANDONED BY LAW (MW-1, MW-1A, MW-2, MW-3, MW-4, MW-6, MW-8, MW-9, MW-11, MW-12, MW-13, MW-14, MW-15, MW-18, MW-19, MW-20, MW-23, MW-27, DW-1A, DW-2A, DW-2B, AND MW-104) (JUNE 1995, JUNE 1997, AUGUST 1998, JANUARY 2000, AND AUGUST 2007)
SW-2010-1 ■	MACTEC SURFACE WATER SAMPLING LOCATIONS (SW-2010-1 TO SW-2010-18)
MW-1(BFI) ⊗	APPROXIMATE LOCATION OF MONITORING WELLS INSTALLED FOR 1993 DUE PHASE II INVESTIGATION.
━	NITRATE AND SULFATE IN GROUNDWATER ARE DELINEATED PER THE VRP DELINEATION CRITERIA 12-8-108(E) DEFAULT RESIDENTIAL CLEANUP STANDARDS (TYPE I RRS) NITRATE 10 MG/L SULFATE 250 MG/L
POD	POINT OF DEMONSTRATION WELL
🟩	HORIZONTAL DELINEATION OF GROUND-WATER CONTAMINATION
— — —	PROPERTY BOUNDARIES
—P—	ABOVEGROUND POWER TRANSMISSION LINES
—UT—	BELOWGROUND FIBER OPTICS CABLE
—×—	FENCE
▭	EXISTING STRUCTURE
⬚	FORMER STRUCTURE
⌒⌒⌒	TREE LINE
— · —	STREAM

ALL CONCENTRATIONS EXPRESSED IN MILLIGRAMS PER LITER (mg/L)

SCALE IN FEET
0 100 200

REV	DATE	BY	SUB	APP	DESCRIPTION	REV	DATE	BY	SUB	APP	DESCRIPTION

DESIGNED R. QUINN
DRAWN T. GLADSTONE
CHECKED M. ANDREWS
IN CHARGE L. NEAL
DATE 2/25/2011

FORMER ESTECH GENERAL CHEMICALS SITE

ATLANTA, GEORGIA

MACTEC
MACTEC Engineering and Consulting, Inc.
3200 TOWN POINT DRIVE, SUITE 100
KENNESAW, GEORGIA 30144 (770) 421-3400

DISTRIBUTION AND DELINEATION OF NITRATE AND SULFATE GROUND WATER

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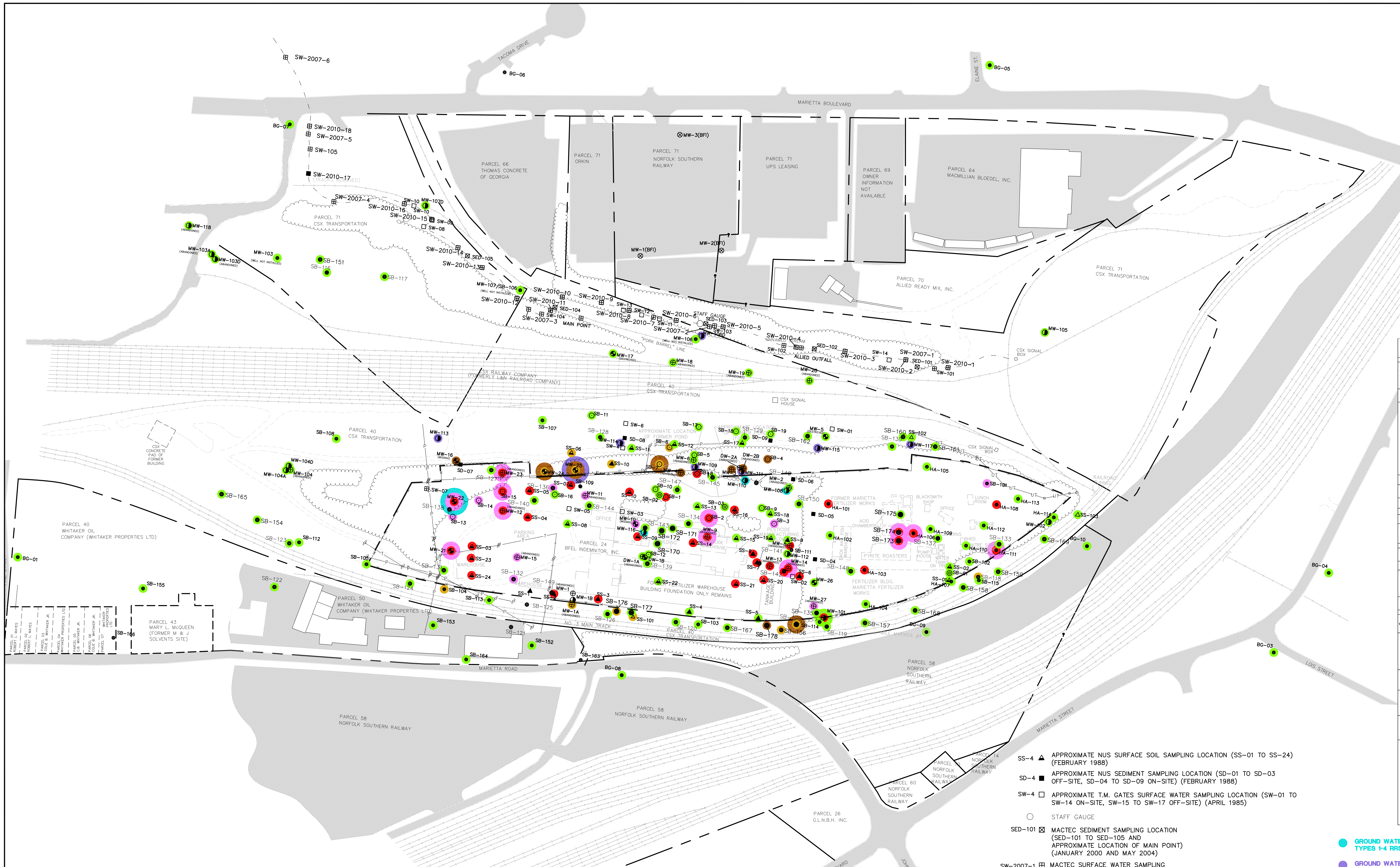
DWG. NO. 4.11C
REV 5
PAGE NO

J:\BFEL ATLANTA\SEPT 2010\FIGURE 411C.dwg - Layout1 03/14/2011 3:05pm tgladsto



NOTES:

1. THE STRUCTURES ASSOCIATED WITH MARIETTA FERTILIZER WORKS ARE NO LONGER PRESENT. MARIETTA FERTILIZER WORKS WAS SHOWN TO BE PRESENT AND ACTIVE ON A 1911 SANBORN FIRE INSURANCE MAP. THE STRUCTURES FOR MARIETTA FERTILIZER WORKS WERE NOT PRESENT ON SANBORN FIRE INSURANCE MAPS DATED 1950 AND 1978.
2. SURVEYORS SURVEYED 4 CORNERS OF TANKAGE BUILDING AS REFERENCE TO TIE THE SITE PLAN IN W/ SURVEYED POINTS
3. ALL SOIL BORINGS AND MONITORING WELLS NEAR ACTIVE RAILROAD TRACKS MUST BE MORE THAN 25 FEET AWAY FROM THE TRACKS.

SOURCES:

1. T.M. GATES REPORTS 1986
2. NUS CORPORATION SITE INVESTIGATION REPORT, AUGUST 1988.
3. TOPOGRAPHIC SURVEY MAP PREPARED FOR BFEL BY TRAVIS PRUITT AND ASSOCIATES, DECEMBER 19, 1989.
4. AERIAL PHOTOGRAPH AND COMPOSITE PLAT BY BLUE RIDGE ENGINEERING, DECEMBER 10, 1996.
5. BOUNDARY SURVEY BY W.L. JORDEN AND COMPANY, APRIL 2, 1997. LAW CSR SOIL BORINGS AND MONITORING WELLS SURVEYED BY W.L. JORDEN IN 1997, 1998, 1999, AND 2000.
6. MARIETTA FERTILIZER WORKS STRUCTURES FROM SANBORN FIRE INSURANCE MAP 1911.
7. MACTEC/LAW CSR SOIL BORINGS AND MONITORING WELLS (2002–2007) AND SURFACE WATER LOCATIONS SURVEYED BY MACTEC ENGINEERING AND CONSULTING INC.
8. PROPERTY OWNERS SHOWN ARE BASED ON 1996 FULTON COUNTY TAX RECORDS
9. WHITAKER AND MARY L. McQUEEN PROPERTY BOUNDARIES WERE REVISED AND ARE APPROXIMATE AND ARE BASED ON FULTON COUNTY BOARD OF ASSESSORS RECORDS 2004–2005 AT www.fultonassessor.org

CADD NOTE: DRAWING XREFS ROTATED @ 0,0; 55° FROM SURVEY FILE COORDINATE POSITION.

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LEGEND:

MW–104 ◑ LAW/MACTEC CSR MONITORING WELL LOCATIONS (MW–1A, MW–1B, MW–101 TO MW–105, MW–103D, MW–104A, MW–104D, MW–106D, MW–107D, MW–108, MW–109, AND MW–110, MW–111 THROUGH MW–118 (FEBRUARY, JUNE, JULY, DECEMBER 1997, MAY 1998, JANUARY 2000, NOVEMBER 2002 AND AUGUST 2007) (MW–106 AND MW–107 WERE NOT INSTALLED)

SB–103 ● LAW/MACTEC CSR SOIL BORING LOCATIONS (BG–01 TO BG–10, SB–101 TO SB–179 AND HA–101 TO HA–114) (FEBRUARY, JUNE, JULY, DECEMBER 1997 / NOVEMBER 1999 NOVEMBER 1999 / NOVEMBER 2002 / JUNE, AUGUST AND OCTOBER 2005, MAY AND AUGUST 2007)

SS–102 △ LAW CSR SURFACE SOIL SAMPLING LOCATIONS (SS–101 TO SS–103) (JULY AND DECEMBER 1997)

MW–10 ⊕ T.M. GATES MONITORING WELL LOCATIONS (MW–1 TO MW–27, MW–7 WAS NOT INSTALLED) (AUGUST 1983, JANUARY 1984, JUNE 1985)

DW–1B ⊕ T.M. GATES DEEP MONITORING WELL LOCATIONS (DW–1A, DW–1B, DW–2A, DW–2B) (AUGUST 1983, FEBRUARY 1984)

MW–1 ⊕ MONITORING WELLS ABANDONED BY LAW/MACTEC (MW–1, MW–1A, MW–2, MW–3, MW–4, MW–6, MW–8, MW–9, MW–11, MW–12, MW–13, MW–14, MW–15, MW–18, MW–19, MW–20, MW–23, MW–27, DW–1A, DW–2A, DW–2B, AND MW–104) (JUNE 1995, JUNE 1997, AUGUST 1998, JANUARY 2000, AND AUGUST 2007). CSX TRANSPORTATION ABANDONED MW–103A, MW–103D AND MW–118 FEBRUARY 2008.

SS–9 ▲ APPROXIMATE T.M. GATES SURFACE SOIL SAMPLING LOCATION (SS–1 TO SS–10) (AUGUST 1983, FEBRUARY 1984)

SB–18 ⊙ APPROXIMATE T.M. GATES SOIL BORING LOCATION (SB–1 TO SB–19) (AUGUST 1983, FEBRUARY 1984)

SB–01 ◎ APPROXIMATE NUS SOIL BORING LOCATION (SB–01 TO SB–03) (FEBRUARY 1988)

SS–4 ▲ APPROXIMATE NUS SURFACE SOIL SAMPLING LOCATION (SS–01 TO SS–24) (FEBRUARY 1988)

SD–4 ■ APPROXIMATE NUS SEDIMENT SAMPLING LOCATION (SD–01 TO SD–03 OFF–SITE, SD–04 TO SD–09 ON–SITE) (FEBRUARY 1988)

SW–4 ☐ APPROXIMATE T.M. GATES SURFACE WATER SAMPLING LOCATION (SW–01 TO SW–14 ON–SITE, SW–15 TO SW–17 OFF–SITE) (APRIL 1985)

○ STAFF GAUGE

SED–101 ☒ MACTEC SEDIMENT SAMPLING LOCATION (SED–101 TO SED–105 AND APPROXIMATE LOCATION OF MAIN POINT) (JANUARY 2000 AND MAY 2004)

SW–2007–1 ⊞ MACTEC SURFACE WATER SAMPLING LOCATION (SW–101 TO SW–105 (NOVEMBER 2002), (MAIN POINT AND ALLIED OUTFALL MAY 2004), AND (SW–2007–1 TO SW–2007–6 AUGUST 2007)

SW–2010–1 ⊞ MACTEC SURFACE WATER SAMPLING LOCATION (SW–2010–1 TO SW–2010–18 SEPTEMBER 2010)

MW–1(BFI) ⊗ APPROXIMATE LOCATION OF 1993 MONITORING WELLS INSTALLED BY BFI FOR PHASE II INVESTIGATION.

PROPERTY BOUNDARIES

ABOVE GROUND POWER TRANSMISSION LINES

BELOW GROUND FIBER OPTICS CABLE

FENCE

EXISTING STRUCTURE

Constiuents in Soil Exceeding Types 1, 2, 3, and 4 RRS	Property	Surface/ Subsurface Soil	Locations
Aldrin	Estech	Surface	SS-21
Alpha, Beta, Delta-BHC	Estech	Surface	MW-23, SS-7, SS-8, MW-14, MW-9, MW-13, SS-2, SS-3, SS-8, MW-8
	Estech	Subsurface	MW-9, MW-11, MW-27, and MW-23
	CSX	Subsurface	DW-2B
Alpha-BHC	Estech	Surface	SS-24, SS-21, SS-23, and HA-108
	CSX	Subsurface	MW-3
	Estech	Subsurface	SB-3 and SB-101
Arsenic	Estech	Surface	SB- 173 , HA-106, MW-22, SS-7, SB-15, SB-174 , MW-13, MW-101, MW-12, MW-21, MW-14, SB-142, MW-8, SS-6, SS-8, SB-1, SS-3, MW-9, HA-103 , SB-2, and HA-111
	CSX	Surface	MW-24, SB-156, MW-25, SS-06, SB-104, MW-1A, SB-118, SB-176, and SB-6,
	Estech	Subsurface	HA-111, SB-132, MW-22, MW-11, MW-12, SB-173, SB-15, HA-106, SB-13, SB-174, MW-15, MW-23, SB-14, MW-10, MW-9, MW-14, SB-136, MW-27, SB-3, MW-21, and SB-2
	CSX	Subsurface	MW-25, MW-4, MW-24, SB-7, SB-4, SB-178, DW-2B, and SB-179
Beta-BHC	Estech	Surface	SS-24, SS-21, SS-23, and HA-108
	Estech	Subsurface	SB-101
Chlordane	Estech	Surface	SS-21, SS-7, MW-13, SS-24, MW-14
	CSX	Surface	SS-10
	CSX	Subsurface	DW-2B
DDE	CSX	Surface	SS-10
	CSX	Subsurface	DW-2B
Delta-BHC	Estech	Surface	SS-24 and SS-21
Dieldrin	Estech	Surface	SS-24 and SS-21
	Estech	Subsurface	SB-101
DDT	Estech	Surface	SS-24, SS-2, SS-21, SS-7, MW-14, MW-13, and SS-23
	Estech	Subsurface	SB-101
	CSX	Subsurface	DW-2B and MW-3
Endrin	Estech	Surface	SS-24
Gamma-BHC	Estech	Surface	SS-21
	CSX	Surface	MW-25
	CSX	Subsurface	DW-2B
Heptachlor	Estech	Surface	SS-21 and SS-7
	CSX	Subsurface	DW-2B
Lead	Estech	Surface	HA-106, SS-07, SS-20, SB-173, SS-05, SS-03, SB-142, SB-174, SS-10, SS-23, SS-09, SS-04, HA-101, SS-16, HA-111, and SS-21
	CSX	Surface	SS-06, SS-101, SB-118
	Estech	Subsurface	HA-111, SB-174, and SB-173
Toxaphene	Estech	Surface	SS-7, MW-14, and MW-23
	CSX	Surface	SS-10 and SB-7
	CSX	Subsurface	DW-2B and MW-16
2,4-Dinitrotoluene	Estech	Surface	SS-14
Constituent in Ground Water Exceeding Types 1, 2, 3, and 4 RRS	**Property**	**Lithology Screened**	**Location**
Alpha-BHC,	CSX	Bedrock (MW-106D), Silty fine sand with brick fragments (fill) (MW-109), and Silty Sand and PWR (MW-111)	MW-106D, MW-109, MW-111
Delta-BHC	CSX	Bedrock (MW-106D, and Silty Sand and PWR (MW-111)	MW-106D and MW-111
Arsenic	CSX	Silty fine sand with brick fragments (fill) (MW-109), and Sandy Clayey Silt (MW-113)	MW-109 and MW-113
Lead	CSX	Silty clay to clayey silt (MW-25), Silty fine sand with brick fragments (fill) (MW-109)	MW-25 and MW-109
Sulfate	Estech	Silty clay and clayey silt (MW-22), Silty fine sand (MW-108), Bedrock (MW-110), and Fine sand (MW-116)	MW-22, MW-108, MW-110, MW-116
	CSX	Bedrock (MW106D), Silty fine sand with brick fragments (fill) (MW-109), Sandy clayey silt (MW-113), Silty clayey fine sand to silty fine sand (MW-114), Silty sand with concrete fragments (MW-115), and Very sandy silt to very silty fine sand (MW-117)	MW-106D, MW-109, MW-113, MW-114, MW-115, MW-117

● GROUND WATER ON BFEL PROPERTY DOES NOT MEET TYPES 1-4 RRS

● GROUND WATER ON CSX PROPERTY DOES NOT MEET TYPES 1-4 RRS

● SOIL AND/OR GROUND WATER MEETS TYPES 1-4 RRS

● SUB SURFACE SOIL ON BFEL PROPERTY DOES NOT MEET TYPES 1, 2, 3 OR 4 RRS

● SUB SURFACE SOIL CSX PROPERTY DOES NOT MEET TYPES 1, 2, 3 OR 4 RRS

● SURFACE SOIL CSX PROPERTY DOES NOT MEET TYPES 1, 2, 3 OR 4 RRS

● SURFACE SOIL BFEL PROPERTY DOES NOT MEET TYPES 1, 2, 3 OR 4 RRS

RRS CALCULATED USING DAF = 1

FORMER STRUCTURE

TREE LINE

STREAM

SCALE IN FEET

0 100 200

REV	DATE	BY	SUB	APP	DESCRIPTION	REV	DATE	BY	SUB	APP	DESCRIPTION

DESIGNED R. QUINN
DRAWN T. GLADSTONE
CHECKED R. QUINN
IN CHARGE L. NEAL
DATE 3/4/2011

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ATLANTA,GEORGIA

MACTEC Engineering and Consulting, Inc.
3200 TOWN POINT DRIVE, SUITE 100
KENNESAW, GEORGIA 30144 (770) 421–3400

RISK REDUCTION STANDARDS COMPLIANCE MAP

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CONTRACT 6122–08–0154
DWG. NO. 7.1
REV 4
PAGE NO

RISK REDUCTION STANDARDS CALCULATIONS

Table A-1
Type 1 through Type 4 Ground Water RRS, mg/L

	Type 1/ Type 3		Type 2 Standard (mg/L)		Type 2 Standard (mg/L)		Type 2	Overall	Type 4 Site-Specific (mg/L)			Type 4 Site-specific (mg/L)		
	(mg/L)		Adult		Child		Overall	Residential	Railroad Worker		Railyard	Construction Worker		Construction
Parameter			**Noncarcinogenic**	**Carcinogenic**	**Noncarcinogenic**	**Carcinogenic**			**Noncarcinogenic**	**Carcinogenic**	**RRS**	**Noncarcinogenic**	**Carcinogenic**	**RRS**
METALS/INORGANICS														
Antimony	0.06	DL	0.015	ND	0.006	ND	**0.0063**	**0.060**	0.22	ND	**0.22**	1.0	ND	**1.0**
Arsenic	0.01		0.011	0.00057	0.005	0.0012	**0.00057**	**0.010**	0.16	0.010	**0.010**	0.77	1.2	**0.77**
Barium	2.0		7.3	ND	3.1	ND	**3.1**	**3.1**	109	ND	**109**	510	ND	**510**
Copper	1.3		1.5	ND	0.6	ND	**0.63**	**1.3**	22	ND	**22**	100	ND	**100**
Cyanide	0.2		0.73	ND	0.31	ND	**0.31**	**0.31**	11	ND	**11**	51	ND	**51**
Lead	0.015		ND	ND	ND	ND	**ND**	**0.015**	ND	ND	**0.015**	ND	ND	**0.015**
Nickel (soluble salts)	0.1		0.73	ND	0.31	ND	**0.31**	**0.31**	11	ND	**11**	51	ND	**51**
Nitrate	10 (NR)	MCL	58	ND	25	ND	**25**	**25**	870	ND	**870**	4088	ND	**4088**
Silver	0.1		0.18	ND	0.08	ND	**0.078**	**0.10**	2.7	ND	**2.7**	13	ND	**13**
Sulfate	250 (NR)	SMCL	ND	ND	ND	ND	**ND**	**250**	ND	ND	**ND**	ND	ND	**250**
Thallium	0.01	DL	ND	ND	ND	ND	**ND**	**0.010**	ND	ND	**0.010**	ND	ND	**0.010**
Zinc	2.0		11	ND	4.7	ND	**4.7**	**5**	160	ND	**160**	770	ND	**770**
VOCs/SVOCs														
1,1,1-Trichloroethane	0.2		9.0	ND	2.7	ND	**2.7**	**2.7**	71	ND	**71**	28	ND	**28**
1,2,3-Trichlorobenzene	0.005	DL	0.029	ND	0.013	ND	**0.013**	**0.013**	0.43	ND	**0.43**	2.0	ND	**2.0**
1,2,4-Trichlorobenzene	0.07		0.0041	0.029	0.0012	0.0629	**0.0012**	**0.0700**	0.031	0.52	**0.031**	0.012	62	**0.012**
2,4-Dinitrotoluene	0.005	DL	0.073	0.0027	0.031	0.0059	**0.0027**	**0.005**	1.1	0.049	**0.049**	5.1	5.8	**5.1**
PAHs														
Anthracene	0.005	DL	11	ND	5	ND	**4.7**	**4.7**	160	ND	**160**	770	ND	**770**
Benzo(a)anthracene	0.005	DL	ND	0.0012	ND	0.0025	**0.0012**	**0.005**	ND	0.021	**0.021**	ND	2.5	**2.5**
Benzo(a)pyrene	0.0002		ND	0.00012	ND	0.00025	**0.00012**	**0.0002**	ND	0.0021	**0.0021**	ND	0.25	**0.25**
Benzo(b)fluoranthene	0.0002		ND	0.0012	ND	0.0025	**0.0012**	**0.0012**	ND	0.021	**0.021**	ND	2.5	**2.5**
Benzo(ghi)perylene	0.005	DL	ND	ND	ND	ND	**ND**	**0.005**	ND	ND	**0.005**	ND	ND	**0.005**
Benzo(k)fluoranthene	0.005	DL	ND	0.012	ND	0.025	**0.012**	**0.012**	ND	0.21	**0.21**	ND	25	**25**
Chrysene	0.005	DL	ND	0.12	ND	0.25	**0.12**	**0.12**	ND	2.1	**2.1**	ND	245	**245**
Fluoranthene	1.0		1.5	ND	0.6	ND	**0.63**	**1.0**	22	ND	**22**	100	ND	**100**
Indeno(1,2,3-cd)pyrene	0.0004		ND	0.0012	ND	0.0025	**0.0012**	**0.0012**	ND	0.021	**0.021**	ND	2.5	**2.5**
Phenanthrene	0.005	DL	ND	ND	ND	ND	**ND**	**0.005**	ND	ND	**0.005**	ND	ND	**0.005**
Pyrene	1.0		1.1	ND	0.5	ND	**0.47**	**1.0**	16	ND	**16**	77	ND	**77**
PESTICIDES														
Aldrin	0.00002		0.0011	0.000050	0.0005	0.00011	**0.000050**	**0.00005**	0.016	0.00090	**0.0009**	0.077	0.11	**0.077**
alpha-HCH (BHC)	0.00005	DL	0.29	0.00014	0.13	0.0003	**0.00014**	**0.00014**	4.3	0.0024	**0.0024**	20	0.28	**0.28**
beta-HCH (BHC)	0.00005	DL	ND	0.00047	ND	0.0010	**0.00047**	**0.00047**	ND	0.0085	**0.0085**	ND	0.99	**0.99**
delta-HCH (technical BHC)	0.00005	DL	ND	0.00047	ND	0.0010	**0.00047**	**0.00047**	ND	0.0085	**0.0085**	ND	0.99	**0.99**
gamma-HCH (BHC)	0.0002		0.011	0.00077	0.005	0.0017	**0.00077**	**0.00077**	0.16	0.014	**0.014**	0.77	1.6	**0.77**
alpha-Chlordane	0.002		0.018	0.0024	0.008	0.0052	**0.0024**	**0.002**	0.27	0.043	**0.043**	1.3	5.1	**1.3**
DDD	0.0001		ND	0.0035	ND	0.0076	**0.0035**	**0.0035**	ND	0.063	**0.063**	ND	7.5	**7.5**
DDE	0.0001		ND	0.0025	ND	0.0054	**0.0025**	**0.0025**	ND	0.045	**0.045**	ND	5.3	**5.3**
DDT	0.0001		0.018	0.0025	0.008	0.0054	**0.0025**	**0.0025**	0.27	0.045	**0.045**	1.3	5.3	**1.3**
Dieldrin	0.0001	DL	0.0018	0.000053	0.0008	0.00011	**0.000053**	**0.000100**	0.027	0.00095	**0.0010**	0.13	0.11	**0.11**
Endrin	0.002		0.011	ND	0.005	ND	**0.0047**	**0.0047**	0.16	ND	**0.16**	0.77	ND	**0.77**
Heptachlor	0.0004		0.018	0.00019	0.008	0.0004	**0.00019**	**0.0004**	0.27	0.0034	**0.0034**	1.3	0.40	**0.40**
Methoxychlor	0.04		0.18	ND	0.08	ND	**0.078**	**0.078**	2.7	ND	**2.7**	13	ND	**13**
Toxaphene	0.005	DL	ND	0.00077	ND	0.0017	**0.00077**	**0.0050**	ND	0.014	**0.014**	ND	1.6	**1.6**

Source for Toxicity Values : Regional Screening Level Table, November 2010
DL Detection Limit
ND Toxicity values not available
NR Not Regulated
MCL Maximum Contaminant Level

Equation 2 (Noncarcinogens):

$$C = \frac{THI \times BW \times AT \times 365 days/year}{EF \times ED \times [(1/RfDi \times K \times IRa) + (1/RfDo \times IRw)]}$$

Equation 1 (Carcinogens):

$$C = \frac{TR \times BW \times AT \times 365 days/year}{EF \times ED \times [(SFi \times K \times IRa) + (SFo \times IRw)]}$$

Where:	Type 2 Adult	Type 2 Parameters Chil]d	Type 4 Off-Site Railyard Worker Parameters	Type 4 On-Site Construction Worker Parameters
THI = Target Hazard Index =	1	1	1	1
BW = Body Weight =	70 kg	15 kg	70 kg	70 kg
AT = Averaging Time =	30 years (noncarc.); 70 (carcinogens)	6 years; 70 years (carc.)	25 years for noncarc. & 70 years for carc.	1 years for noncarc. & 70 years for carc.
EF = Exposure Frequency =	350 days/year	350 days/year	47 day/year	125 day/year
ED = Exposure Duration =	30 years	6 years	25 years	1 year
RfDi = Inhalation Reference Dose =	Chemical Specific	Chemical Specific	Chemical Specific	Chemical Specific
K = Volatilization Factor = 0.0005 x 1000 L/m3 =	0.5 L/m3	0.5 L/m3	0.5 L/m3	0.5 L/m3
IRa = Inhalation Rate for Air =	20 m3/day	15 m3/day	20 m3/day	20 m3/day
RfDo = Oral Reference Dose =	Chemical Specific	Chemical Specific	Chemical Specific	Chemical Specific
IRw = Ingestion Rate for Water =	2 L/day	1 L/day	1 L/day	0.08 L/day
TR = Target Risk =	0.00001	0.00001	0.00001	0.00001
CSFo = Oral Cancer Slope Factor =	Chemical Specific	Chemical Specific	Chemical Specific	Chemical Specific
CSFi = Inhalation Cancer Slope Factor =	Chemical Specific	Chemical Specific	Chemical Specific	Chemical Specific

ND Toxicity values not available

Prepared by: MKB 9/21/07
Checked by: LMS 11/15/10

Table A-2
Type 1 and 3 Soil Calculations, mg/kg

SUBSTANCE	Volatilization Factor (m^3/kg)	Table 2 Appendix III	Appendix I	Type 1 GW x 100	Number 1	Risk-Based Residential Type 1			Least of 1,2, & 3	Overall Type 1 RRS	Risk-Based Nonresidential Type 3		Risk-based Soil Type 3 RRS	Subsurface Soil Type 3 RRS	Surface Soil Type 3 RRS
						NC-Type 1	C-Type 1	Type 1 RRS			NC-Type 3	C-Type 3			
INORGANICS/METALS															
Antimony	0.0E+00	4.0E+00	1.0E+01	6.0E-01	1.0E+01	2.6E+02	--	2.6E+02	1.0E+01	4.0E+00	8.2E+02	--	8.2E+02	1.0E+01	1.0E+01
Arsenic	0.0E+00	2.0E+01	4.1E+01	1.0E+00	4.1E+01	1.9E+02	1.0E+01	1.0E+01	1.0E+01	2.0E+01	6.1E+02	3.8E+01	3.8E+01	4.1E+01	3.8E+01
Barium	0.0E+00	1.0E+03	5.0E+02	2.0E+02	5.0E+02	1.2E+05	--	1.2E+05	5.0E+02	1.0E+03	3.6E+05	--	3.6E+05	1.0E+03	1.0E+03
Copper	0.0E+00	1.0E+02	1.5E+03	1.3E+02	1.5E+03	2.6E+04	--	2.6E+04	1.5E+03	1.0E+02	8.2E+04	--	8.2E+04	1.5E+03	1.5E+03
Cyanides (soluble salts and complexes) n.o.s.	0.0E+00	--	1.0E+01	2.0E+01	2.0E+01	1.3E+04	--	1.3E+04	2.0E+01	2.0E+01	4.1E+04	--	4.1E+04	2.0E+01	2.0E+01
Lead	0.0E+00	7.5E+01	4.0E+02	1.5E+00	4.0E+02	--	--	4.0E+02	4.0E+02	7.5E+01	--	--	--	4.0E+02	4.0E+02
Nickel	0.0E+00	5.0E+01	4.2E+02	1.0E+01	4.2E+02	1.3E+04	5.8E+05	1.3E+04	4.2E+02	5.0E+01	3.8E+04	7.3E+05	3.8E+04	4.2E+02	4.2E+02
Silver	0.0E+00	2.0E+00	1.0E+01	1.0E+01	1.0E+01	3.2E+03	--	3.2E+03	1.0E+01	2.0E+00	1.0E+04	--	1.0E+04	1.0E+01	1.0E+01
Sulfate (Not Regulated)	0.0E+00	--	--	2.5E+04	2.5E+04	--	--	--	2.5E+04	2.5E+04	--	--	--	2.5E+04	2.5E+04
Thallium	0.0E+00	2.0E+00	1.0E+01	1.0E+00	1.0E+01	--	--	--	1.0E+01	2.0E+00	--	--	--	1.0E+01	1.0E+01
Zinc	0.0E+00	1.0E+02	2.8E+03	2.0E+02	2.8E+03	1.9E+05	--	1.9E+05	2.8E+03	1.0E+02	6.1E+05	--	6.1E+05	2.8E+03	2.8E+03
VOCs/SVOCs															
1,1,1-Trichloroethane	1.2E+03	--	5.4E+00	2.0E+01	2.0E+01	8.1E+03	--	8.1E+03	2.0E+01	2.0E+01	8.5E+03	--	8.5E+03	2.0E+01	2.0E+01
2,4-Dinitrotoluene	0.0E+00	--	6.6E-01	5.0E-01	6.6E-01	1.3E+03	4.8E+01	4.8E+01	6.6E-01	6.6E-01	4.1E+03	1.8E+02	1.8E+02	6.6E-01	6.6E-01
PAHs															
Anthracene	2.3E+06	--	5.0E+02	5.0E-01	5.0E+02	1.9E+05	--	1.9E+05	5.0E+02	5.0E+02	6.1E+05	--	6.1E+05	5.0E+02	5.0E+02
Benzo(a)anthracene	0.0E+00	--	5.0E+00	1.0E-02	5.0E+00	--	2.0E+01	2.0E+01	5.0E+00	5.0E+00	--	7.8E+01	7.8E+01	5.0E+00	5.0E+00
Benzo(a)pyrene	0.0E+00	--	1.6E+00	2.0E-02	1.6E+00	--	2.0E+00	2.0E+00	1.6E+00	1.6E+00	--	7.8E+00	7.8E+00	1.6E+00	1.6E+00
Benzo(b)fluoranthene	0.0E+00	--	5.0E+00	2.0E-02	5.0E+00	--	2.0E+01	2.0E+01	5.0E+00	5.0E+00	--	7.8E+01	7.8E+01	5.0E+00	5.0E+00
Benzo(ghi)perylene	0.0E+00	--	5.0E+02	5.0E-01	5.0E+02	ND	--	ND	5.0E+02	5.0E+02	ND	--	ND	5.0E+02	5.0E+02
Benzo(k)fluoranthene	0.0E+00	--	5.0E+00	5.0E-01	5.0E+00	--	2.0E+02	2.0E+02	5.0E+00	5.0E+00	--	7.8E+02	7.8E+02	5.0E+00	5.0E+00
Chrysene	0.0E+00	--	5.0E+00	5.0E-01	5.0E+00	--	2.0E+03	2.0E+03	5.0E+00	5.0E+00	--	7.8E+03	7.8E+03	5.0E+00	5.0E+00
Fluoranthene	0.0E+00	--	5.0E+02	1.0E+02	5.0E+02	2.6E+04	--	2.6E+04	5.0E+02	5.0E+02	8.2E+04	--	8.2E+04	5.0E+02	5.0E+02
Indeno(1,2,3-cd)pyrene	0.0E+00	--	5.0E+00	4.0E-02	5.0E+00	--	2.0E+01	2.0E+01	5.0E+00	5.0E+00	--	7.8E+01	7.8E+01	5.0E+00	5.0E+00
Phenanthrene	1.3E+06	--	1.1E+02	5.0E-01	1.1E+02	ND	--	ND	1.1E+02	1.1E+02	ND	--	ND	1.1E+02	1.1E+02
Pyrene	0.0E+00	--	5.0E+02	1.0E+02	5.0E+02	1.9E+04	--	1.9E+04	5.0E+02	5.0E+02	6.1E+04	--	6.1E+04	5.0E+02	5.0E+02
PESTICIDES															
Aldrin	0.0E+00	--	6.6E-01	2.0E-03	6.6E-01	1.9E+01	8.8E-01	8.8E-01	6.6E-01	6.6E-01	6.1E+01	3.4E+00	3.4E+00	6.6E-01	6.6E-01
alpha-BHC	0.0E+00	--	6.6E-01	2.5E-03	6.6E-01	5.1E+09	2.4E+00	2.4E+00	6.6E-01	6.6E-01	1.6E+10	9.1E+00	9.1E+00	6.6E-01	6.6E-01
beta-BHC	0.0E+00	--	6.6E-01	2.5E-03	6.6E-01	--	8.3E+01	8.3E+01	6.6E-01	6.6E-01	--	3.2E+01	3.2E+01	6.6E-01	6.6E-01
delta-BHC	0.0E+00	--	2.5E+01	2.5E-03	2.5E+01	--	8.3E+01	8.3E+01	2.5E+01	2.5E+01	--	3.2E+01	3.2E+01	2.5E+01	2.5E+01
gamma-BHC (Lindane)	0.0E+00	--	6.6E-01	2.0E-02	6.6E-01	1.9E+02	1.4E+01	1.4E+01	6.6E-01	6.6E-01	6.1E+02	5.2E+01	5.2E+01	6.6E-01	6.6E-01
Chlordane	0.0E+00	--	9.2E+00	2.0E-01	9.2E+00	3.2E+02	4.3E+01	4.3E+01	9.2E+00	9.2E+00	1.0E+03	1.6E+02	1.6E+02	9.2E+00	9.2E+00
DDD	0.0E+00	--	6.6E-01	1.0E-02	6.6E-01	--	6.2E+01	6.2E+01	6.6E-01	6.6E-01	--	2.4E+02	2.4E+02	6.6E-01	6.6E-01
DDE	0.0E+00	--	6.6E-01	1.0E-02	6.6E-01	--	4.4E+01	4.4E+01	6.6E-01	6.6E-01	--	1.7E+02	1.7E+02	6.6E-01	6.6E-01
DDT	0.0E+00	--	6.6E-01	1.0E-02	6.6E-01	3.2E+02	4.4E+01	4.4E+01	6.6E-01	6.6E-01	1.0E+03	1.7E+02	1.7E+02	6.6E-01	6.6E-01
Dieldrin	0.0E+00	--	6.6E-01	2.0E-03	6.6E-01	3.2E+01	9.3E-01	9.3E-01	6.6E-01	6.6E-01	1.0E+02	3.6E+00	3.6E+00	6.6E-01	6.6E-01
Endrin	0.0E+00	--	1.0E+01	2.0E-01	1.0E+01	1.9E+02	--	1.9E+02	1.0E+01	1.0E+01	6.1E+02	--	6.1E+02	1.0E+01	1.0E+01
Heptachlor	0.0E+00	--	6.6E-01	4.0E-02	6.6E-01	3.2E+02	3.3E+00	3.3E+00	6.6E-01	6.6E-01	1.0E+03	1.3E+01	1.3E+01	6.6E-01	6.6E-01
Methoxychlor	0.0E+00	--	1.0E+01	4.0E+00	1.0E+01	3.2E+03	--	3.2E+03	1.0E+01	1.0E+01	1.0E+04	--	1.0E+04	1.0E+01	1.0E+01
Toxaphene	0.0E+00	--	1.1E+01	3.0E-01	1.1E+01	--	1.4E+01	1.4E+01	1.1E+01	1.1E+01	--	5.2E+01	5.2E+01	1.1E+01	1.1E+01

Notes:

NC	Noncarcinogen
C	Carcinogen
RRS	Risk Reduction Standard
GW	Groundwater

Exposure Parameters	Residential Type 1	Nonresidential Type 3	Unit
Total Hazard Index (THI)	1	1	unitless
Target Risk (TR)	1.E-05	1.E-05	unitless
Body Weight (BW)	70	70	kg
Averaging Time, Carcinogen (ATc)	70	70	yrs
Averaging Time, Noncarcinogen (ATn)	30.0	25.0	yrs
Exposure Duration (ED)	30.0	25.0	yrs
Exposure Frequency (EF)	350	250	days/yr
Soil Ingestion Rate (IRs)	114	50	mg/day
Air Inhalation Rate (InhR)	15	20	m^3/day
Particulate Emission Factor (PEF)	4.63E+09	4.63E+09	m^3/kg
Conversion Factor (CF)	1.E-06	1.E-06	kg/mg
Volatilization Factor (K)	Chemical-specific	Chemical-specific	m^3/kg

Noncarcinogenic Exposure

THI x BW x ATn x 365days/year
C = --
EF x ED x [(1/RfDi x (1/K + 1/PEF) x InhR) + (1/RfD(

Carcinogenic Exposure

TR x BW x ATc x 365days/year
C = --
EF x ED x [(SFi x (1/K + 1/PEF) x IRa) + (SFo x IRw)]

Prepared by:MKB 10/5/07
Checked by: LMS 11/15/10

Table A-3
Type 2 Soil Calculations, mg/kg

SUBSTANCE	Volatilization Factor (m^3/kg)	Residential Leaching	Residential Child			Residential Adult			Overall Type 2 RRS
			NC-Type 2	C-Type 2	Type 2 RRS	NC-Type 2	C-Type 2	Type 2 RRS	
INORGANICS/METALS									
Antimony	0.0E+00	2.7E+00	3.1E+01	--	3.1E+01	2.9E+02	--	2.9E+02	2.7E+00
Arsenic	0.0E+00	2.2E+01	2.3E+01	6.1E+00	6.1E+00	2.2E+02	1.1E+01	1.1E+01	6.1E+00
Barium	0.0E+00	1.3E+02	1.5E+04	--	1.5E+04	1.4E+05	--	1.4E+05	1.3E+02
Copper	0.0E+00	4.6E+01	3.1E+03	--	3.1E+03	2.9E+04	--	2.9E+04	4.6E+01
Cyanides (soluble salts and complexes) n.o.s.	0.0E+00	3.2E+00	1.6E+03	--	1.6E+03	1.5E+04	--	1.5E+04	3.2E+00
Lead	0.0E+00	1.2E+02	3.3E+02	--	3.3E+02	--	--	--	1.2E+02
Nickel	0.0E+00	2.0E+01	1.5E+03	6.2E+05	1.5E+03	1.4E+04	4.3E+05	1.4E+04	2.0E+01
Silver	0.0E+00	8.5E-01	3.9E+02	--	3.9E+02	3.7E+03	--	3.7E+03	8.5E-01
Sulfate (Not Regulated)	0.0E+00	2.5E+04	--	--	--	--	--	--	2.5E+04
Thallium	0.0E+00	7.1E-01	--	--	--	--	--	--	7.1E-01
Zinc	0.0E+00	2.9E+02	2.3E+04	--	2.3E+04	2.2E+05	--	2.2E+05	2.9E+02
VOCs/SVOCs									
1,1,1-Trichloroethane	1.2E+03	9.3E-01	1.7E+03	--	1.7E+03	6.1E+03	--	6.1E+03	9.3E-01
2,4-Dinitrotoluene	0.0E+00	6.8E-03	1.6E+02	2.9E+01	2.9E+01	1.5E+03	5.5E+01	5.5E+01	6.8E-03
PAHs									
Anthracene	2.3E+06	1.5E+02	2.3E+04	--	2.3E+04	2.2E+05	--	2.2E+05	1.5E+02
Benzo(a)anthracene	0.0E+00	1.8E+00	--	1.2E+01	1.2E+01	--	2.3E+01	2.3E+01	1.8E+00
Benzo(a)pyrene	0.0E+00	2.4E-01	--	1.2E+00	1.2E+00	--	2.3E+00	2.3E+00	2.4E-01
Benzo(b)fluoranthene	0.0E+00	1.4E+00	--	1.2E+01	1.2E+01	--	2.3E+01	2.3E+01	1.4E+00
Benzo(ghi)perylene	0.0E+00	2.3E+03	--	--	--	--	--	--	2.3E+03
Benzo(k)fluoranthene	0.0E+00	1.4E+01	--	1.2E+02	1.2E+02	--	2.3E+02	2.3E+02	1.4E+01
Chrysene	0.0E+00	4.2E+01	--	1.2E+03	1.2E+03	--	2.3E+03	2.3E+03	4.2E+01
Fluoranthene	0.0E+00	1.1E+02	3.1E+03	--	3.1E+03	2.9E+04	--	2.9E+04	1.1E+02
Indeno(1,2,3-cd)pyrene	0.0E+00	4.6E+00	--	1.2E+01	1.2E+01	--	2.3E+01	2.3E+01	4.6E+00
Phenanthrene	1.3E+06	1.9E+01	--	--	--	--	--	--	1.9E+01
Pyrene	0.0E+00	1.1E+02	2.3E+03	--	2.3E+03	2.2E+04	--	2.2E+04	1.1E+02
PESTICIDES									
Aldrin	0.0E+00	8.2E-03	2.3E+00	5.4E-01	5.4E-01	2.2E+01	1.0E+00	1.0E+00	8.2E-03
alpha-BHC	0.0E+00	7.9E-04	6.3E+08	1.4E+00	1.4E+00	5.8E+09	2.7E+00	2.7E+00	7.9E-04
beta-BHC	0.0E+00	2.8E-03	--	5.1E+00	5.1E+00	--	9.5E+00	9.5E+00	2.8E-03
delta-BHC	0.0E+00	2.8E-03	--	5.1E+00	5.1E+00	--	9.5E+00	9.5E+00	2.8E-03
gamma-BHC (Lindane)	0.0E+00	4.5E-03	2.3E+01	8.3E+00	8.3E+00	2.2E+02	1.5E+01	1.5E+01	4.5E-03
Chlordane	0.0E+00	1.6E-01	3.9E+01	2.6E+01	2.6E+01	3.6E+02	4.9E+01	4.9E+01	1.6E-01
DDD	0.0E+00	8.4E-01	--	3.8E+01	3.8E+01	--	7.1E+01	7.1E+01	8.4E-01
DDE	0.0E+00	5.9E-01	--	2.7E+01	2.7E+01	--	5.0E+01	5.0E+01	5.9E-01
DDT	0.0E+00	8.5E-01	3.9E+01	2.7E+01	2.7E+01	3.7E+02	5.0E+01	5.0E+01	8.5E-01
Dieldrin	0.0E+00	4.0E-03	3.9E+00	5.7E-01	5.7E-01	3.7E+01	1.1E+00	1.1E+00	4.0E-03
Endrin	0.0E+00	1.9E-01	2.3E+01	--	2.3E+01	2.2E+02	--	2.2E+02	1.9E-01
Heptachlor	0.0E+00	3.3E-02	3.9E+01	2.0E+00	2.0E+00	3.7E+02	3.8E+00	3.8E+00	3.3E-02
Methoxychlor	0.0E+00	4.2E+00	3.9E+02	--	3.9E+02	3.7E+03	--	3.7E+03	4.2E+00
Toxaphene	0.0E+00	7.7E-01	--	8.3E+00	8.3E+00	--	1.5E+01	1.5E+01	7.7E-01

Notes:

NC	Noncarcinogen
C	Carcinogen
RRS	Risk Reduction Standard
GW	Groundwater

Exposure Parameters	Residential Child	Residential Adult
Total Hazard Index (THI)	1	1
Target Risk (TR)	1.E-05	1.E-05
Body Weight (BW)	15	70
Averaging Time, Carcinogen (ATc)	70	70
Averaging Time, Noncarcinogen (ATn)	6.0	30.0
Exposure Duration (ED)	6.0	30.0
Exposure Frequency (EF)	350	350
Soil Ingestion Rate (IRs)	200	100
Air Inhalation Rate (InhR)	15	20
Particulate Emission Factor (PEF)	4.63E+09	4.63E+09
Conversion Factor (CF)	1.E-06	1.E-06
Volatilization Factor (K)	Chemical-specific	hemical-specific

Noncarcinogenic Exposure

$$C = \frac{THI \times BW \times ATn \times 365days/year}{EF \times ED \times [(1/RfDi \times (1/K + 1/PEF) \times InhR) + (1/RfDo \times IRs)]}$$

Carcinogenic Exposure

$$C = \frac{TR \times BW \times ATc \times 365days/year}{EF \times ED \times [(SFi \times (1/K + 1/PEF) \times IRa) + (SFo \times IRw)]}$$

Prepared by: MKB 10/11/07
Checked by: LMS 11/15/10

Table A-4
Type 4 Soil Calculations, mg/kg

			Construction Worker						Rail Site Worker				
SUBSTANCE	**Volatilization Factor (m^3/kg)**	**CW Leaching Criteria (mg/kg) (a)**	**NC-Type 4**	**C-Type 4**	**Direct Contact Type 4 RRS**	**CW Surface Soil RRS**	**Subsurface Soil RRS (mg/kg) (b)**	**Rail Site Worker Leaching Criteria (mg/kg) (c)**	**NC-Type 4**	**C-Type 4**	**Direct Contact**	**SW Surface Soil RRS**	**SW Subsurface Soil (mg/kg) (d)**
INORGANICS/METALS													
Antimony	0.00E+00	4.6E+01	2.5E+02	--	2.5E+02	4.6E+01	4.6E+01	9.8E+00	4.3E+03	--	4.3E+03	9.8E+00	9.8E+00
Arsenic	0.00E+00	2.2E+01	1.9E+02	2.9E+02	1.9E+02	2.2E+01	2.2E+01	2.2E+01	3.2E+03	2.0E+02	2.0E+02	2.2E+01	2.2E+01
Barium	0.00E+00	2.1E+04	1.2E+05	--	1.2E+05	2.1E+04	2.1E+04	4.5E+03	1.9E+06	--	1.9E+06	4.5E+03	4.5E+03
Copper	0.00E+00	3.5E+03	2.5E+04	--	2.5E+04	3.5E+03	3.5E+03	7.7E+02	4.3E+05	--	4.3E+05	7.7E+02	7.7E+02
Cyanides (soluble salts and complexes) n.o.s.	0.00E+00	5.2E+02	1.2E+04	--	1.2E+04	5.2E+02	5.2E+02	1.1E+02	2.2E+05	--	2.2E+05	1.1E+02	1.1E+02
Lead	0.00E+00	1.2E+02	6.0E+02	--	6.0E+02	1.2E+02	1.2E+02	1.2E+02	3.0E+03	--	3.0E+03	1.2E+02	1.2E+02
Nickel	0.00E+00	3.3E+03	1.2E+04	3.6E+07	1.2E+04	3.3E+03	3.3E+03	7.0E+02	2.0E+05	3.9E+06	2.0E+05	7.0E+02	7.0E+02
Silver	0.00E+00	1.1E+02	3.1E+03	--	3.1E+03	1.1E+02	1.1E+02	2.3E+01	5.4E+04	--	5.4E+04	2.3E+01	2.3E+01
Sulfate (Not Regulated)	0.00E+00	2.5E+04	--	--	--	2.5E+04	2.5E+04	2.5E+04	--	--	--	2.5E+04	2.5E+04
Thallium	0.00E+00	7.1E-01	--	--	--	7.1E-01	7.1E-01	7.1E-01	--	--	--	7.1E-01	7.1E-01
Zinc	0.00E+00	4.8E+04	1.9E+05	--	1.9E+05	4.8E+04	4.8E+04	1.0E+04	3.3E+06	--	3.3E+06	1.0E+04	1.0E+04
VOCs/SVOCs													
1,1,1-Trichloroethane	1.55E+03	9.9E+00	2.2E+04	--	2.2E+04	9.9E+00	9.9E+00	2.00E+01	5.9E+04	--	5.9E+04	2.0E+01	2.0E+01
2,4-Dinitrotoluene	0.00E+00	6.9E+00	1.2E+03	1.4E+03	1.2E+03	6.9E+00	6.9E+00	6.6E-02	2.2E+04	9.8E+02	9.8E+02	6.6E-02	6.6E-02
PAHs													
Anthracene	7.33E+05	2.5E+04	1.9E+05	--	1.9E+05	2.5E+04	2.5E+04	5.3E+03	3.3E+06	--	3.3E+06	5.3E+03	5.3E+03
Benzo(a)anthracene	0.00E+00	8.7E+02	--	5.9E+02	5.9E+02	5.9E+02	8.7E+02	7.4E+00	--	4.2E+02	4.2E+02	7.4E+00	7.4E+00
Benzo(a)pyrene	0.00E+00	2.9E+02	--	5.9E+01	5.9E+01	5.9E+01	2.9E+02	2.5E+00	--	4.2E+01	4.2E+01	2.5E+00	2.5E+00
Benzo(b)fluoranthene	0.00E+00	2.9E+03	--	5.9E+02	5.9E+02	5.9E+02	2.9E+03	2.5E+01	--	4.2E+02	4.2E+02	2.5E+01	2.5E+01
Benzo(ghi)perylene	0.00E+00	2.3E+03	--	--	--	2.3E+03	2.3E+03	2.3E+03	--	--	--	2.3E+03	2.3E+03
Benzo(k)fluoranthene	0.00E+00	2.9E+04	--	5.9E+03	5.9E+03	5.9E+03	2.9E+04	2.5E+02	--	4.2E+03	4.2E+03	2.5E+02	2.5E+02
Chrysene	0.00E+00	8.8E+04	--	5.9E+04	5.9E+04	5.9E+04	8.8E+04	7.5E+02	--	4.2E+04	4.2E+04	7.5E+02	7.5E+02
Fluoranthene	0.00E+00	1.1E+04	2.5E+04	--	2.5E+04	1.1E+04	1.1E+04	2.4E+03	4.3E+05	--	4.3E+05	2.4E+03	2.4E+03
Indeno(1,2,3-cd)pyrene	0.00E+00	9.6E+03	--	5.9E+02	5.9E+02	5.9E+02	9.6E+03	8.1E+01	--	4.2E+02	4.2E+02	8.1E+01	8.1E+01
Phenanthrene	1.26E+06	1.9E+01	--	--	--	1.9E+01	1.9E+01	1.9E+01	--	--	--	1.9E+01	1.9E+01
Pyrene	0.00E+00	8.3E+03	1.9E+04	--	1.9E+04	8.3E+03	8.3E+03	1.8E+03	3.3E+05	--	3.3E+05	1.8E+03	1.8E+03
PESTICIDES													
Aldrin	0.00E+00	1.3E+01	1.9E+01	2.6E+01	1.9E+01	1.3E+01	1.3E+01	1.5E-01	3.3E+02	1.8E+01	1.8E+01	1.5E-01	1.5E-01
alpha-BHC	0.00E+00	1.7E+00	5.0E+09	6.9E+01	6.9E+01	1.7E+00	1.7E+00	1.4E-02	8.7E+10	4.8E+01	4.8E+01	1.4E-02	1.4E-02
beta-BHC	0.00E+00	5.8E+00	--	2.4E+02	2.4E+02	5.8E+00	5.8E+00	4.9E-02	--	1.7E+02	1.7E+02	4.9E-02	4.9E-02
delta-BHC	0.00E+00	5.8E+00	--	2.4E+02	2.4E+02	5.8E+00	5.8E+00	4.9E-02	--	1.7E+02	1.7E+02	4.9E-02	4.9E-02
gamma-BHC (Lindane)	0.00E+00	4.5E+00	1.9E+02	3.9E+02	1.9E+02	4.5E+00	4.5E+00	8.0E-02	3.3E+03	2.8E+02	2.8E+02	8.0E-02	8.0E-02
Chlordane	0.00E+00	8.7E+01	3.1E+02	1.2E+03	3.1E+02	8.7E+01	8.7E+01	2.9E+00	5.4E+03	8.7E+02	8.7E+02	2.9E+00	2.9E+00
DDD	0.00E+00	1.8E+03	--	1.8E+03	1.8E+03	1.8E+03	1.8E+03	1.5E+01	--	1.3E+03	1.3E+03	1.5E+01	1.5E+01
DDE	0.00E+00	1.2E+03	--	1.3E+03	1.3E+03	1.2E+03	1.2E+03	1.1E+01	--	9.0E+02	9.0E+02	1.1E+01	1.1E+01
DDT	0.00E+00	4.3E+02	3.1E+02	1.3E+03	3.1E+02	3.1E+02	4.3E+02	1.5E+01	5.4E+03	9.0E+02	9.0E+02	1.5E+01	1.5E+01
Dieldrin	0.00E+00	4.5E+00	3.1E+01	2.7E+01	2.7E+01	4.5E+00	4.5E+00	3.8E-02	5.4E+02	1.9E+01	1.9E+01	3.8E-02	3.8E-02
Endrin	0.00E+00	3.1E+01	1.9E+02	--	1.9E+02	3.1E+01	3.1E+01	6.6E+00	3.3E+03	--	3.3E+03	6.6E+00	6.6E+00
Heptachlor	0.00E+00	3.3E+01	3.1E+02	9.6E+01	9.6E+01	3.3E+01	3.3E+01	2.8E-01	5.4E+03	6.8E+01	6.8E+01	2.8E-01	2.8E-01
Methoxychlor	0.00E+00	6.9E+02	3.1E+03	--	3.1E+03	6.9E+02	6.9E+02	1.5E+02	5.4E+04	--	5.4E+04	1.5E+02	1.5E+02
Toxaphene	0.00E+00	2.5E+02	--	3.9E+02	3.9E+02	2.5E+02	2.5E+02	2.1E+00	--	2.8E+02	2.8E+02	2.1E+00	2.1E+00

Notes:

(a) Based on the higher of Type 1, Type 2, or site-specific Type 4 (construction worker) ground-water RRS, but no greater than 100,000 mg/kg.
(b) Lower of On-Site Leaching Criteria and Construction Worker soil RRS.
(c) Based on the higher of Type 1, Type 2, or site-specific Type 4 (railroad worker) ground-water RRS, but no greater than 100,000 mg/kg.
(d) Lower of Off-Site Leaching Criteria and Railroad Worker soil RRS.

NC Noncarcinogen
C Carcinogen
RRS Risk Reduction Standard
GW Groundwater

Exposure Parameters	**Construction Worker**	**Rail Site Worker**
Total Hazard Index (THI)	1	1
Target Risk (TR)	1.E-05	1.E-05
Body Weight (BW)	70	70
Averaging Time, Carcinogen (ATc)	70	70
Averaging Time, Noncarcinogen (ATn)	1.0	25.0
Exposure Duration (ED)	1.0	25.0
Exposure Frequency (EF)	125	47
Soil Ingestion Rate (IRs)	330	50
Air Inhalation Rate (InhR)	20	20
Particulate Emission Factor (PEF)	4.63E+09	4.63E+09
Conversion Factor (CF)	1.E-06	1.E-06
Volatilization Factor (K)	Chemical-specific	Chemical-specific

Noncarcinogenic Exposure

$$C = \frac{\text{THI x BW x ATn x 365days/year}}{\text{EF x ED x [(1/RfDi x (1/K + 1/PEF) x InhR) + (1/RfDo x IRs)]}}$$

Carcinogenic Exposure

$$C = \frac{\text{TR x BW x ATc x 365days/year}}{\text{EF x ED x [(SFi x (1/K + 1/PEF) x IRa) + (SFo x IRw)]}}$$

Prepared by: MKB 10/11/07
Checked by: LMS 11/15/10

Table A-5
Toxicity Values for HSRA Soil Calculations

SUBSTANCE	RFDO	RFDI	CSFO	CSFI	CCLASS	Source
INORGANICS/METALS						
Antimony	4.00E-04	NA	NA	NA	ND	IRIS
Arsenic	3.00E-04	4.30E-06	1.50E+00	1.51E+01	A	IRIS
Barium	2.00E-01	1.43E-04	NA	NA	D	IRIS, HEAST
Copper	4.00E-02	NA	NA	NA	D	HEAST
Cyanides (soluble salts and c	2.00E-02	NA	NA	NA	D	IRIS
Lead	NA	NA	NA	NA	B2	IRIS
Nickel (soluble salts)	2.00E-02	2.60E-05	NA	9.10E-01	ND	IRIS, CAL EPA, ATSDR
Silver	5.00E-03	NA	NA	NA	D	IRIS
Sulfate (Not Regulated)	NA	NA	NA	NA	D	IRIS
Thallium	NA	NA	NA	NA	D	IRIS
Zinc	3.00E-01	NA	NA	NA	D	IRIS
VOCs/SVOCs						
1,1,1-Trichloroethane	2.00E+00	1.40E+00	NA	NA	D	IRIS
2,4-Dinitrotoluene	2.00E-03	NA	3.10E-01	3.10E-01	ND	IRIS, CAL EPA
PAHs						
Anthracene	3.00E-01	NA	NA	NA	D	IRIS
Benzo(a)anthracene	NA	NA	7.30E-01	3.90E-01	B2	NCEA, CAL EPA
Benzo(a)pyrene	NA	NA	7.30E+00	3.90E+00	B2	IRIS, CAL EPA
Benzo(b)fluoranthene	NA	NA	7.30E-01	3.90E-01	B2	NCEA, CAL EPA
Benzo(ghi)perylene	NA	NA	NA	NA	D	ND
Benzo(k)fluoranthene	NA	NA	7.30E-02	3.90E-01	B2	NCEA, CAL EPA
Chrysene	NA	NA	7.30E-03	3.90E-02	B2	NCEA, CAL EPA
Fluoranthene	4.00E-02	NA	NA	NA	D	IRIS
Indeno(1,2,3-cd)pyrene	NA	NA	7.30E-01	3.90E-01	B2	NCEA, CAL EPA
Phenanthrene	NA	NA	NA	NA	D	ND
Pyrene	3.00E-02	NA	NA	NA	D	IRIS
PESTICIDES						
Aldrin	3.00E-05	NA	1.70E+01	1.70E+01	B2	IRIS
alpha-BHC	8.00E+03	NA	6.30E+00	6.30E+00	B2	IRIS, ATSDR
beta-BHC	NA	NA	1.80E+00	1.90E+00	C	IRIS
delta-BHC	NA	NA	1.80E+00	1.80E+00	C	IRIS
gamma-BHC (Lindane)	3.00E-04	NA	1.10E+00	1.10E+00	ND	IRIS, CAL EPA
Chlordane	5.00E-04	2.00E-04	3.50E-01	3.50E-01	B2	IRIS
DDD	NA	NA	2.40E-01	2.40E-01	B2	IRIS
DDE	NA	NA	3.40E-01	3.40E-01	B2	IRIS
DDT	5.00E-04	NA	3.40E-01	3.40E-01	B2	IRIS
Dieldrin	5.00E-05	NA	1.60E+01	1.60E+01	B2	IRIS
Endrin	3.00E-04	NA	NA	NA	D	IRIS
Heptachlor	5.00E-04	NA	4.50E+00	4.60E+00	B2	IRIS
Methoxychlor	5.00E-03	NA	NA	NA	D	IRIS
Toxaphene	NA	NA	1.10E+00	1.10E+00	B2	IRIS

Source: EPA Regional Screening Values November 2010 and IRIS, 2010.

Prepared by: MKB 10/11/07
Checked by: LMS 11/15/10

Table A-6
SUMMARY
SOIL RRS

SUBSTANCE	Type 1 Soil RRS (mg/kg)	Type 2 Soil RRS (mg/kg)	Type 3 Subsurface Soil RRS (mg/kg)	Type 3 Surface Soil RRS (mg/kg)	Type 4 CW Surface Soil RRS (mg/kg)	Type 4 CW Subsurface Soil RRS (mg/kg)	Type 4 Rail SW Surface Soil RRS (mg/kg)	Type 4 Rail SW Subsurface Soil RRS (mg/kg)	Maximum Onsite Surface (a) (mg/kg)	Maximum Onsite Subsurface (b) (mg/kg)	Maximum Offsite Surface (c) (mg/kg)	Maximum Offsite Subsurface (d) (mg/kg)
INORGANICS/METALS												
Antimony	4.0E+00	2.7E+00	1.0E+01	1.0E+01	4.6E+01	4.6E+01	9.8E+00	9.8E+00	46	46	4	10
Arsenic	2.0E+01	6.1E+00	4.1E+01	3.8E+01	2.2E+01	2.2E+01	2.2E+01	2.2E+01	38	41	20	41
Barium	1.0E+03	1.3E+02	1.0E+03	1.0E+03	2.1E+04	2.1E+04	4.5E+03	4.5E+03	21012	21012	1000	4500
Copper	1.0E+02	4.6E+01	1.5E+03	1.5E+03	3.5E+03	3.5E+03	7.7E+02	7.7E+02	3520	3520	100	1500
Cyanides (soluble salts and complexes) n.o.s.	2.0E+01	3.2E+00	2.0E+01	2.0E+01	5.2E+02	5.2E+02	1.1E+02	1.1E+02	516	516	20	110
Lead	7.5E+01	1.2E+02	4.0E+02	4.0E+02	1.2E+02	1.2E+02	1.2E+02	1.2E+02	400	400	120	400
Nickel	5.0E+01	2.0E+01	4.2E+02	4.2E+02	3.3E+03	3.3E+03	7.0E+02	7.0E+02	3332	3332	50	700
Silver	2.0E+00	8.5E-01	1.0E+01	1.0E+01	1.1E+02	1.1E+02	2.3E+01	2.3E+01	109	109	2.0	23
Sulfate (Not Regulated)	2.5E+04	2.5E+04	2.5E+04	2.5E+04	2.5E+04	2.5E+04	2.5E+04	2.5E+04	25050	25050	25050	25050
Thallium	2.0E+00	7.1E-01	1.0E+01	1.0E+01	7.1E-01	7.1E-01	7.1E-01	7.1E-01	10	10	2.0	10
Zinc	1.0E+02	2.9E+02	2.8E+03	2.8E+03	4.8E+04	4.8E+04	1.0E+04	1.0E+04	47894	47894	292	10000
VOCs/SVOCs												
1,1,1-Trichloroethane	2.0E+01	9.3E-01	2.0E+01	2.0E+01	9.9E+00	9.9E+00	2.0E+01	2.0E+01	20	20	20	20
2,4-Dinitrotoluene	6.6E-01	6.8E-03	6.6E-01	6.6E-01	6.9E+00	6.9E+00	6.6E-02	6.6E-02	6.9	6.9	0.66	0.66
PAHs												
Anthracene	5.0E+02	1.5E+02	5.0E+02	5.0E+02	2.5E+04	2.5E+04	5.3E+03	5.3E+03	25349	25349	500	5267
Benzo(a)anthracene	5.0E+00	1.8E+00	5.0E+00	5.0E+00	5.9E+02	8.7E+02	7.4E+00	7.4E+00	594	867	5.0	7.4
Benzo(a)pyrene	1.6E+00	2.4E-01	1.6E+00	1.6E+00	5.9E+01	2.9E+02	2.5E+00	2.5E+00	59	288	1.6	2.5
Benzo(b)fluoranthene	5.0E+00	1.4E+00	5.0E+00	5.0E+00	5.9E+02	2.9E+03	2.5E+01	2.5E+01	594	2938	5.0	25
Benzo(ghi)perylene	5.0E+02	2.3E+03	5.0E+02	5.0E+02	2.3E+03	2.3E+03	2.3E+03	2.3E+03	2250	2250	2250	2250
Benzo(k)fluoranthene	5.0E+00	1.4E+01	5.0E+00	5.0E+00	5.9E+03	2.9E+04	2.5E+02	2.5E+02	5939	28788	14	245
Chrysene	5.0E+00	4.2E+01	5.0E+00	5.0E+00	5.9E+04	8.8E+04	7.5E+02	7.5E+02	59390	88494	42	753
Fluoranthene	5.0E+02	1.1E+02	5.0E+02	5.0E+02	1.1E+04	1.1E+04	2.4E+03	2.4E+03	11110	11110	500	2416
Indeno(1,2,3-cd)pyrene	5.0E+00	4.6E+00	5.0E+00	5.0E+00	5.9E+02	9.6E+03	8.1E+01	8.1E+01	594	9560	5	81
Phenanthrene	1.1E+02	1.9E+01	1.1E+02	1.1E+02	1.9E+01	1.9E+01	1.9E+01	1.9E+01	110	110	110	110
Pyrene	5.0E+02	1.1E+02	5.0E+02	5.0E+02	8.3E+03	8.3E+03	1.8E+03	1.8E+03	8346	8346	500	1776
PESTICIDES												
Aldrin	6.6E-01	8.2E-03	6.6E-01	6.6E-01	1.3E+01	1.3E+01	1.5E-01	1.5E-01	13	13	0.66	0.66
alpha-BHC	6.6E-01	7.9E-04	6.6E-01	6.6E-01	1.7E+00	1.7E+00	1.4E-02	1.4E-02	1.7	1.7	0.66	0.66
beta-BHC	6.6E-01	2.8E-03	6.6E-01	6.6E-01	5.8E+00	5.8E+00	4.9E-02	4.9E-02	5.8	5.8	0.66	0.66
delta-BHC	2.5E+01	2.8E-03	2.5E+01	2.5E+01	5.8E+00	5.8E+00	4.9E-02	4.9E-02	25	25	25	25
gamma-BHC (Lindane)	6.6E-01	4.5E-03	6.6E-01	6.6E-01	4.5E+00	4.5E+00	8.0E-02	8.0E-02	4.5	4.5	0.66	0.66
Chlordane	9.2E+00	1.6E-01	9.2E+00	9.2E+00	8.7E+01	8.7E+01	2.9E+00	2.9E+00	87	87	9.2	9.2
DDD	6.6E-01	8.4E-01	6.6E-01	6.6E-01	1.8E+03	1.8E+03	1.5E+01	1.5E+01	1760	1760	0.84	15
DDE	6.6E-01	5.9E-01	6.6E-01	6.6E-01	1.2E+03	1.2E+03	1.1E+01	1.1E+01	1242	1242	0.66	11
DDT	6.6E-01	8.5E-01	6.6E-01	6.6E-01	3.1E+02	4.3E+02	1.5E+01	1.5E+01	310	432	0.85	15
Dieldrin	6.6E-01	4.0E-03	6.6E-01	6.6E-01	4.5E+00	4.5E+00	3.8E-02	3.8E-02	4.5	4.5	0.66	0.66
Endrin	1.0E+01	1.9E-01	1.0E+01	1.0E+01	3.1E+01	3.1E+01	6.6E+00	6.6E+00	31	31	10	10
Heptachlor	6.6E-01	3.3E-02	6.6E-01	6.6E-01	3.3E+01	3.3E+01	2.8E-01	2.8E-01	33	33	0.66	0.66
Methoxychlor	1.0E+01	4.2E+00	1.0E+01	1.0E+01	6.9E+02	6.9E+02	1.5E+02	1.5E+02	690	690	10	147
Toxaphene	1.1E+01	7.7E-01	1.1E+01	1.1E+01	2.5E+02	2.5E+02	2.1E+00	2.1E+00	251	251	11	11

(a) Maximum of Type 1, Type 2, and Type 3 and Type 4 CW surface soil RRS
(b) Maximum of Type 1, Type 2, and Type 3 and Type 4 CW subsurface soil RRS
(c) Maximum of Type 1 and Type 2
(d) Maximum of Type 1, Type 2 and Type 3 and Type 4 Rail Site Worker subsurface soil RRS.

Prepared by:MKB 10/5/07
Checked by: LMS 11/15/10

Table A-7
Soil to Ground water Leachability

	K_d (a) (L/kg)	K_{oc} (L/kg)	Source	$Ø_w$	Øa	H' (unitless)	$Øw+Øa*H'/Þ_b$	Groundwater Type 1/3 RRS	C_w*1	Pathway Type 1/3 C_s (mg/kg)	Groundwater Type 2 RRS	C_w*1	Pathway Type 2 C_s	Residential Soil Leaching Criteria	Off-Property Groundwater Type 4 RRS (c) (C_w, mg/L)	C_w*1	Pathway Type 4 C_s (mg/kg)	Off-Property Soil Leaching Criteria	On-Property Groundwater Type 4 RRS (d) (C_w, mg/L)	C_w*1	Pathway Type 4 C_s (mg/kg)	On-Property Soil Leaching Criteria
METALS/INORGANICS																						
Antimony	4.50E+01		RSL	0.3	0.13	0.00E+00	0.2	6.0E-02	6.0E-02	2.7E+00	6.3E-03	6.3E-03	2.8E-01	2.7E+00	2.2E-01	2.2E-01	9.8E+00	9.8E+00	1.0E+00	1.0E+00	4.6E+01	4.6E+01
Arsenic	(e)		Site	0.3	0.13	0.00E+00	0.2	1.0E-02	1.0E-02	2.2E+01	5.7E-04	5.7E-04	2.2E+01	2.2E+01	1.0E-02	1.0E-02	2.2E+01	2.2E+01	7.7E-01	7.7E-01	2.2E+01	2.2E+01
Barium	4.10E+01		RSL	0.3	0.13	0.00E+00	0.2	2.0E+00	2.0E+00	8.2E+01	3.1E+00	3.1E+00	1.3E+02	1.3E+02	1.1E+02	1.1E+02	4.5E+03	4.5E+03	5.1E+02	5.1E+02	2.1E+04	2.1E+04
Copper	3.50E+01		RSL	0.3	0.13	0.00E+00	0.2	1.3E+00	1.3E+00	4.6E+01	6.3E-01	6.3E-01	2.2E+01	4.6E+01	2.2E+01	2.2E+01	7.7E+02	7.7E+02	1.0E+02	1.0E+02	3.5E+03	3.5E+03
Cyanide	9.90E+00		RSL	0.3	0.13	0.00E+00	0.2	2.0E-01	2.0E-01	2.0E+00	3.1E-01	3.1E-01	3.2E+00	3.2E+00	1.1E+01	1.1E+01	1.1E+02	1.1E+02	5.1E+01	5.1E+01	5.2E+02	5.2E+02
Lead	(e)		Site	0.3	0.13	0.00E+00	0.2	1.5E-02	1.5E-02	1.2E+02	ND	NA	NA	1.2E+02	1.5E-02	1.5E-02	1.2E+02	1.2E+02	1.5E-02	1.5E-02	1.2E+02	1.2E+02
Nickel	6.50E+01		RSL	0.3	0.13	0.00E+00	0.2	1.0E-01	1.0E-01	6.5E+00	3.1E-01	3.1E-01	2.0E+01	2.0E+01	1.1E+01	1.1E+01	7.0E+02	7.0E+02	5.1E+01	5.1E+01	3.3E+03	3.3E+03
Silver	8.30E+00		RSL	0.3	0.13	0.00E+00	0.2	1.0E-01	1.0E-01	8.5E-01	7.8E-02	7.8E-02	6.6E-01	8.5E-01	2.7E+00	2.7E+00	2.3E+01	2.3E+01	1.3E+01	1.3E+01	1.1E+02	1.1E+02
Sulfate (Not Regulated)	1.00E+02		(f)	0.3	0.13	0.00E+00	0.2	2.5E+02	2.5E+02	2.5E+04	ND	ND	ND	2.5E+04	ND	ND	ND	2.5E+04	2.5E+02	2.5E+02	2.5E+04	2.5E+04
Thallium	7.10E+01		RSL	0.3	0.13	0.00E+00	0.2	1.0E-02	1.0E-02	7.1E-01	ND	ND	ND	7.1E-01	1.0E-02	1.0E-02	7.1E-01	7.1E-01	1.0E-02	1.0E-02	7.1E-01	7.1E-01
Zinc	6.20E+01		RSL	0.3	0.13	0.00E+00	0.2	2.0E+00	2.0E+00	1.2E+02	4.7E+00	4.7E+00	2.9E+02	2.9E+02	1.6E+02	1.6E+02	1.0E+04	1.0E+04	7.7E+02	7.7E+02	4.8E+04	4.8E+04
VOCS																						
1,1,1-Trichloroethane	8.78E-02	4.39E+01	RSL	0.3	0.13	7.00E-01	0.2607	2.0E-01	2.0E-01	7.0E-02	2.7E+00	2.7E+00	9.3E-01	9.3E-01	7.1E+01	7.1E+01	2.0E+01	2.0E+01	2.8E+01	2.8E+01	9.9E+00	9.9E+00
2,4-Dinitrotoluene	1.15E+00	5.76E+02	RSL	0.3	0.13	2.20E-06	0.2000	5.0E-03	5.0E-03	6.8E-03	2.7E-03	2.7E-03	3.7E-03	6.8E-03	4.9E-02	4.9E-02	6.6E-02	6.6E-02	5.1E+00	5.1E+00	6.9E+00	6.9E+00
PAHs																						
Anthracene	3.27E+01	1.64E+04	RSL	0.3	0.13	2.30E-03	0.2002	5.0E-03	5.0E-03	1.6E-01	4.7E+00	4.7E+00	1.5E+02	1.5E+02	1.6E+02	1.6E+02	5.3E+03	5.3E+03	7.7E+02	7.7E+02	2.5E+04	2.5E+04
Benzo(a)anthracene	3.54E+02	1.77E+05	RSL	0.3	0.13	4.90E-04	0.2000	5.0E-03	5.0E-03	1.8E+00	1.2E-03	1.2E-03	4.1E-01	1.8E+00	2.1E-02	2.1E-02	7.4E+00	7.4E+00	2.5E+00	2.5E+00	8.7E+02	8.7E+02
Benzo(a)pyrene	1.17E+03	5.87E+05	RSL	0.3	0.13	1.90E-05	0.2000	2.0E-04	2.0E-04	2.4E-01	1.2E-04	1.2E-04	1.4E-01	2.4E-01	2.1E-03	2.1E-03	2.5E+00	2.5E+00	2.5E-01	2.5E-01	2.9E+02	2.9E+02
Benzo(b)fluoranthene	1.20E+03	5.99E+05	RSL	0.3	0.13	2.70E-05	0.2000	2.0E-04	2.0E-04	2.4E-01	1.2E-03	1.2E-03	1.4E+00	1.4E+00	2.1E-02	2.1E-02	2.5E+01	2.5E+01	2.5E+00	2.5E+00	2.9E+03	2.9E+03
Benzo(g,h,i)perylene	4.50E+05	2.25E+08	SCDM	0.3	0.13	5.74E-06	0.2000	5.0E-03	5.0E-03	2.3E+03	ND	ND	ND	2.3E+03	5.0E-03	5.0E-03	2.3E+03	2.3E+03	5.0E-03	5.0E-03	2.3E+03	2.3E+03
Benzo(k)fluoranthene	1.17E+03	5.87E+05	RSL	0.3	0.13	2.40E-05	0.2000	5.0E-03	5.0E-03	5.9E+00	1.2E-02	1.2E-02	1.4E+01	1.4E+01	2.1E-01	2.1E-01	2.5E+02	2.5E+02	2.5E+01	2.5E+01	2.9E+04	2.9E+04
Chrysene	3.61E+02	1.81E+05	RSL	0.3	0.13	2.10E-04	0.2000	5.0E-03	5.0E-03	1.8E+00	1.2E-01	1.2E-01	4.2E+01	4.2E+01	2.1E+00	2.1E+00	7.5E+02	7.5E+02	2.5E+02	2.5E+02	8.8E+04	8.8E+04
Fluoranthene	1.11E+02	5.55E+04	RSL	0.3	0.13	3.60E-04	0.2000	1.0E+00	1.0E+00	1.1E+02	6.3E-01	6.3E-01	7.0E+01	1.1E+02	2.2E+01	2.2E+01	2.4E+03	2.4E+03	1.0E+02	1.0E+02	1.1E+04	1.1E+04
Indeno(1,2,3-cd)pyrene	3.90E+03	1.95E+06	RSL	0.3	0.13	1.40E-05	0.2000	4.0E-04	4.0E-04	1.6E+00	1.2E-03	1.2E-03	4.6E+00	4.6E+00	2.1E-02	2.1E-02	8.1E+01	8.1E+01	2.5E+00	2.5E+00	9.6E+03	9.6E+03
Phenanthrene	3.70E+03	1.85E+06	SCDM	0.3	0.13	9.43E-04	0.2001	5.0E-03	5.0E-03	1.9E+01	ND	ND	ND	1.9E+01	5.0E-03	5.0E-03	1.9E+01	1.9E+01	5.0E-03	5.0E-03	1.9E+01	1.9E+01
Pyrene	1.09E+02	5.43E+04	RSL	0.3	0.13	4.90E-04	0.2000	1.0E+00	1.0E+00	1.1E+02	4.7E-01	4.7E-01	5.1E+01	1.1E+02	1.6E+01	1.6E+01	1.8E+03	1.8E+03	7.7E+01	7.7E+01	8.3E+03	8.3E+03
PESTICIDES																						
Aldrin	1.64E+02	8.20E+04	RSL	0.3	0.13	1.80E-03	0.2002	2.0E-05	2.0E-05	3.3E-03	5.0E-05	5.0E-05	8.2E-03	8.2E-03	9.0E-04	9.0E-04	1.5E-01	1.5E-01	7.7E-02	7.7E-02	1.3E+01	1.3E+01
alpha-HCH	5.61E+00	2.81E+03	RSL	0.3	0.13	2.10E-04	0.2000	5.0E-05	5.0E-05	2.9E-04	1.4E-04	1.4E-04	7.9E-04	7.9E-04	2.4E-03	2.4E-03	1.4E-02	1.4E-02	2.8E-01	2.8E-01	1.7E+00	1.7E+00
beta-HCH	5.61E+00	2.81E+03	RSL	0.3	0.13	2.10E-04	0.2000	5.0E-05	5.0E-05	2.9E-04	4.7E-04	4.7E-04	2.8E-03	2.8E-03	8.5E-03	8.5E-03	4.9E-02	4.9E-02	9.9E-01	9.9E-01	5.8E+00	5.8E+00
delta-HCH	5.61E+00	2.81E+03	RSL	0.3	0.13	2.10E-04	0.2000	5.0E-05	5.0E-05	2.9E-04	4.7E-04	4.7E-04	2.8E-03	2.8E-03	8.5E-03	8.5E-03	4.9E-02	4.9E-02	9.9E-01	9.9E-01	5.8E+00	5.8E+00
gamma-HCH (Lindane)	5.61E+00	2.81E+03	RSL	0.3	0.13	2.10E-04	0.2000	2.0E-04	2.0E-04	1.2E-03	7.7E-04	7.7E-04	4.5E-03	4.5E-03	1.4E-02	1.4E-02	8.0E-02	8.0E-02	7.7E-01	7.7E-01	4.5E+00	4.5E+00
alpha-Chlordane	6.76E+01	3.38E+04	RSL	0.3	0.13	2.00E-03	0.2002	2.0E-03	2.0E-03	1.4E-01	2.4E-03	2.4E-03	1.6E-01	1.6E-01	4.3E-02	4.3E-02	2.9E+00	2.9E+00	1.3E+00	1.3E+00	8.7E+01	8.7E+01
DDD	2.36E+02	1.18E+05	RSL	0.3	0.13	2.70E-04	0.2000	1.0E-04	1.0E-04	2.4E-02	3.5E-03	3.5E-03	8.4E-01	8.4E-01	6.3E-02	6.3E-02	1.5E+01	1.5E+01	7.5E+00	7.5E+00	1.8E+03	1.8E+03
DDE	2.36E+02	1.18E+05	RSL	0.3	0.13	1.70E-03	0.2001	1.0E-04	1.0E-04	2.4E-02	2.5E-03	2.5E-03	5.9E-01	5.9E-01	4.5E-02	4.5E-02	1.1E+01	1.1E+01	5.3E+00	5.3E+00	1.2E+03	1.2E+03
DDT	3.38E+02	1.69E+05	RSL	0.3	0.13	3.40E-04	0.2000	1.0E-04	1.0E-04	3.4E-02	2.5E-03	2.5E-03	8.5E-01	8.5E-01	4.5E-02	4.5E-02	1.5E+01	1.5E+01	1.3E+00	1.3E+00	4.3E+02	4.3E+02
Dieldrin	4.02E+01	2.01E+04	RSL	0.3	0.13	4.10E-04	0.2000	1.0E-04	1.0E-04	4.0E-03	5.3E-05	5.3E-05	2.2E-03	4.0E-03	9.5E-04	9.5E-04	3.8E-02	3.8E-02	1.1E-01	1.1E-01	4.5E+00	4.5E+00
Endrin	4.02E+01	2.01E+04	RSL	0.3	0.13	1.00E-05	0.2000	2.0E-03	2.0E-03	8.1E-02	4.7E-03	4.7E-03	1.9E-01	1.9E-01	1.6E-01	1.6E-01	6.6E+00	6.6E+00	7.7E-01	7.7E-01	3.1E+01	3.1E+01
Heptachlor	8.26E+01	4.13E+04	RSL	0.3	0.13	1.20E-02	0.2010	4.0E-04	4.0E-04	3.3E-02	1.9E-04	1.9E-04	1.6E-02	3.3E-02	3.4E-03	3.4E-03	2.8E-01	2.8E-01	4.0E-01	4.0E-01	3.3E+01	3.3E+01
Methoxychlor	5.38E+01	2.69E+04	RSL	0.3	0.13	8.30E-06	0.2000	4.0E-02	4.0E-02	2.2E+00	7.8E-02	7.8E-02	4.2E+00	4.2E+00	2.7E+00	2.7E+00	1.5E+02	1.5E+02	1.3E+01	1.3E+01	6.9E+02	6.9E+02
Toxaphene	1.54E+02	7.72E+04	RSL	0.3	0.13	2.50E-04	0.2000	5.0E-03	5.0E-03	7.7E-01	7.7E-04	7.7E-04	1.2E-01	7.7E-01	1.4E-02	1.4E-02	2.1E+00	2.1E+00	1.6E+00	1.6E+00	2.5E+02	2.5E+02

Koc, metal Kd, and H' values from EPA Regional Screening Values Table November 2010 unless otherwise noted.
Groundwater RRS from Table A-1

RSL Regional Screening Level Table
SCDM Superfund Chemical Data Matrix (US Environmental Protection Agency, 1997)
$Ø_w$ Water-filled soil porosity = 0.3 (L/L)
$Ø_a$ Air-filled soil porosity = 0.13 (L/L)
H' Dimensionless Henry Law Constant (HLC x 41) (unitless)
Þb Dry soil bulk density = 1.5 kg/L
RRS Risk Reduction Standard
C_w Target Leachate Concentration (mg/L)
C_s Screening Level in soil (mg/kg)
(a) $K_d = K_{oc} * f_{oc}$ where f_{oc} equal 0.002
(b) C_s based on Type 1 RRS higher than C_s based on Type 4 RRS
(c) Off-site based on Railyard Worker Scenario
(d) On-site based on Construction Worker Scenario
(e) SPLP study conducted for arsenic and lead; Highest total concentration with SPLP results less than the GW Standard times the DF of 1.
(f) Based on sodium; assumed sodium sulfate as form of sulfate.

Table A-8
Derivation of VF Factors (Soil-to-Air Volatilization Factor)
Based on Regional Screening Level Chemical-specific Parameters Supporting Table November 2010

Analyte	CAS No.	MW	HLC (atm-m^2/mole)	Dia (cm^2/s)	Koc (L/kg)	Dei (cm^2/sec)	K_d (cm^3/g)	K_{as} (g/cm^3)	Y (cm^2/sec)	VF (m^3/kg)
Anthracene	120-12-7	178.24	0.0000556	3.90E-02	16360	0.027484431	327	6.97E-06	3.89E-08	7.33E+05
Phenanthrene	85-01-8	178.24	2.30E-05	0.0574	29500	0.040451445	590	1.60E-06	1.31E-08	1.26E+06
Trichloroethane, 1,1,1-	71-55-6	133.41	0.0172	6.50E-02	43.89	0.045807385	0.878	8.03E-01	6.43E-03	1.55E+03

$$VF = (LS \times V \times DH) / (A) \; * \; \frac{(3.14 \times Y \times T)^{1/2}}{(2 \times Dei \times P \times Kas \times 0.001)}$$

Source for Phenanthrene: Superfund Data Matrix, 1997.

$$Y = \frac{Dei \times P}{P + (p(1-P)/Kas)}$$

MW = Molecular Weight

HLC = Henry's Law Constant

Dia = Diffusivity in Air

Koc = Soil organic carbon water partition coefficient

LS = Length of side of contaminated area = 45 m (default)

V = wind speed in mixing zone = 2.25 m/s (default)

DH = diffusion height = 2 m

A = area of contamination = 20,250,000 cm² (default)

T = exposure interval = 790000000 s = 25 yrs

Dei = effective diffusivity (cm^2/s) = Chemical Specific

P = air filled soil porosity (unitless) = 0.35 (default)

Kas = soil/air partition coefficient (g soil/cm^3 air) = Chemical Specific

Conversion factor = 0.001 kg/g

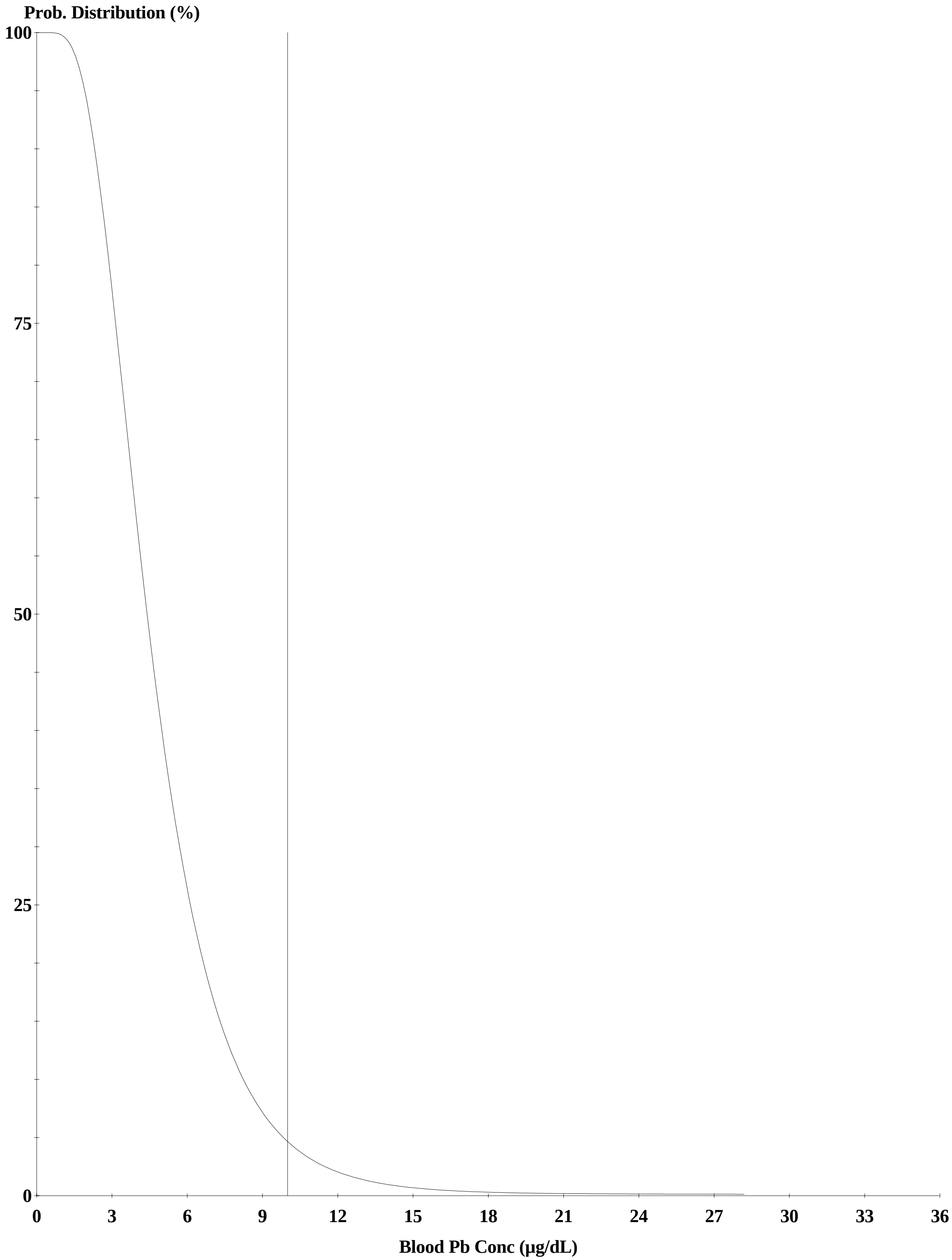
p = True soil density or particulate density = 2.65 g/cm³ (default)

Prepared/Date: EJS 5/6/10

Checked/Date: LMS 11/15/10

```
          LEAD MODEL FOR WINDOWS Version 1.1

==================================================================================
Model Version: 1.1 Build9
User Name:
Date:
Site Name:
Operable Unit:
Run Mode: Research
==================================================================================

****** Air ******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age       Time       Ventilation        Lung         Outdoor Air
        Outdoors        Rate         Absorption        Pb Conc
        (hours)      (m³/day)           (%)        (µg Pb/m³)
-----------------------------------------------------------------------
.5-1     1.000          2.000          32.000           0.100
1-2      2.000          3.000          32.000           0.100
2-3      3.000          5.000          32.000           0.100
3-4      4.000          5.000          32.000           0.100
4-5      4.000          5.000          32.000           0.100
5-6      4.000          7.000          32.000           0.100
6-7      4.000          7.000          32.000           0.100

****** Diet ******

Age     Diet Intake(µg/day)
-----------------------------------
.5-1     2.260
1-2      1.960
2-3      2.130
3-4      2.040
4-5      1.950
5-6      2.050
6-7      2.220

****** Drinking Water ******

Water Consumption:
Age     Water (L/day)
-----------------------------------
.5-1     0.200
1-2      0.500
2-3      0.520
3-4      0.530
4-5      0.550
5-6      0.580
6-7      0.590

Drinking Water Concentration: 15.000 µg Pb/L

****** Soil & Dust ******

Multiple Source Analysis Used
Average multiple source concentration: 237.500 µg/g

Mass fraction of outdoor soil to indoor dust conversion factor: 0.700
Outdoor airborne lead to indoor household dust lead concentration: 100.000
Use alternate indoor dust Pb sources? No
```

```
Age        Soil (µg Pb/g)     House Dust (µg Pb/g)
-----------------------------------------------------
.5-1          325.000          237.500
1-2           325.000          237.500
2-3           325.000          237.500
3-4           325.000          237.500
4-5           325.000          237.500
5-6           325.000          237.500
6-7           325.000          237.500

****** Alternate Intake ******

Age     Alternate (µg Pb/day)
----------------------------------
.5-1     0.000
1-2      0.000
2-3      0.000
3-4      0.000
4-5      0.000
5-6      0.000
6-7      0.000

****** Maternal Contribution: Infant Model ******

Maternal Blood Concentration: 1.000 µg Pb/dL

*****************************************
CALCULATED BLOOD LEAD AND LEAD UPTAKES:
*****************************************

Year        Air              Diet            Alternate       Water
         (µg/day)         (µg/day)            (µg/day)      (µg/day)
-----------------------------------------------------------------------------
.5-1       0.021            1.022            0.000         1.356
1-2        0.034            0.865            0.000         3.310
2-3        0.062            0.955            0.000         3.497
3-4        0.067            0.928            0.000         3.616
4-5        0.067            0.910            0.000         3.850
5-6        0.093            0.966            0.000         4.101
6-7        0.093            1.052            0.000         4.195

 Year     Soil+Dust            Total            Blood
         (µg/day)          (µg/day)          (µg/dL)
-------------------------------------------------------------
.5-1       6.385            8.784            4.7
1-2        9.897           14.106             5.7
2-3       10.054            14.568             5.4
3-4       10.202            14.813             5.2
4-5        7.753           12.580             4.4
5-6        7.047           12.207             3.8
6-7        6.693           12.034             3.5
```



Cutoff = 10.000 μg/dl
Geo Mean = 4.613
GSD = 1.600
% Above = 4.984

Age Range = 0 to 84 months

Run Mode = Research

Table A-10A
Calculation of Remediation Goal for Lead in Soil - Railway Site Workers

Exposure Variable	PRG Equation[1]	Description of Exposure Variable	Units	Values for Site Worker Using Equation 1 GSDi = 2.04	Values for Site Worker Using Equation 1 GSDi = 1.8 (a)
$PbB_{fetal, 0.95}$	X	95th percentile PbB in fetus	ug/dL	10	10
$R_{fetal/maternal}$	X	Fetal/maternal PbB ratio	--	0.9	0.9
BKSF	X	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4
GSD_i	X	Geometric standard deviation PbB	--	2.04	1.8
PbB_0	X	Baseline PbB	ug/dL	1.38	1.00
IR_S	X	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	0.050
$AF_{S, D}$	X	Absorption fraction (same for soil and dust)	--	0.12	0.12
C_w	X	Concentration of lead in ground water (average for site)	ug/L	15	15
IR_w[2]	X	Intake rate of water from on-site ground water	L/day	1	1
AF_w	X	Absolute gastrointestinal absorption fraction for lead in GW		0.2	0.2
EF	X	Exposure frequency (same for soil and dust and water)	days/yr	90	90
AT	X	Averaging Time	days/yr	365	365
PRG		**Preliminary Remediation Goal**	**ppm**	**3,000**	**4,900**

Note:

Level in groundwater set to treatment technique.

(a) Assumptions for the Adult Lead Model for EPA were updated in June 2009. Soil ingestion rate and frequency of exposure based on Frequent Questions from Risk Assessors on the ALM (www.epa.gov/superfund/health/contaminants/lead/almfaq.htm).

Exposure frequency for rail workers is 47 days per year. Per modeling guidance, exposure frequency has been set to lowest acceptable value of 90 days.

***Equation based on Georgia Adult Lead Model (November, 1999).**

$$\mathbf{PRG} = \frac{[([[PbB_{fetal,0.95}/(R*(GSD_i^{1.645})])-PbB_0) - (C_w*I_w*A_w)] \;*\; (IR_S*AF_S)^{-1}}{BKSF*(EF/AT)}$$

Prepared by: MKB 9/15/10

Checked by: LMS 11/15/10

Sources:
U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil.
Georgia EPD HSRA: Appendix IV.

Table A-10B
Calculation of Remediation Goal for Lead in Soil - Construction Workers

Exposure Variable	PRG Equation[1]	Description of Exposure Variable	Units	Values for Construction Worker Using Equation 1 GSDi = 2.04	Values for Construction Worker Using Equation 1 GSDi = 1.8 (a)
$PbB_{fetal, 0.95}$	X	95th percentile PbB in fetus	ug/dL	10	10
$R_{fetal/maternal}$	X	Fetal/maternal PbB ratio	--	0.9	0.9
BKSF	X	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4
GSD_i	X	Geometric standard deviation PbB	--	2.04	1.8
PbB_0	X	Baseline PbB	ug/dL	1.38	1.00
IR_S	X	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.100	0.100
$AF_{S, D}$	X	Absorption fraction (same for soil and dust)	--	0.12	0.12
C_w	X	Concentration of lead in ground water (average for site)	ug/L	15	15
$IR_w{}^2$	X	Intake rate of water from on-site ground water	L/day	0.08	0.08
AF_w	X	Absolute gastrointestinal absorption fraction for lead in GW		0.2	0.2
EF	X	Exposure frequency (same for soil and dust and water)	days/yr	125	125
AT	X	Averaging Time	days/yr	183	183
PRG		**Preliminary Remediation Goal**	**ppm**	**600**	**1,000**

Note:

Level in groundwater set to treatment technique.

(a) Assumptions for the Adult Lead Model for EPA were updated in June 2009. Soil ingestion rate based on Frequent Questions from Risk Assessors on the ALM (www.epa.gov/superfund/health/contaminants/lead/almfaq.htm).

***Equation based on Georgia Adult Lead Model (November, 1999).**

$$\textbf{PRG} = \frac{[([[PbB_{fetal,0.95}/(R*(GSD_i^{1.645})])-PbB_0) \ - (C_w*I_w*A_w)] \ \ * \ (IR_S*AF_S)^{-1}}{BKSF*(EF/AT)}$$

Prepared by: MKB 9/15/10

Checked by: LMS 11/15/10

APPENDIX C

FATE AND TRANSPORT MODEL

TECHNICAL ANALYSIS OF PESTICIDE FATE AND TRANSPORT
Former Estech General Chemicals Site (BFEL) - Atlanta, Georgia

Introduction

The main source zones of pesticides at the Estech Site are two former ponds, in the areas currently monitored by monitoring wells MW-109, MW-110, and MW-111. MW-109 is a residuum well, screened above the bedrock in a 10-foot thick sandy silt and silty sand. These soils are overlaid by about 5 feet of silty clay, which is covered by about 15 feet of surficial fill. Well MW-111 is a deep saprolite/partially weathered rock well, screened across the top of fractured bedrock and bottom of saprolite. Well MW-110 is a bedrock well. Figure 4.6 of the VRP Application Addendum is a schematic cross section from the main source zone toward the unnamed stream which is the closest receptor for the contaminated groundwater.

Table 1 shows the most recent sampling results for the source zones monitoring wells with the highest pesticide concentrations, as well as for the bedrock well MW-106D located directly downgradient of the source zone wells; this bedrock well is adjacent to the Unnamed Stream.

Table 1: Pesticide Concentrations, in mg/L, (samples collected on July 28, 2010, and September 14-15, 2010)

	MW-109	MW-110	MW-111	MW-106D
Alpha-BHC	0.027E	0.00047	0.017E	0.0082
Beta-BHC	0.004E	0.00043	0.0048E	0.0019
Delta-BHC	0.0066E	0.00088	0.033E	0.01
Lindane	0.018E	0.00055	0.0087E	0.0051

E = estimated concentration, highest detected concentration before dilution

Side-gradient to downgradient shallow monitoring well MW-114, which is screened in the residuum, in September 2010 had orders of magnitude lower pesticide concentrations than the source-zone shallow well MW-109.

Historically, shallow monitoring well DW-2A (now abandoned) adjacent to the existing MW-111 had the highest concentrations of lindane and other combined BHC pesticides: 0.2146 mg/L and 0.4083 mg/L respectively (samples collected on July 26, 1985). Two downgradient shallow wells, MW-17 and MW-18 (now abandoned) sampled on June 6, 1985 had pesticide concentrations one and two orders of magnitude lower respectively (Table 2)

Table 2: Pesticide Concentrations, in mg/L, recorded in June-July 1985

	DW-2A	MW-17	MW-18
Lindane	0.2146	0.0102	0.00223
alpha, beta, delta-BHC	0.4083	0.0336	0.00506

Based on the recorded historic, as well as the most recent pesticide concentrations in groundwater, it is apparent that they generally decrease downgradient from the main source zone. Comparison of the results from two adjacent wells, DW-2A and MW-111, also indicate that the latest 2010 lindane concentration at MW-111 is 24.7 times lower than the historic maximum concentrations at DW-2A in 1985: 0.0087 mg/L vs. 0.2146 mg/L. This points out to significant source zone depletion, at the rate of 0.0137 mg/L per year, which corresponds to groundwater contaminant source zone half-life of approximately 7.83 years. In other words, at the rate of lindane concentration decrease of 0.0137 mg/L, it takes approximately 8 years for the initial concentration of 0.2146 mg/L in the source zone to decrease by one half.

The presence of lindane degradation products, alpha, beta, and delta BHC confirms that, in addition to dispersion and sorption, mechanisms acting to decrease contaminant concentrations include biodegradation and/or hydrolysis (ATSDR, 2005).

Fate and Transport Calculations

Domenico Analytical Model

The concentrations of three pesticides with the in-stream water quality standards, alpha BHC, beta BHC and gamma BHC (Lindane), as they flow in groundwater from the main source zone (two former ponds) toward the first receptor (Unnamed Stream), were predicted using Domenico (1987) analytical model, which is one of the most commonly applied analytical solutions of the advection-dispersion equation. This is an analytical solution to one-dimensional advection and sorption with three-dimensional dispersion that describes the fate and transport of a contaminant plume evolving from a finite planar source. The solution is applicable to any solute, organic or inorganic, and includes option for the solute decay. It is based on an approach previously published by Domenico and Robbins (1985) for modeling a non-decaying contaminant plume. The key advantage of the Domenico and Robbins (1985) approach is that it provides a closed form solution without involving numerical integration procedures. Due to this computational advantage, the Domenico solution has been widely used in several public domain design tools, including the USEPA tools BIOCHLOR and BIOSCREEN (Newell et al. 1996; Aziz et al. 2000).

Karanovic et al. (2007) present an enhanced version of BIOSCREEN that supplements the Domenico (1987) solution with an exact analytical solution for the contaminant concentration. The exact solution is derived for the same conceptual model as Domenico (1987) but without invoking approximations in its evaluation that introduce errors of unknown magnitude in the analysis. The exact analytical solution is integrated seamlessly within a modified interface BIOSCREEN-AT. The Excel user interface for BIOSCREEN-AT is nearly identical to that for BIOSCREEN, and a user familiar with BIOSCREEN will have no difficulty using BIOSCREEN-AT. The fate and transport of lindane at the Site were simulated with BIOSCREEN-AT, which is available, free of charge at: http://www.sspa.com/Software/bioscreen.shtml.

BIOSCREEN-AT model features designed to account for degradation processes specific to natural attenuation of dissolved hydrocarbons from petroleum fuel release sites (e.g., BTEX) were not used. The use of BIOSCREEN AT was limited to modeling advection and dispersion (two basic processes applicable to any dissolved constituent), adsorption onto porous media, which is applicable to all COCs at the Site, as well as degradation based on solute’s half-life, which is applicable to all organic COCs at the Site including pesticides.

The use of the BIOSCREEN-AT groundwater model is fully consistent with the published recommendation of the USEPA as stated by Ford (2007). Specifically, the following quotes from this USEPA documents (Section ID.2.1, page 11) were considered when the BIOSCREEN-AT model was selected to simulate the fate and transport of the COCs at the Site:

> "*There are several types of models that may prove useful for characterizing attenuation processes at a site. In general, in approaching a specific question, it is most expedient to begin working with the simplest applicable model, adding complexity to the study as necessary. It is wise to avoid the temptation to begin by constructing the "ultimate" model, one that accounts for all aspects of transport and reaction at a site.*
>
> *Highly complex models are difficult to work with, expensive to produce, and difficult to interpret. A more efficient strategy is to begin with simple models of various aspects of the system, combining these as necessary into progressively more complex models, until reaching a satisfactory final result, one that reproduces the salient aspects of the system's behavior without introducing unnecessary complexity.*"

In addition, the following quote from the USEPA's Center for Subsurface Modeling Support (CSMoS, 2008) is consistent with the MACTEC use of BIOSCREEN-AT:

> *"CSMoS believes that the Domenico-based models in their current forms are reasonable for screening level tools, such as BIOCHLOR, BIOSCREEN, FOOTPRINT, and REMChlor."* [3]

Pesticides Fate and Transport in Saturated Residuum

Hydraulic Conductivity

The average hydraulic conductivity of the residuum soils based on slug tests performed in monitoring wells MW-1, MW-4, MW-12, DW-2A, and MW-22 is 0.84 ft/day or 3x10^{-4} cm/s (see Table 4.3 o March 18, 2010 VRP Application).

Hydraulic Gradient

The average hydraulic gradient in the residuum, based on three rounds of water level measurements is 0.038 (see Table 3).

Table 3: Hydraulic gradient (*i*) in the residuum, between source zone and unnamed stream (500 feet distance)

Date	MW-109	Unnamed Stream	*i* (ft/ft)
01/21/2000	879.32	861.00*	0.0366
11/26/2002	882.02	861.00*	0.042
08/20/2007	878.65	860.9	0.0355

* Estimated

Effective Porosity

The site-specific effective porosity of the residuum is 0.23, as determined from water retention test of soil samples from SB-109 23-26 and MW-110 20-23 (see Table 4.3 of March 18, 2010 VRP Application)

Groundwater Seepage Velocity

Based on the above values for the hydraulic conductivity, hydraulic gradient, and effective porosity, the calculated seepage velocity of groundwater in saprolite is 50.66 ft/year, rounded to 51 ft/year.

Source Zone Geometry

The average thickness of the saturated residuum in the main source area is 20 feet; it is assumed that the groundwater contaminant source zone in the residuum model is also 20 feet thick.

The width of the source zone is assumed to be the same as the 600-foot long section of the impacted Unnamed Stream along which there is a significant increase in the pesticides concentrations (approximately between stations 1200 and 1800 – see Appendix E and Figures 2 and 3).

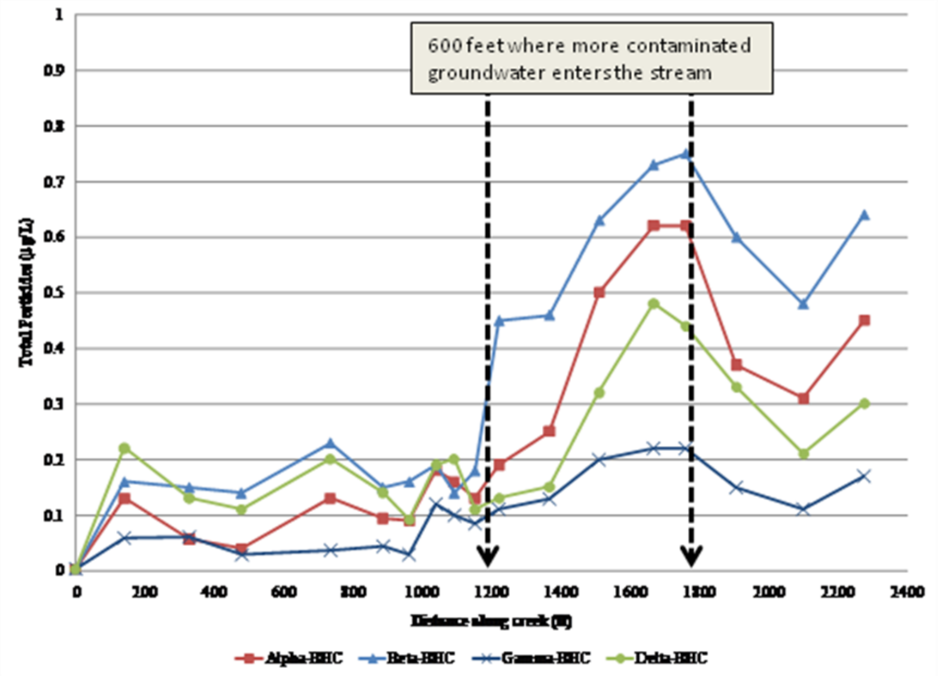


Figure 2: Concentrations of pesticides in the Unnamed Stream

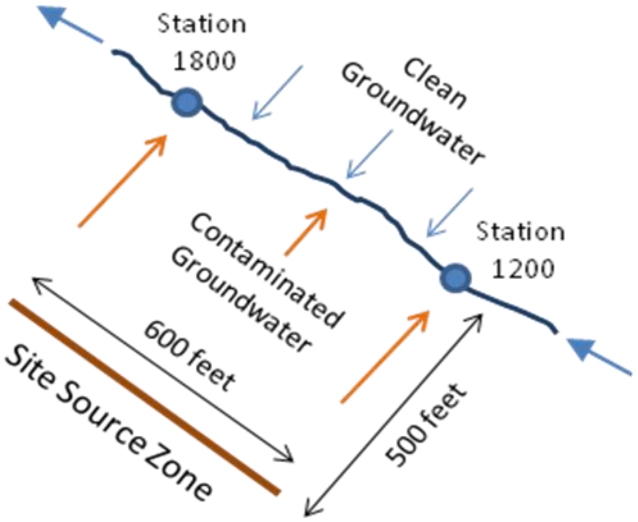


Figure 3: Scheme of the groundwater flow between the assumed source zone and the impacted section of the Unnamed Stream

Initial Source Zone Concentration

The initial concentration of the modeled pesticides in groundwater is shown in Table 4 (note that Delta-BHC was not modeled since it does not have established in-stream water quality standard). These values are the highest recorded in September 14-15, 2010 at any of the source area monitoring wells, and are conservatively assigned uniformly to the entire assumed 600 feet wide source zone.

Table 4: Initial pesticide concentrations, in mg/L, in the source zone (data from July 28, 2010, and September 14-15, 2010)

	Concentration mg/L	Monitoring Well
Alpha-BHC	0.027	MW-109
Beta-BHC	0.0048	MW-111
Gamma-BHC (Lindane)	0.018	MW-109

Source Zone Depletion Rate

The source of groundwater contamination is assumed to be depleted based on more than twenty-fold decrease from 1985 to 2010 in lindane concentration in the saturated residuum below the former ponds. As discussed earlier, the source zone half-life is calculated at 8 years, based on the 1985 concentration at DW-2A (0.2146 mg/L) and the September 2010 concentration at MW-111 (0.0087 mg/L). The latest 2010 lindane concentration at MW-111 is 24.7 times lower than the historic maximum concentrations at DW-2A in 1985. This points out to significant source zone depletion, at the rate of 0.0137 mg/L per year, which corresponds to groundwater contaminant source zone half-life of approximately 7.83 years. In other words, at the rate of lindane concentration decrease of 0.0137 mg/L, it takes approximately 8 years for the initial concentration of 0.2146 mg/L in the source zone to decrease by one half.

Dispersivity

As recommended by the USEPA (Newell et al., 1996), the longitudinal dispersivity is assumed to be 50 feet, or 10% of the length between the source zone (MW-109/MW-111) and the Unnamed Stream adjacent to MW-106D. The transverse and vertical dispersivities are estimated at 10% and 1% of the longitudinal dispersivity, i.e., 5 ft and 0.5 ft respectively.

Sorption (Distribution Coefficient)

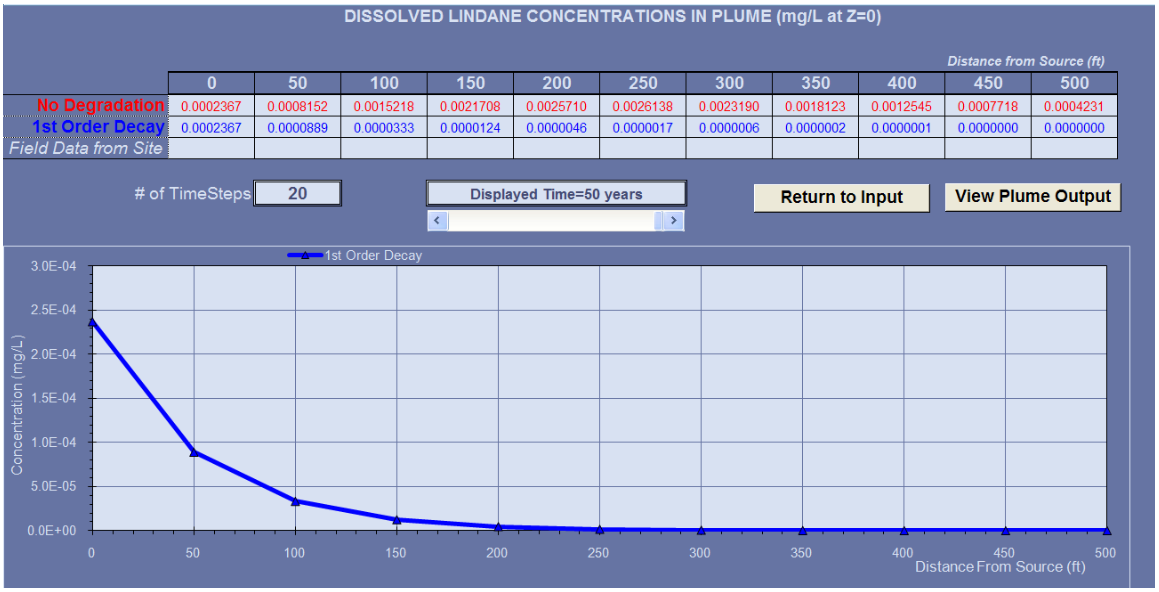
The distribution coefficient of lindane and its two degradation products, alpha-BHC and beta-BHC is calculated using equation $K_d = f_{oc} \times K_{oc}$. The updated 2010 literature value of K_{oc} for lindane is 2807 L/kg (USEPA Regional Screening Level (RSL) Chemical-specific Parameters Supporting Table November 2010). The site-specific fraction organic carbon in the residuum soil, f_{oc}, varies between approximately 10,750 mg/kg or 0.011 (samples from SB-109 and SB-110), and 61.7 mg/kg or 6.2×10^{-5} (sample from SB-111; see Table 4.1, Revised CSR, 2007). Since some portions of the residuum with low fraction organic carbon, such as at SB-111, may not exhibit significant sorption of lindane, the site-representative fraction organic carbon is conservatively estimated to be 0.0005 resulting in K_d of 1.40 L/kg for the three modeled pesticides. The calculated corresponding retardation factor, R, is 11.4.

Solute Degradation Rate

Degradation of lindane dissolved in groundwater, which is evident at the Site from the presence of other isomers of BHC, is modeled by assigning the aerobic soil metabolism half-life of 980 days, the most conservative value found in literature (USEPA, 2006). The same half-life of 2.7 years is assumed for alpha-BHC and beta-BHC.

Model Prediction

Figure 4 shows the predicted lindane concentration, in mg/L, in the saturated residuum 50 years after the current conditions in 2010. Figures 5 and 6 show the predicted concentrations of alpha-BHC and beta-BHC respectively for the same period of 50 years.



DISSOLVED LINDANE CONCENTRATIONS IN PLUME (mg/L at Z=0)

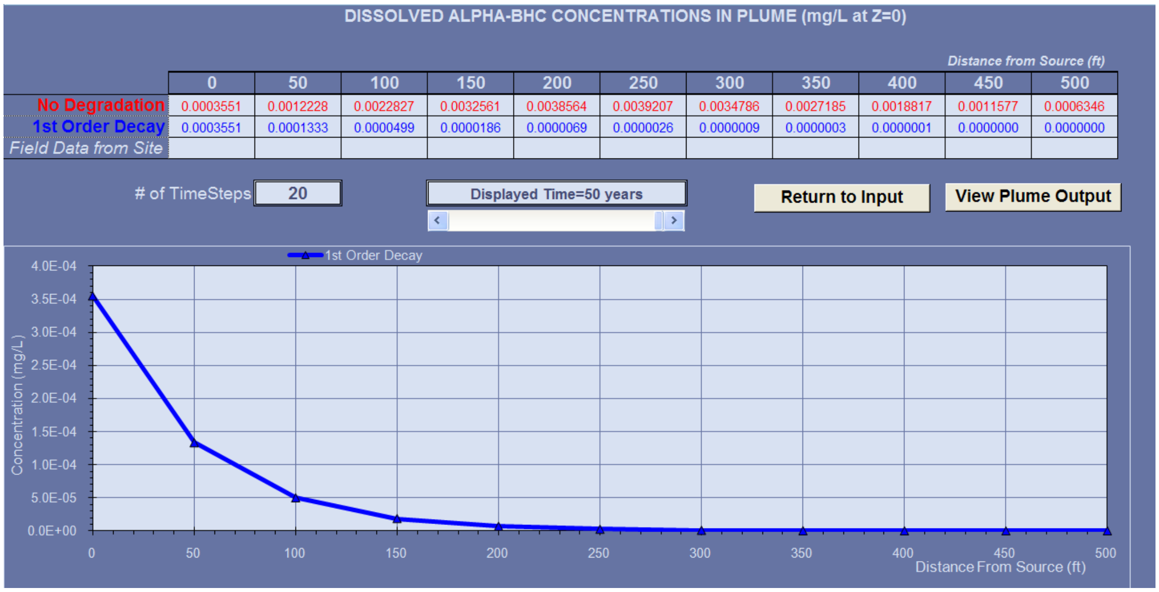
Distance from Source (ft)

	0	50	100	150	200	250	300	350	400	450	500
No Degradation	0.0002367	0.0008152	0.0015218	0.0021708	0.0025710	0.0026138	0.0023190	0.0018123	0.0012545	0.0007718	0.0004231
1st Order Decay	0.0002367	0.0000889	0.0000333	0.0000124	0.0000046	0.0000017	0.0000006	0.0000002	0.0000001	0.0000000	0.0000000
Field Data from Site											

# of TimeSteps: 20

Displayed Time=50 years

Figure 4: Modeled lindane concentration in the saturated residuum, in mg/L after 50 years at various distances from the source zone, in feet.



DISSOLVED ALPHA-BHC CONCENTRATIONS IN PLUME (mg/L at Z=0)

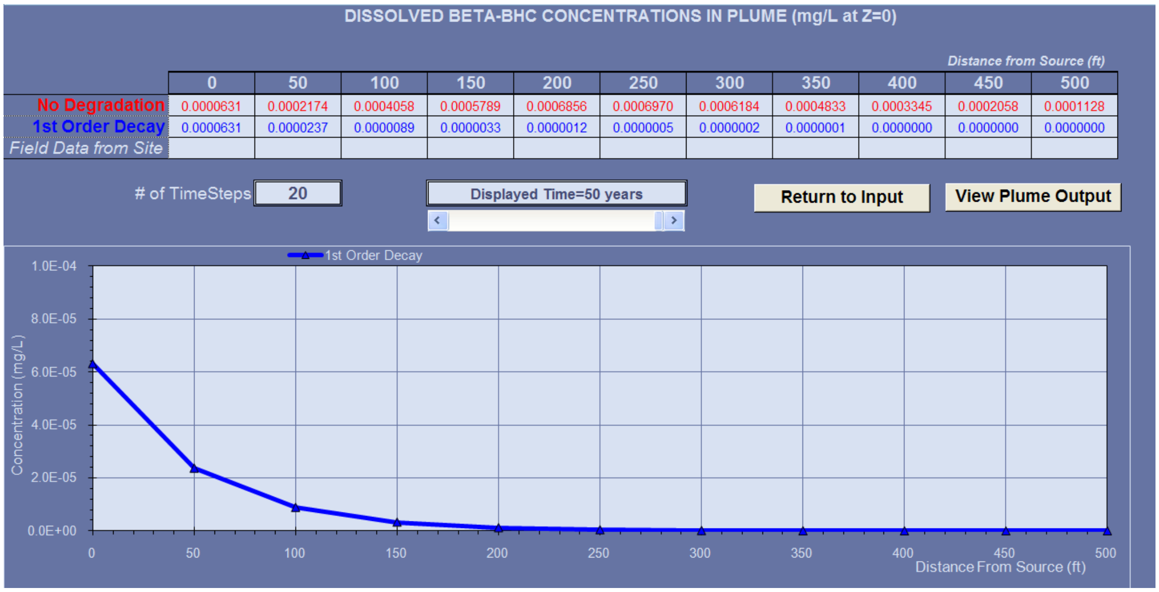
Distance from Source (ft)

	0	50	100	150	200	250	300	350	400	450	500
No Degradation	0.0003551	0.0012228	0.0022827	0.0032561	0.0038564	0.0039207	0.0034786	0.0027185	0.0018817	0.0011577	0.0006346
1st Order Decay	0.0003551	0.0001333	0.0000499	0.0000186	0.0000069	0.0000026	0.0000009	0.0000003	0.0000001	0.0000000	0.0000000
Field Data from Site											

# of TimeSteps 20

Displayed Time=50 years

Figure 5: Modeled alpha-BHC concentration in the saturated residuum, in mg/L after 50 years at various distances from the source zone, in feet.



DISSOLVED BETA-BHC CONCENTRATIONS IN PLUME (mg/L at Z=0)

Distance from Source (ft)

	0	50	100	150	200	250	300	350	400	450	500
No Degradation	0.0000631	0.0002174	0.0004058	0.0005789	0.0006856	0.0006970	0.0006184	0.0004833	0.0003345	0.0002058	0.0001128
1st Order Decay	0.0000631	0.0000237	0.0000089	0.0000033	0.0000012	0.0000005	0.0000002	0.0000001	0.0000000	0.0000000	0.0000000
Field Data from Site											

# of TimeSteps 20

Displayed Time=50 years

Figure 6: Modeled beta-BHC concentration in the saturated residuum, in mg/L after 50 years at various distances from the source zone, in feet.

As can be seen, after 50 years, the predicted concentrations of all three pesticides in the saturated residuum adjacent to the Unnamed Stream are non-detect.

Soil Concentrations of COCs in Source Zone Protective of Surface Water Quality

Groundwater concentrations of the constituents of concern (COCs) adjacent to the Unnamed Stream, and soil concentrations in the source zone that can be left in place while still being protective of the applicable in-stream water quality standards were estimated based on:

1. In-stream water quality standard for COCs
2. The concentrations of COCs detected in the Unnamed Stream,
3. The measured flow rate of the Unnamed Stream during dry baseflow conditions in September 2010, and
4. The results of the Domenico analytical fate and transport model

(1) As listed by the U.S. Environmental Protection Agency pursuant to Section 307(a)(1) of the Federal Clean Water Act (as amended), in-stream concentrations of the following COCs cannot exceed criteria indicated below under annual average or higher stream flow conditions: (GDNR 2007 Chapter 391-3-6-.03).

Lindane [Hexachlorocyclohexane (g-BHC-Gamma)]	0.063 μg/l
Alpha-BHC	0.013 μg/l
Beta-BHC	0.046 μg/l

(2) The concentrations of COCs in the Unnamed Stream during dry baseflow conditions in September 2010 are shown in Figure 2. As can be seen, all analyzed pesticides exhibit stable lower concentrations in the first segment between stations 0 and approximately 1200, at which point there is notable increase in the flux of contaminated groundwater discharging into the stream. This influx of pesticides in the second stream segment, between stations 1200 and 1800, continues to increase and reaches peak at approximately station 1800. In the third segment after station 1800, the dissolved pesticides concentrations decrease indicating dilution with the non-contaminated groundwater discharging into the stream. Currently, the dissolved pesticides concentrations in the Unnamed Stream exceed in-stream water quality standards in all three stream segments.

(3) The flow in the Unnamed Stream was measured at the Site as described in Appendix E and shown in Figure 7. Steady increase of the stream flow rate is attributable to groundwater discharge during dry baseflow conditions in September 2010. There are two relatively distinct stream segments in terms of the baseflow: before and after approximately 1200 feet (station 1200). This is shown schematically in Figure 8 together with the characteristic flows and pesticide concentrations used to calculate the contaminant mass balance resulting from mixing of groundwater and surface water.

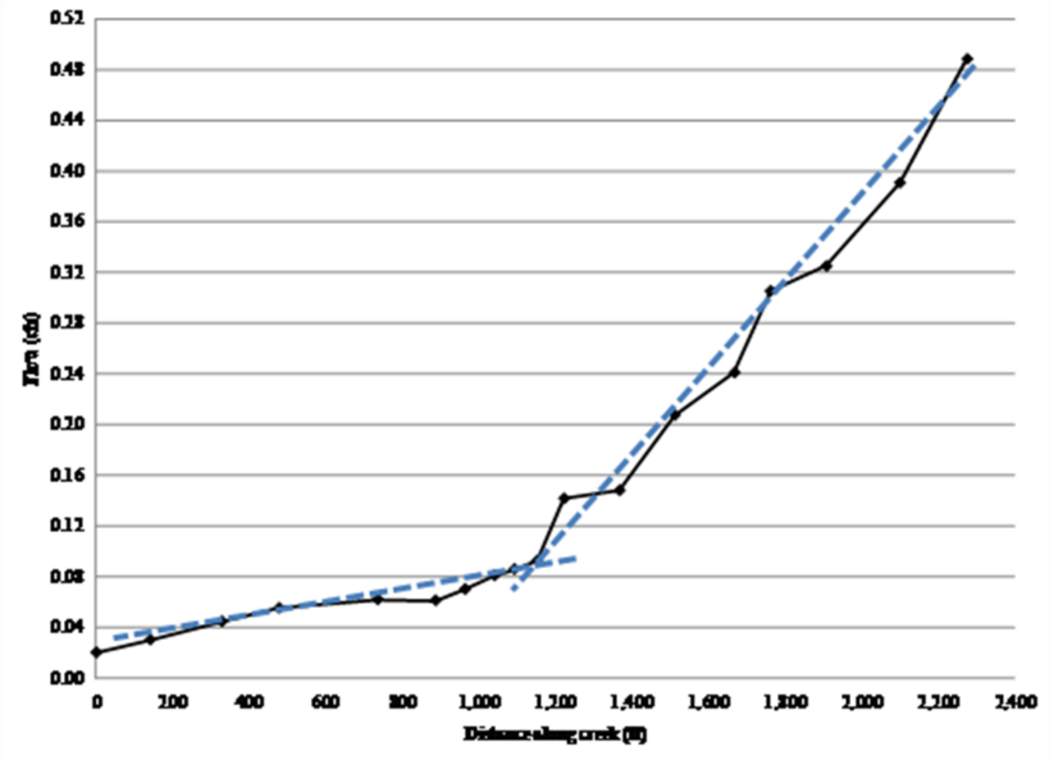


Figure 7: Flow rate in the Unnamed Stream measured during dry baseflow conditions in September 2010.

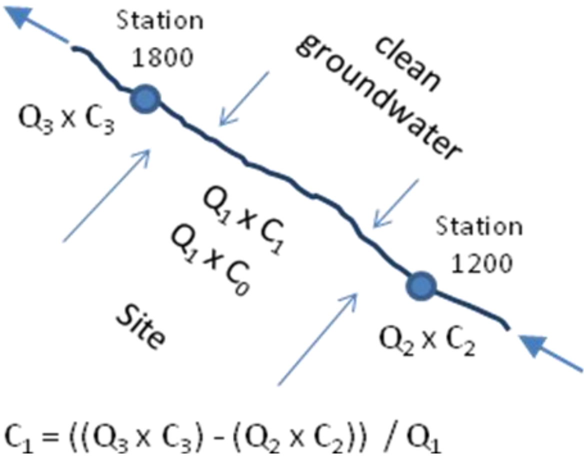


Figure 8: Calculation scheme for determining contaminant mass balance and mixing between groundwater and surface water

The results of the mixing calculation for the second stream segment are presented in Table 5. Because the Unnamed Stream is already impacted before station 1200, the calculated groundwater concentrations of all three pesticides currently discharging into the stream are higher than those that would be protective of the in-stream water quality standard. In addition, the groundwater concentrations of alpha-BHC and beta-BHC discharging into the stream would have to be "negative" in order to meet their in-stream water quality standards.

Table 5: Allowed average pesticides concentration in groundwater (C_1), in ug/L, along the 600-foot segment, to meet in-stream water quality standard for current conditions

COC	Calculated C_0 (ug/L) in groundwater	C_1 (ug/L) to meet standard	C_2 (ug/L)	Q_1 (cfs)	Q_2 (cfs)	Q_3 (cfs)	C_3 (ug/L) current	In-stream standard (ug/L)
alpha-BHC	1.625	-0.086	0.15	0.11	0.09	0.31	0.62	0.013
beta-BHC	1.868	-0.116	0.30	0.11	0.09	0.31	0.75	0.046
Lindane	0.538	0.096	0.10	0.11	0.09	0.31	0.22	0.063

Table 6 shows results of the same calculation assuming that the Unnamed Stream upgradient of the Site is not impacted by the pesticides (C_2=0). As discussed further, the calculated concentrations C_1 in Table 6 were used as the starting point for determining concentrations of COCs in the Site source areas that would be protective of the in-stream water quality standards.

Table 6: Allowed average concentration of pesticides in groundwater (C_1), in ug/L, along the 600-foot segment, to meet in-stream water quality standard when assuming non-detect pesticide concentrations in the Unnamed Stream upgradient of the Site

COC	C_1 (ug/L) to meet standard	C_2 (ug/L)	Q_1 (cfs)	Q_2 (cfs)	Q_3 (cfs)	C_3 = In-stream standard (ug/L)
alpha-BHC	0.037	0.00	0.11	0.09	0.31	0.013
beta-BHC	0.130	0.00	0.11	0.09	0.31	0.046
gamma-BHC (Lindane)	0.178	0.00	0.11	0.09	0.31	0.063

(4) Dissolved concentrations of the COCs in groundwater below the main source zone at the Site, that would result in their acceptable concentrations in groundwater immediately adjacent to the Unnamed Stream (listed under (3) above), are calculated using the analytical fate and transport model BIOSCREEN-AT described in previous sections. It is assumed that all three COCs (lindane, alpha-BHC and beta-BHC) have the same distribution coefficients and degradation half-lives. The model-calculated dissolved concentrations (C_w) underlying the source zones are used to calculate COC concentrations sorbed onto soil particles in the soil source zone (C_s, in mg/kg) as follows:

$$C_s[mg/kg] = K_d[L/kg] \times C_w[mg/L]$$

Where K_d is the sorption (distribution) coefficient for the source zone soils, calculated as 1.40 L/kg.

It is assumed that both the sorbed and dissolved calculated COCs concentrations are representative of the present conditions in the vadose zone that cause impacts to the underlying saturated zone. This approach is justified since the historic concentrations of COCs in the saturated zone are higher than in 2010 (see Introduction), reflecting several decades of contaminant leaching from the vadose zone and the related source depletion.

For the model simulation it is assumed that the initial concentrations of the pesticides in the Unnamed Stream are non-detect and that they would increase due to discharge of contaminated groundwater from the Site.

Table 7 shows the results of calculated concentrations of individual COCs in the vadose zone in the source area, which are protective of the in-stream water quality standards for a 50-year simulation. The contaminant half-life for all three COCs is assumed to be 10 years, equal to 3 times the most conservative value found in literature (980 days; USEPA, 2006).

Table 7: Concentrations of COCs in the source area vadose zone protective of the surface water quality standards

	With degradation (10-year half-life)	
COC	Dissolved (pore water) concentration (mg/L)	Sorbed concentration (mg/kg)
Alpha-BHC	32.8	45.9
Beta-BHC	116	162
Lindane	159	223

Pesticides Fate and Transport in Fractured Bedrock

Since it is evident that portion of the groundwater flow impacted by the Site COCs is taking place in the fractured bedrock, the Domenico analytical fate and transport model is applied to this pathway as well. The model is used to predict dissolved concentrations of the COCs in groundwater below the main source zone at the Site that would result in their acceptable concentrations in groundwater immediately adjacent to the Unnamed Stream. Assuming absence of pesticides in the Unnamed Stream upgradient from the Site, the allowed average concentration of pesticides in groundwater (C_1) discharging into the stream along the 600-foot segment are presented in Table 6 and again below:

COC	C_1 (ug/L) to meet standard	C_2 (ug/L)	Q_1 (cfs)	Q_2 (cfs)	Q_3 (cfs)	C_3 = In-stream standard (ug/L)
alpha-BHC	0.037	0.00	0.11	0.09	0.31	0.013
beta-BHC	0.130	0.00	0.11	0.09	0.31	0.046
gamma-BHC (Lindane)	0.178	0.00	0.11	0.09	0.31	0.063

The calculated concentrations C_1 in the above table were used as the starting point for determining concentrations of COCs in the Site source areas that would be protective of the in-stream water quality standards. Again, the fate and transport of COCs in the saturated zone, from the Site to the Unnamed Stream, is assumed to be taking place entirely through the fractured bedrock even though the bedrock is overlain by approximately 20 feet thick saturated residuum at the Site (see Figure 1). This approach is significantly more conservative since the overall model input parameters for the fractured bedrock are more conservative than for the saturated residuum.

Hydraulic Conductivity

The average hydraulic conductivity of the fractured bedrock based on slug tests performed in monitoring wells MW-106-D and MW-110 is 0.2 ft/day or 7×10^{-5} cm/s (see table 4.3 of March 18, 2010 VRP Application).

Hydraulic Gradient

The average hydraulic gradient in the bedrock, based on three rounds of water level measurements is 0.021 (see Table 8).

Table 8: Hydraulic gradient (*i*) in the bedrock, between source zone (MW-110) and the Unnamed Stream (MW-106D), for the 500-ft distance

Date	MW-110	MW-106D	*i* (ft/ft)
01/20/1998	879.32	867.64	0.023
01/21/2000	875.44	865.87	0.019
11/26/2002	877.62	866.75	0.022

Effective Porosity

The effective porosity of the fractured amphibolite gneiss bedrock is estimated at 0.05.

Groundwater Seepage Velocity

Average seepage velocity through the fractured bedrock is calculated at 31 ft/day based on the above values for the hydraulic conductivity, hydraulic gradient, and effective porosity.

Source Zone Geometry

The thickness of impacted fractured bedrock is estimated at 50 feet. The width of the assumed source zone is the same as in the residuum, approximately 600 feet.

Source Zone Depletion Rate

The source of groundwater contamination is assumed to be decaying based on more than twenty-fold decrease in lindane concentration in groundwater below former ponds. As discussed earlier, the source half-life is calculated at 8 years.

Dispersivity

As recommended by the USEPA (Newell et al., 1996), the longitudinal dispersivity is assumed to be 50 feet, or 10% of the length between the source zone (MW-109/MW-111) and the Unnamed Stream adjacent to MW-106D. The transverse and vertical dispersivities are estimated at 10% and 1% of the longitudinal dispersivity, i.e., 5 ft and 0.5 ft respectively.

Sorption (Distribution Coefficient)

The distribution coefficient of lindane and its two degradation products, alpha BHC and beta BHC is calculated using equation $K_d = f_{oc} \times K_{oc}$. The updated 2010 literature value of K_{oc} for lindane is 2807 L/kg (USEPA Regional Screening Level (RSL) Chemical-specific Parameters Supporting Table November 2010), whereas the site-specific fraction organic carbon in the fractured rock is unknown. Since this fraction is expected to be smaller than in the overlying residuum, it is conservatively assumed to be 0.00005, thus effectively minimizing sorption of the pesticides in fractured bedrock. These values result in distribution coefficient, K_d, for the three pesticides of 0.140 L/kg.

Solute Degradation Rate

Degradation of lindane dissolved in groundwater, which is evident at the Site from the presence of other isomers of BHC, is modeled by assigning the aerobic soil metabolism half-life of 980 days, the most conservative value found in literature (USEPA, 2006). The same half-life of 2.7 years is assumed for alpha-BHC and beta-BHC.

Soil Concentrations of COCs in Source Zone Protective of Surface Water Quality

Concentrations of COCs in the source zone soil that can be left in place while still being protective of the applicable in-stream water quality standards were estimated using the same approach described for the saturated residuum. The model-calculated dissolved concentrations (C_w) in the fractured bedrock underlying the source zones are used to calculate concentrations of COCs sorbed onto soil particles in the soil source zone (C_s, in mg/kg) as follows:

$$C_s[mg/kg] = K_d[L/kg] \times C_w[mg/L]$$

Where K_d is the sorption (distribution) coefficient for the source zone soils, calculated as 1.40 L/kg.

Table 9 shows the results of calculated concentrations of individual COCs in the vadose zone in the source area, which are protective of the in-stream water quality standards for a 50-year simulation. The contaminant half-life for all three COCs is assumed to be 10 years, equal to more than 3 times the most conservative value found in literature (980 days; USEPA, 2006).

Table 9: Concentrations of COCs in the source area vadose zone protective of the surface water quality standards, assuming contaminant fate and transport is occurring entirely through the saturated fractured bedrock

	With degradation (10-year half-life)	
COC	Dissolved (pore water) concentration (mg/L)	Sorbed concentration (mg/kg)
Alpha-BHC	1.93	2.7
Beta-BHC	6.8	9.5
Lindane	9.3	13

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APPENDIX D

CONCEPTUAL EXPOSURE MODEL AND CALCULATION OF UCLS AND EPCS

APPENDIX D
SITE CONCEPTUAL EXPOSURE MODEL AND COMPARISON OF RISK REDUCTION STANDARDS TO REPRESENTATIVE CONCENTRATIONS

Sampling of the facility and surrounding property included collection of surface soils (0 to 2 feet in depth), subsurface soils (greater than 2 feet in depth), groundwater, and surface water. The following section identifies the complete or potentially complete exposure pathways for human and ecological receptors, discusses the results of the chemical laboratory analyses for site media, and establishes exposure point concentrations (EPCs). The EPCs were compared to established screening criteria or risk reduction standards calculated for the BFEL property and offsite CSX property to identify those areas in need of further remediation.

POTENTIALLY COMPLETE EXPOSURE PATHWAYS – HUMAN POPULATIONS

The conceptual exposure model (CEM) is a tool to identify the exposure pathways for human health risk evaluation. The CEM is shown in Figure D-1 and is discussed below. Additionally, a groundwater and surface water usage map for the site vicinity is included as Figure D-2.

An exposure pathway is the mechanism by which receptors may come into contact with COPCs. A complete exposure pathway has four components, defined by USEPA (1989) as follows:

1. A source and mechanism of chemical release (*i.e.*, a source of contamination)

2. An environmental retention or transport medium for the release chemical

3. A point of potential human contact with the contaminated medium (*i.e.*, an exposure point)

4. A route of exposure at the exposure point

Without the presence of the four components, exposure does not occur. The complete exposure pathways identified for this site are carried through the human health risk evaluation. The following complete or potentially complete pathways were identified in the human health exposure study for BFEL and the surrounding property owned by CSX:

Soil Pathways

Future Onsite Construction Worker

- Incidental ingestion of onsite surface and subsurface soils during excavation activities
- Inhalation of soil particulates

Current and Future Offsite Railyard Maintenance Workers

- Incidental ingestion of surface soil during maintenance activities
- Inhalation of soil particulates

Leaching to Groundwater

- Leaching of soils to groundwater and subsequent migration to offsite surface water

Groundwater Pathways

Future Onsite Construction Worker

- Incidental ingestion of groundwater during excavation activities

Future Offsite Railyard Maintenance Worker

- Ingestion of groundwater during working hours

Current exposures by onsite workers to site soils are rare and infrequent because the site is not currently used and is heavily vegetated. Future onsite workers were not included in the risk evaluation since any future land use at the site would not occur without engineering or institutional controls.

The closest potential off-site human receptors include employees of the railroad yard (Tilford Yard) who may potentially be exposed through inhalation of fugitive dusts generated from contaminated soils or via direct contact with soils impacted via fugitive dust transport. There is expected to be only a limited amount of fugitive dust transported off the site, due to entrapment by the extensive vegetative cover. The majority of constituents detected in onsite and offsite soils have minimal potential for volatility and exposure to volatile emissions is expected to be a minimum exposure pathway. Constituents detected in groundwater have limited volatility, and inhalation exposures would be minimal.

There are no drinking water wells present in the area or in the same drainage basin as the site. Deed restrictions and covenants are anticipated, which would restrict groundwater as a source of potable water for future workers. Incidental ingestion of groundwater is potentially complete by the construction worker if future subsurface activities involving excavation or grading were to occur.

Trespassers were not considered as potential soil receptors because the site is entirely enclosed by railroad tracks and has limited access, the site is enclosed with security fencing, is regularly patrolled, and heavily vegetated. No current residential receptors are present and future land use restrictions would prohibit residential development of the site.

Groundwater is not used as a source of drinking water in this area. Because of the long-term use of the land for industrial purposes, groundwater is not a suitable source for potable water. Institutional controls would be applied to prohibit future groundwater use at the BFEL site.

The nearest surface water body is an unnamed tributary between the CSX railyard and Marietta Boulevard which discharges to Peachtree Creek approximately 2.5 miles from the site. Impacts to nearby surface water may occur as site constituents in subsurface soils leach to groundwater which ultimately discharges to the unnamed tributary. Exposure to surface waters and sediments by trespassers or offsite CSX railyard workers were considered incomplete due to the heavily vegetated banks that would prohibit access. Figure D-1 illustrates the migration pathways for site constituents through environmental media.

POTENTIALLY COMPLETE EXPOSURE PATHWAYS – ECOLOGICAL RECEPTORS

A Preliminary Risk Evaluation (PRE) conducted for BFEL was limited to the subject site and the area within the railroad tracks and along the unnamed stream to the east of BFEL. An initial ecological risk screening assessment compares concentrations of facility-related contaminants with U.S. Environmental Protection Agency (USEPA) Region IV ecological screening values (ESVs). It is also used to develop an exposure scenario and risk characterization for model ecological receptors based on contaminants which exceed screening values. No rare or unusual natural communities and only one protected species, Indian olive (*Nestronia umbellula*), were noted by the Georgia Department of Natural Resources as being previously observed within the area of the Northwest Atlanta, Georgia topographic quadrangle map. One wetland area was noted as being present approximately 0.5 miles south of the site and was described as palustrine with an excavated unconsolidated bottom and permanently flooded. Palustrine habitat indicates dominance by trees, shrubs, or emergent vegetation. The wetland area does not appear to be a part of a larger, connected wetland system. Ecological receptors identified at BFEL and surrounding area include the northern bobwhite, the short-tailed shrew, and the raccoon. These ecological receptors could be exposed by contact with or ingestion of impacted soil, sediment, and surface water or from seeds, vegetation, or insects impacted site constituents.

The ecological risk calculations have been updated to include the surface water data collected at the site in September 2010 and comments received from Georgia EPD in prior submittals. Ecological COPCs in surface water were selected if the maximum detected concentration was above the ESV or if an ESV was not available. Additional surface water COPECs were selected and EPCs updated as based on the results of the 2010 sampling event. With these revisions, copper and zinc were added as COPECs in surface water (Table 6.2). Nitrate and sulfate were also added to Table 6.2; however, only sulfate was selected as a COPEC in surface water because there is not a ESV for this constituent. Nitrate was below the available screening criterion, and therefore, was not identified as a COPEC. Tables 6.5 through 6.7 were updated to include sulfate. Tables 6.12 through 6.17 were revised to include the additional surface water COPECs copper, zinc, and sulfate, as well as the updated surface water exposure point concentrations.

In response to EPD's Comments on the previous PRE, the use of surrogates when screening soil COPECs was eliminated for those constituents that do not have ESVs (Table 6.4). Where appropriate, values for compound groups such as Total Polycyclic Aromatic Hydrocarbons (PAHs) and DDT/metabolites were used as screening values (e.g., the total PAHs value was used for each PAH, the DDT/metabolites value was used for DDT, DDD, and DDE, etc.). Based on these updates, four additional soil COPECs were identified in the screening process: endosulfan I, heptachlor epoxide, methoxychlor, and naphthalene.

Ecological risk calculations were performed for the northern bobwhite, the short-tailed shrew, and the raccoon. Two separate exposure scenarios were evaluated. In the first scenario, risk was evaluated from the BFEL site and the unnamed tributary combined. Risk from the unnamed tributary only was evaluated in the second scenario. Surface soil and surface water were considered media of exposure for the northern bobwhite and short-tailed shrew in the first scenario. Surface soil, surface water, and sediment were considered media of exposure for the raccoon in the first scenario since this receptor may forage for food within the stream sediments as well as the nearby surface soil. In the second scenario, surface water was the media of exposure for the bobwhite and shrew, and surface water and sediment were the media of exposure for the raccoon.

With the addition of the additional COPECs for surface water, ecological risk due to exposure to the unnamed stream only for the northern bobwhite, short-tailed shrew, and raccoon is below the threshold value of one set forth by USEPA. The HIs for the northern bobwhite and the short-tailed shrew exposed to surface water only changed to 0.033 (Table 6.13) compared to 0.004 previously and 0.30 (Table 6.15) compared to 0.003 previously, respectively. The HI for the raccoon is 0.56 (Table 6.17 – sediment and surface water exposure only) compared to 0.11. Based on the findings of the Preliminary Risk Evaluation (PRE), exposure to the unnamed stream does not present a risk of adverse effects for ecological receptors and additional study for a full ecological risk assessment of the stream is not warranted.

Hazard indices generated as part of the PRE were greater than one when risk was evaluated for the BFEL site surface soils and the unnamed tributary. The addition of the four soil COPECs and the addition of the 2010 surface water data resulted in the following revisions to the HIs: the HI for the northern bobwhite changed to 3,595 (Table 6.12) compared to 3,594 previously and the HI for the short-tailed shrew changed to 10,186 (Table 6.14) compared to 10,182 previously. These updates resulted in revised raccoon HIs of 2,756 (Table 6.16) compared to 362.

Additional ecological risk evaluation is not recommended for site surface soils because site remediation will likely involve re-grading and removal of surface soils or on-site soil capping, which will both limit future exposures to elevated soil concentrations and reduce current ecological habitat. When the site is redeveloped, future use scenarios will involve exposure barriers blocking future exposure to site soils. The limits on ecological exposure and maintenance of these exposure barriers are outlined in the VRP Application Addendum. If the redevelopment activities do not achieve the aforementioned limits on exposure, a Baseline Ecological Risk Assessment (BERA) that documents that there are no unacceptable risks to ecological receptors may be developed.

SUMMARY OF CONSTITUENTS DETECTED IN SOILS

Onsite Soils

Sampling of onsite soils at BFEL include surface soils (0 to 2 foot in depth) and subsurface soils (greater than 2 feet in depth). Onsite surface and subsurface soil samples collected as part of site investigations conducted from 1983 to 2007 were included in the VRP Application. Soil samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, and inorganic compounds.

A total of 17 VOCs/SVOCs, 18 pesticides, and 13 inorganics were detected in onsite surface soils. Of these constituents, the following had maximum detected concentrations above the notification requirements provided under HSRA:

- VOCs/SVOCs: 2,4-dinitrotoluene, benzo(a)anthracene, benzo(a)pyrene, benzo(b,k)fluoranthene, chrysene
- Pesticides: aldrin, alpha/beta/delta-BHC, alpha-BHC, beta-BHC, chlordane, DDD, DDE, DDT, delta-BHC, dieldrin, endosulfan I, endrin, gamma-BHC (Lindane), heptachlor, and toxaphene
- Inorganic Compounds: antimony, arsenic, barium, lead, silver, and zinc.

A total of 11 VOCs/SVOCs, 13 pesticides, and 9 inorganic compounds were detected in subsurface soils. Of these constituents, the following had maximum detected concentrations above the notification requirements provided under HSRA:

- VOCs/SVOCs: benzo(a)pyrene and chrysene
- Pesticides: alpha/beta/delta-BHC, alpha-BHC, beta-BHC, chlordane, DDD, DDE, DDT, dieldrin, gamma-BHC (Lindane), heptachlor, and toxaphene
- Inorganic Compounds: arsenic and lead

Tables D-1 and D-2 summarize the soil data for onsite soils. The historical soil dataset used was included in the March 18, 2010 VRP Application.

Offsite Soils

Sampling of offsite soils at the CSX railyard include surface soils (0 to 2 foot in depth) and subsurface soils (greater than 2 feet in depth). Onsite surface and subsurface oil samples collected as part of site investigations conducted from 1983 to 2007 were included in the VRP Application. Soil samples were analyzed for VOCs, SVOCs, pesticides, and inorganic compounds.

A total of 16 VOCs/SVOCs, 13 pesticides, and 11 inorganic compounds were detected in offsite surface soils. Of these constituents, the following had maximum detected concentrations above the notification requirements provided under HSRA:

- VOCs/SVOCs: no detected constituents above notification requirements
- Pesticides: chlordane, DDD, DDE, DDT, gamma-BHC (Lindane), and toxaphene
- Inorganic Compounds: antimony, arsenic, barium, lead, and silver

A total of 10 pesticides, and 2 inorganic compounds were detected in offsite subsurface soils. No SVOCs/VOCs were detected in subsurface soils. Of these constituents, the following had maximum detected concentrations above the notification requirements provided under HSRA:

- Pesticides: alpha/beta/delta-BHC, alpha-BHC, chlordane, DDD, DDE, DDT, gamma-BHC (Lindane), heptachlor, and toxaphene
- Inorganic Compounds: arsenic

Tables D-3 and D-4 summarize the soil data for offsite soils. The historical soil dataset used was included in the March 18, 2010 VRP Application.

Calculation of the Representative Exposure Point Concentrations in Soils

Per the Georgia VRP Act of 2009, a representative concentration is the average concentration to which a receptor is exposed within a relevant exposure domain. USEPA guidance has been used to generate representative exposure point concentrations (EPCs) for surface soils and subsurface soils both on-site and off-site. USEPA has developed software (ProUCL) that supports the development of upper confidence limits (UCLs) of the arithmetic mean. The program will generate multiple statistics based on normal, lognormal, gamma, and nonparametric distributions. The program will test the distribution of the data and make a recommendation regarding the most applicable UCL to use.

Using an UCL as the representative EPC for site detected constituents is appropriate because exposure may potentially occur over an area. The use of the 95 percent UCL would be protective of the majority of the potentially exposed populations (95 percent or greater) without skewing site remediation to the farthest limits of the data distribution.

UCLs were calculated using the historical data for onsite surface and subsurface soil at BFEL and offsite surface and subsurface soils at CSX. The UCLs were generally selected as EPCs when assessing risk except in instances where not enough samples were available for statistical analysis or too few detections were available. The maximum detected concentration was used as the EPC for constituents without UCLs. The mean concentration was used as the EPC for lead exposure modeling per USEPA guidelines. A summary of the EPCs for BFEL and CSX soils is provided in Tables D-1 through D-4.

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER

The 2010 groundwater data collected at BFEL and CSX indicate the presence of inogranic compounds and pesticides (Table 4.10). A total of 5 pesticides and 4 inorganic compounds were detected in groundwater underlying BFEL and the CSX railyard. These include the following constituents:

- Pesticides: alpha-BHC, beta-BHC, delta-BHC, dieldrin, and gamma-BHC (Lindane)
- Inorganics: arsenic, copper, lead, and zinc.

SUMMARY OF CONSTITUENTS DETECTED IN SURFACE WATER

Groundwater from the site flows in an easterly direction toward the unnamed small stream on the adjacent CSX property. The unnamed stream is believed to be a normal discharge boundary for groundwater migrating from the site.

Additional discrete surface water samples were collected in September 2010 to determine if site contaminates were present in the unnamed stream and verify that concentrations were below Georgia Instream Water Quality Standards (ISWQS). A total of 6 pesticides and 4 inorganics were detected in groundwater underlying BFEL and the CSX railyard (Table 4-12). These include the following constituents:

- Pesticides: alpha-BHC, beta-BHC, delta-BHC, dieldrin, gamma-BHC (Lindane), and DDD
- Inorganics: arsenic, copper, lead, and zinc.

COMPARISON OF EPCS TO RISK REDUCTION STANDARDS

Risk reduction standards (RRS) were calculated for soil (Tables A-1 through A-10B in Appendix B). Site-specific soil to water partition coefficients (Kd) were calculated for arsenic and lead for the site using site soil analytical results for total and SPLP metals. The equations and assumptions used in the derivation of the risk reduction standards are presented in Appendix B. The selected surface soil and subsurface soil RRS for each constituent is also provided on the soil summary tables for BFEL and CSX (Tables D-1 through D-4). These selected RRS have been compared to the EPCs (UCLs or maximum concentrations) to determine the soil constituents of concern (COCs).

BFEL Onsite Soils

Six pesticides and two inorganic compounds had EPCs above the Type 1 through Type 4 RRS for onsite surface soils. Pesticides included aldrin, alpha-BHC, beta-BHC, alpha-, beta-, delta-BHC, DDT, and dieldrin. Inorganic compounds included arsenic and lead (Table D-1).

Two pesticides and 2 inorganic compounds had EPCs above the Type 1 through Type 4 RRS for onsite subsurface soils. Pesticides included alpha/beta/delta-BHC, and alpha-BHC. Inorganics included arsenic and lead (Table D-2).

Offsite Soils

Five pesticides and nine inorganic compounds had EPCs above the Type 1 through Type 4 RRS for offsite surface soils. Pesticides included chlordane, DDD, DDE, DDT, and toxaphene. Inorganics included antimony, arsenic, barium, copper, lead, nickel, silver, thallium, and zinc (Table D-3).

Six pesticides and one inorganic compound had EPCs above the Type 1 through Type 4 RRS for offsite surface soils. Pesticides included alpha/beta/delta-BHC, alpha-BHC, chlordane, DDT, gamma-BHC (Lindane), and toxaphene. Arsenic was the only inorganic above the RRS in offsite subsurface soils (Table D-4).

Groundwater

Vertical migration of soil constituents has resulted in the detection of pesticides and inorganic compounds to groundwater. However, no groundwater constituents were above the groundwater RRS calculated for an onsite construction worker (Table 7-2). In the offsite wells, alpha-, beta-, and delta-BHC, arsenic and lead were above RRS.

Surface Water

The surface water results from 2010 indicate that 5 pesticides and 3 metals are above the Georgia ISWQS. Pesticides include alpha-BHC, beta-BHC, delta-BHC, DDD, and dieldrin. Metals include copper, lead, and zinc (Table 4.12). The source of these constituents may be surface runoff and/or discharge of groundwater to surface water. Alpha-BHC, beta-BHC, delta-BHC, dieldrin, copper, lead, and zinc were detected in groundwater. All eight constituents were also present in surface soil.

APPENDIX D TABLES

Table D-1
BFEL Surface Soil - Comparison of EPCs to RRS

Parameter	Mininum Detected, mg/kg	Maximum Detected, mg/kg	Frequency of Detection	Exposure Point Concentration (EPC), mg/kg	Basis for EPC	Notification Concentration, mg/kg	Target (Maximum On-Site Surface) RRS, mg/kg	Goal to Achieve (EPC < RRS)	Removal of Soil Locations to Achieve EPC < Target RRS
VOCs/SVOCs									
2,4-Dinitrotoluene	7.5	7.5	1 / 20	7.5	Max	0.66	6.9	7.5	SS-14
Acenaphthene	0.41	0.75	2 / 20	0.75	Max	300	NA	NA	
Acenaphthylene	0.14	0.72	4 / 20	0.72	Max	130	NA	NA	
Anthracene	0.064	6.9	7 / 20	1.73	95% KM (t) UCL	500	25300	NA	
Benzo(a)anthracene	0.025	32	20 / 33	13.8	99% KM (Chebyshev) UCL	5	594	NA	
Benzo(a)pyrene	0.0052	14	20 / 33	2.26	95% KM (BCA) UCL	1.6	59	NA	
Benzo(b)fluoranthene	0.0052	2.9	7 / 13	0.873	95% KM (BCA) UCL	5	594	NA	
Benzo(b,k)fluoranthene	0.096	22	13 / 20	6.24	95% KM (BCA) UCL	5	594	NA	
Benzo(ghi)pyrene	0.025	21	12 / 33	2.51	95% KM (t) UCL	500	2250	NA	
Benzo(k)fluoranthene	0.0021	0.99	7 / 13	0.417	95% KM (t) UCL	5	5940	NA	
Chrysene	0.13	32	19 / 33	13.8	99% KM (Chebyshev) UCL	5	59400	NA	
Fluoranthene	0.18	34	18 / 33	16.5	99% KM (Chebyshev) UCL	500	11100	NA	
Fluorene	0.41	0.57	2 / 20	0.57	Max	360	NA	NA	
Indeno(1,2,3-cd)pyrene	0.31	3.4	6 / 20	1.26	95% KM (t) UCL	5	594	NA	
Naphthalene	0.071	0.25	4 / 20	0.25	Max	100	NA	NA	
Phenanthrene	0.55	0.9	3 / 12	0.667	95% KM (t) UCL	110	110	NA	
Pyrene	0.087	32	20 / 33	16.9	99% KM (Chebyshev) UCL	500	8350	NA	
Pesticides									
Aldrin	0.039	140	3 / 21	86	99% KM (Chebyshev) UCL	0.66	**13**	>140 (>95)	SS-21
alpha, beta, delta-BHC	0.006	40.7	26 / 29	11.3	95% KM (Chebyshev) UCL	0.66	**1.7**	>3.7	MW-23, SS-7, SB-8, MW-14, MW-9, MW-13,, SS-2, SS-3
alpha -BHC	0.005	960	21 / 42	254	99% KM (Chebyshev) UCL	0.66	**1.7**	>5.5	SS-24, SS-21
beta-BHC	0.0092	930	17 / 35	300	99% KM (Chebyshev) UCL	0.66	**5.8**	>18	SS-24, SS-21
Chlordane	0.012	390	39 / 71	71	97.5% KM (Chebyshev) UCL	9.2	87	NA	
DDD	0.013	550	23 / 63	81	97.5% KM (Chebyshev) UCL	0.66	1760	NA	
DDE	0.0029	94	57 / 73	12.3	95% KM (Chebyshev) UCL	0.66	1240	NA	
DDT	0.003	9100	62 / 73	1140	97.5% KM (Chebyshev) UCL	0.66	**310**	>1280	SS-24, SS-2, SS-21
delta-BHC	0.003	69	9 / 37	6.6	95% KM (t) UCL	25	25	NA	
Dieldrin	0.0052	590	20 / 64	70	97.5% KM (Chebyshev) UCL	0.66	**4.5**	>3.2	SS-24, SS-21
Endosulfan sulfate	1.3	1.3	1 / 20	1.3	Max	1.7	NA	NA	
Endosulfan I	0.005	0.005	1 / 20	0.005	Max	10	NA	NA	
Endrin	0.15	38	4 / 45	2.71	95% KM (t) UCL	10	31	NA	
gamma-BHC (Lindane)	0.0051	14	37 / 71	0.865	95% KM (BCA) UCL	0.66	4.5	NA	
Heptachlor	0.007	210	33 / 73	22.5	97.5% KM (Chebyshev) UCL	0.66	33	NA	
Heptachlor epoxide	0.008	0.96	3 / 20	0.96	Max	1.7	NA	NA	
Methoxychlor	0.031	0.067	2 / 64	0.067	Max	10	690	NA	
Toxaphene	0.251	1633	28 / 74	190	97.5% KM (Chebyshev) UCL	11	251	NA	
Inorganic compounds									
Sulfate	160	1200	6 / 6	960	95% Student's-t UCL	NR	25100	NA	
Cyanide	1.8	1.8	1 / 20	1.8	Max	10	516	NA	
Antimony	20	30	2 / 20	30	Max	10	46	NA	
Arsenic	0.0067	1100	64 / 74	202	97.5% KM (Chebyshev) UCL	41	**38**	>120	SB-173 (0-2), HA-106 (1-2'), MW-22 (0-1.5), SS-7 (0-2), SB-15 (0-1.5), SB-174 (0-2), MW-13 (0-0.5), MW-101 (0-2), MW-12 (0-0.5), MW-21 (0-1.5), MW-14 (0-0.5)
Barium	28	2000	20 / 23	817	95% KM (Chebyshev) UCL	500	21000	NA	
Beryllium	1.1	1.8	3 / 20	1.8	Max	3	NA	NA	
Chromium	5.9	68	15 / 20	37.1	95% Approximate Gamma UCL	1200	NA	NA	
Copper	21	800	26 / 29	430	97.5% KM (Chebyshev) UCL	1500	3520	NA	
Lead	0.027	7450	55 / 56	770	Mean	400	**400**	>3300	HA-106 (1-2), SS-07 (0-2), SS-20 (0-1), SB-173 (0-2)
Mercury	0.1	0.325	2 / 23	0.325	Max	17	NA	NA	
Nickel	36	120	5 / 23	52	95% KM (t) UCL	420	3330	NA	
Silver	6.1	14	5 / 23	8.06	95% KM (t) UCL	10	109	NA	
Thallium	2.9	8.8	5 / 20	4.34	95% KM (t) UCL	10	10	NA	
Zinc	49	3200	26 / 29	731	95% H-UCL	2800	47900	NA	

mg/kg milligrams per kilograms
UCL Upper confidence limit of the arithmetic mean. Calculated with ProUCL Version 4.00.05.
EPC Exposure Point Concentration
Basis of EPC - Recommended UCL is listed if sufficient data to calculate the UCL. The mean is used for lead per modeling guidance. For detections less than 3 or when a high detection limit exceeds the maximum, the maximum concentration is listed.
Notification Concentration from Appendix I of the HSRA Rule.
Target RRS - Target Risk Reduction Standard for On-Site Surface Soil (Nonresidential exposures) from VRP RRS Summary Table.
Bolded RRS - The EPC exceeds the target RRS.
Goal to Achieve - Sample concentrations were ranked from low to high. The higher concentrations were removed from the data set and the UCL recalculated until the revised UCL was less than the target RRS. All samples greater than the indicated value were removed.
Removal of Soil Locations to Achieve EPC< RRS - Location of samples causing the EPC to exceed the target RRS.

PREPARED/DATE: LMS 11/29/10
CHECKED/DATE: MKB 11/29/10

Table D-2
BFEL Subsurface Soil - Comparison of EPCs to RRS

Parameter		Mininum Detected, mg/kg	Maximum Detected, mg/kg	Frequency of Detection	Exposure Point Concentration (EPC), mg/kg	Basis for EPC	Notification Concentration, mg/kg	Maximum On-Site Subsurface RRS	Goal to Achieve EPC < RRS	Removal of Soil Locations to Achieve EPC < Target RRS
VOCs/SVOCs										
Benzo(a)anthracene		0.022	2.9	2 / 9	2.9	Max	5	867	NA	
Benzo(a)pyrene		0.0021	3.8	4 / 9	1.3	95% KM (t) UCL	1.6	288	NA	
Benzo(b)fluoranthene		0.0054	2.2	3 / 6	2.2	Max	5	2940	NA	
Benzo(b,k)fluoranthene		0.13	0.13	1 / 3	0.13	Max	5	2940	NA	
Benzo(ghi)pyrene		0.079	0.58	2 / 9	0.58	Max	500	2250	NA	
Benzo(k)fluoranthene		0.0021	1.3	3 / 6	1.3	Max	5	28800	NA	
Chrysene		0.056	5.5	3 / 9	1.98	95% KM (t) UCL	5	88500	NA	
Fluoranthene		0.33	11	2 / 9	11	Max	500	11100	NA	
Naphthalene		0.12	0.12	1 / 3	0.12	Max	100	NA	NA	
Phenanthrene		3.9	3.9	1 / 6	3.9	Max	110	110	NA	
Pyrene		0.32	16	2 / 9	16	Max	500	8350	NA	
Pesticides										
alpha, beta, delta-BHC		0.005	44	49 / 90	4.06	97.5% KM (Chebyshev) UCL	0.66	**1.7**	>10.52	MW-8
alpha -BHC		0.0034	41	12 / 62	2	95% KM (t) UCL	0.66	**1.7**	>6.8	SB-2
beta-BHC		0.0068	10.6	4 / 29	1.08	95% KM (t) UCL	0.66	5.8	NA	
Chlordane		0.002	191	53 / 151	9.93	97.5% KM (Chebyshev) UCL	9.2	87	NA	
DDD		0.0022	57	13 / 111	3.88	97.5% KM (Chebyshev) UCL	0.66	1760	NA	
DDE		0.0025	17	35 / 151	1.26	97.5% KM (Chebyshev) UCL	0.66	1240	NA	
DDT		0.0036	555	61 / 151	38.2	97.5% KM (Chebyshev) UCL	0.66	432	NA	
delta-bHC		0.003	0.043	3 / 29	0.008	95% KM (t) UCL	25	25	NA	
Dieldrin		0.0019	6.6	8 / 111	0.21	95% KM (t) UCL	0.66	4.5	NA	
gamma-BHC (Lindane)		0.0011	19	52 / 152	0.78	95% KM (Chebyshev) UCL	0.66	4.5	NA	
Heptachlor		0.006	6.2	40 / 151	0.32	95% KM (Chebyshev) UCL	0.66	33	NA	
Methoxychlor		0.08	0.08	1 / 151	0.08	Max	10	690	NA	
Toxaphene		0.118	592	23 / 151	33.6	97.5% KM (Chebyshev) UCL	11	251	NA	
Inorganic compounds										
Sulfate		130	850	6 / 6	646	95% Student's-t UCL	NR	25100	NA	
Arsenic		0.68	3300	132 / 176	238	97.5% KM (Chebyshev) UCL	41	**41**	>217.7	HA-111 (5-6), SB-132 (12-13), SB-8 (13.5-15), MW-22 (3.5-5), MW-11 (13.5-15), SB-132 (3-5), MW-12 (3.5-5), SB-173 (4.5'), SB-2 (18.5-20), SB-132 (14-15), SB-15 (4.5-6), HA-106 (4-5), SB-13 (3.5-5), MW-15 (3.5-5), SB-174 (4.5'), MW-23 (4-5.5), MW-11 (8.5-10), MW-12 (8.5-10)
Barium		83	270	3 / 15	262	95% KM (t) UCL	500	21000	NA	
Beryllium		1	1	1 / 3	1	Max	3	NA	NA	
Chromium		2	18	3 / 3	18	Max	1200	NA	NA	
Copper		33	330	11 / 21	109	95% KM (t) UCL	1500	3520	NA	
Lead		0.0081	65300	43 / 54	1318	Mean	400	**400**	>3100	HA-111 (5-6')
Mercury		0.26	0.26	1 / 15	0.26	Max	17	NA	NA	
Nickel		31.5	31.5	1 / 15	31.5	Max	420	3330	NA	
Zinc		57.3	390	17 / 21	207	95% KM (Chebyshev) UCL	2800	47900	NA	

mg/kg milligrams per kilograms
UCL Upper confidence limit of the arithmetic mean. Calculated with ProUCL Version 4.00.05.
EPC Exposure Point Concentration
Basis of EPC - Recommended UCL is listed if sufficient data to calculate the UCL. The mean is used for lead per modeling guidance. For detections less than 3 or when a high detection limit exceeds the maximum, the maximum concentration is listed.
Notification Concentration from Appendix I of the HSRA Rule.
Target RRS - Target Risk Reduction Standard for Subsurface Soil (Nonresidential exposures) from VRP RRS Summary Table.
Bolded RRS - The EPC exceeds the target RRS.
Goal to Achieve - Sample concentrations were ranked from low to high. The higher concentrations were removed from the data set and the UCL recalculated until the revised UCL was less than the target RRS. All samples greater than the indicated value were removed.
Removal of Soil Locations to Achieve EPC< RRS - Location of samples causing the EPC to exceed the target RRS.

PREPARED/DATE: LMS 11/29/10
CHECKED/DATE: MKB 11/29/10

Table D-3
CSX Surface Soil - Comparison of EPCs to RRS

Parameter	Mininum Detected	Maximum Detected	Frequency	EPC	Basis	Notification Concentration	Maximum Off-Site Surface RRS	Goal to Achieve (EPC < RRS)	Removal of Soil Locations to Achieve EPC < Target RRS
VOCs/SVOCs									
1,1,1-Trichloroethane	0.009	0.009	1 / 4	0.009	Max	5.44	20		
Acenaphthene	0.13	0.13	1 / 4	0.13	Max	300	--		
Anthracene	0.12	0.33	3 / 4	0.33	Max	500	500		
Benzo(a)anthracene	0.17	1.4	7 / 22	0.537	95% KM(t) UCL	5	5		
Benzo(a)pyrene	0.45	0.9	5 / 22	0.56	95% KM(t) UCL	1.6	1.6		
Benzo(b)fluoranthene	0.41	1.6	4 / 18	0.685	95% KM(t) UCL	5	5		
Benzo(b,k)fluoranthene	0.81	1.7	3 / 4	1.7	Max	5	5		
Benzo(ghi)pyrene	0.19	0.9	4 / 22	0.43	95% KM(t) UCL	500	2250		
Benzo(k)fluoranthene	0.41	0.41	2 / 18	0.41	Max	5	14		
Chrysene	0.19	1.6	7 / 22	0.585	95% KM(t) UCL	5	42		
Fluoranthene	0.32	3.3	11 / 23	1.11	95% KM(t) UCL	500	500		
Fluorene	0.14	0.14	1 / 4	0.14	Max	360	--		
Indeno(1,2,3-cd)pyrene	0.16	0.45	3 / 4	0.45	Max	5	5		
Naphthalene	0.11	0.12	2 / 4	0.12	Max	100	--		
Phenanthrene	0.42	0.66	4 / 15	0.484	95% KM(t) UCL	110	110		
Pyrene	0.27	2.7	11 / 23	0.983	95% KM(t) UCL	500	1776		
Pesticides									
alpha, beta, delta-BHC	0.01	0.36	7 / 17	0.0977	95% KM(t) UCL	0.66	0.66		
alpha -BHC	0.01	0.023	3 / 29	0.023	Max	0.66	0.66		
beta-BHC	0.4	0.4	1 / 26	0.4	Max	0.66	0.66		
Chlordane	0.0042	67	12 / 46	16.48	99% KM (Chebyshev) UCL	9.2	**9.2**	>0.63	SS-10
DDD	0.0039	3.7	9 / 41	1.04	99% KM (Chebyshev) UCL	0.66	**0.84**	>0.096	SB-104
DDE	0.0031	24	19 / 48	2.841	95% KM (Chebyshev) UCL	0.66	**0.66**	>1.2	SS-10
DDT	0.014	11.1	27 / 49	1.606	95% KM (BCA) UCL	0.66	**0.85**	>2.4	MW-4, SS-10, SB-104, MW-6, SB-5, DW-2B, SS-17
delta-BHC	0.012	0.012	1 / 27	0.012	Max	25	25		
Dieldrin	0.0099	0.514	5 / 38	0.0636	95% KM (t) UCL	0.66	0.66		
gamma-BHC (Lindane)	0.015	1.78	13 / 44	0.167	95% KM (BCA) UCL	0.66	0.66		
Heptachlor	0.00902	0.3	9 / 48	0.0294	95% KM (t) UCL	0.66	0.66		
Heptachlor epoxide	0.0076	0.008	2 / 4	0.008	Max	1.7	--		
Toxaphene	0.071	190	8 / 48	11.4	95% KM (t) UCL	11	**11**	>11.6	SS-10
Inorganic compounds									
Antimony	37	37	1 / 4	37	Max	10	**4**		SS-06
Arsenic	1.2	1547	43 / 50	263	97.5% KM (Chebyshev) UCL	41	**20**	>75.7	MW-24, MW-25,SB-104, SB-156
Barium	99	1300	4 / 4	1300	Max	500	**1000**	>210	SS-06
Beryllium	1	1	1 / 4	1	Max	3	--		
Chromium	8.2	27	4 / 4	27	Max	1200	--		
Copper	20	820	4 / 4	820	Max	1500	**100**	>51	SS-06
Lead	0.0151	4000	29 / 29	264	Mean	400	**120**	>681	SS-06
Nickel	82	82	1 / 4	82	Max	420	**50**	Only Detection	SS-06
Silver	21	21	1 / 4	21	Max	10	**2**	Only Detection	SS-06
Thallium	6.3	6.3	1 / 4	6.3	Max	10	**2**	Only Detection	SS-06
Zinc	93	1500	4 / 4	1500	Max	2800	**292**	>200	SS-06

mg/kg milligrams per kilograms
UCL Upper confidence limit of the arithmetic mean. Calculated with ProUCL Version 4.00.05.
EPC Exposure Point Concentration
Basis of EPC - Recommended UCL is listed if sufficient data to calculate the UCL. The mean is used for lead per modeling guidance. For detections less than 3 or when a high detection limit exceeds the maximum, the maximum concentration is listed.
Notification Concentration from Appendix I of the HSRA Rule.
Target RRS - Target Risk Reduction Standard for Off-Site Surface Soil from VRP RRS Summary Table
Bolded RRS - The EPC exceeds the target RRS.
Goal to Achieve - Sample concentrations were ranked from low to high. The higher concentrations were removed from the data set and the UCL recalculated until the revised UCL was less than the target RRS. All samples greater than the indicated value were removed.
Removal of Soil Locations to Achieve EPC< RRS - Location of samples causing the EPC to exceed the target RRS.

Prepared/Date: LMS 2/3/2011
Checked/Date: MKB 2/10/11

Table D-4
CSX Subsurface Soil - Comparison of EPCs to RRS

Parameter	Mininum Detected	Maximum Detected	Frequency	EPC	Basis	Notification Concentration	Maximum Off-Site Subsurface RRS	Goal to Achieve (EPC < RRS)	Removal of Soil Locations to Achieve EPC < Target RRS	
Pesticides										
alpha, beta, delta-BHC	0.0032	222	22 / 86	19.1	97.5% KM(Chebyshev) UCL	0.66	**0.66**	>6.5	DW-2B (16-17.5)	These samples are from 1980s.
alpha -BHC	0.0028	26	13 / 66	3.08	97.5% KM(Chebyshev) UCL	0.66	**0.66**	>4.4	SB-5 (18.5-20)	
Chlordane	0.0031	466	26 / 152	22.6	97.5% KM(Chebyshev) UCL	9.2	**9.2**	>1.6	DW-2B (16-17.5)	
DDD	0.0021	3.8	4 / 91	3.8	Max	0.66	15			
DDE	0.0045	78	25 / 153	3.78	97.5% KM(Chebyshev) UCL	0.66	11			
DDT	0.0022	774	43 / 153	38.1	97.5% KM(Chebyshev) UCL	0.66	**15**	>7.3	DW-2B (16-17.5)	
Dieldrin	0.065	0.22	2 / 92	0.22	Max	0.66	0.66			
gamma-BHC (Lindane)	0.005	33	28 / 153	1.92	97.5% KM(Chebyshev) UCL	0.66	**0.66**	>1.7	SB-5 (18.5-20), DW-2B (16-17.5)	
Heptachlor	0.0021	1.3	18 / 153	0.0503	95% KM (Chebyshev) UCL	0.66	0.66			
Toxaphene	0.077	700	12 / 152	35	97.5% KM(Chebyshev) UCL	11	**11**	>17.1	DW-2B (16-17.5)	
Inorganic compounds										
Arsenic	0.061	840	91 / 144	111	97.5% KM(Chebyshev) UCL	41	**20**	>133	14 PTS. With some at depth (All collected in 1980s).	
Lead	2.9	200	37 / 37	30.6	Mean	400	120			

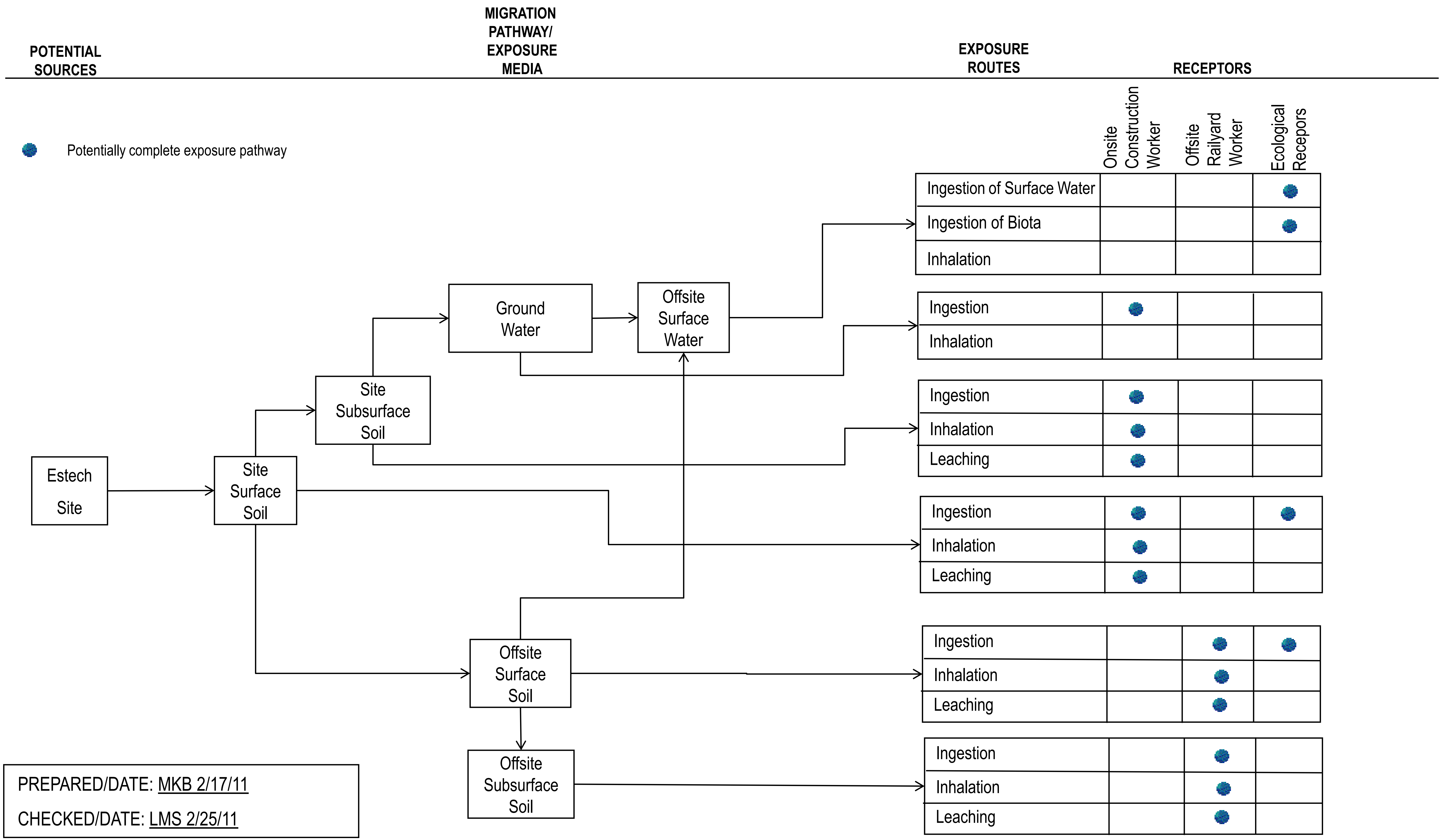
mg/kg milligrams per kilograms
UCL Upper confidence limit of the arithmetic mean. Calculated with ProUCL Version 4.00.05.
EPC Exposure Point Concentration
Basis of EPC - Recommended UCL is listed if sufficient data to calculate the UCL. The mean is used for lead per modeling guidance. For detections less than 3 or when a high detection limit exceeds the maximum, the maximum concentration is listed.
Notification Concentration from Appendix I of the HSRA Rule.
Target RRS - Target Risk Reduction Standard for Off-Site Subsurface Soil from VRP RRS Summary Table
Bolded RRS - The EPC exceeds the target RRS.
Goal to Achieve - Sample concentrations were ranked from low to high. The higher concentrations were removed from the data set and the UCL recalculated until the revised UCL was less than the target RRS. All samples greater than the indicated value were removed.
Removal of Soil Locations to Achieve EPC< RRS - Location of samples causing the EPC to exceed the target RRS.

Prepared/Date: LMS 2/3/2011
Checked/Date: MKB 2/10/11

APPENDIX D FIGURES

FIGURE D-1

CONCEPTUAL EXPOSURE MODEL – HUMAN & ECOLOGICAL RECEPTORS

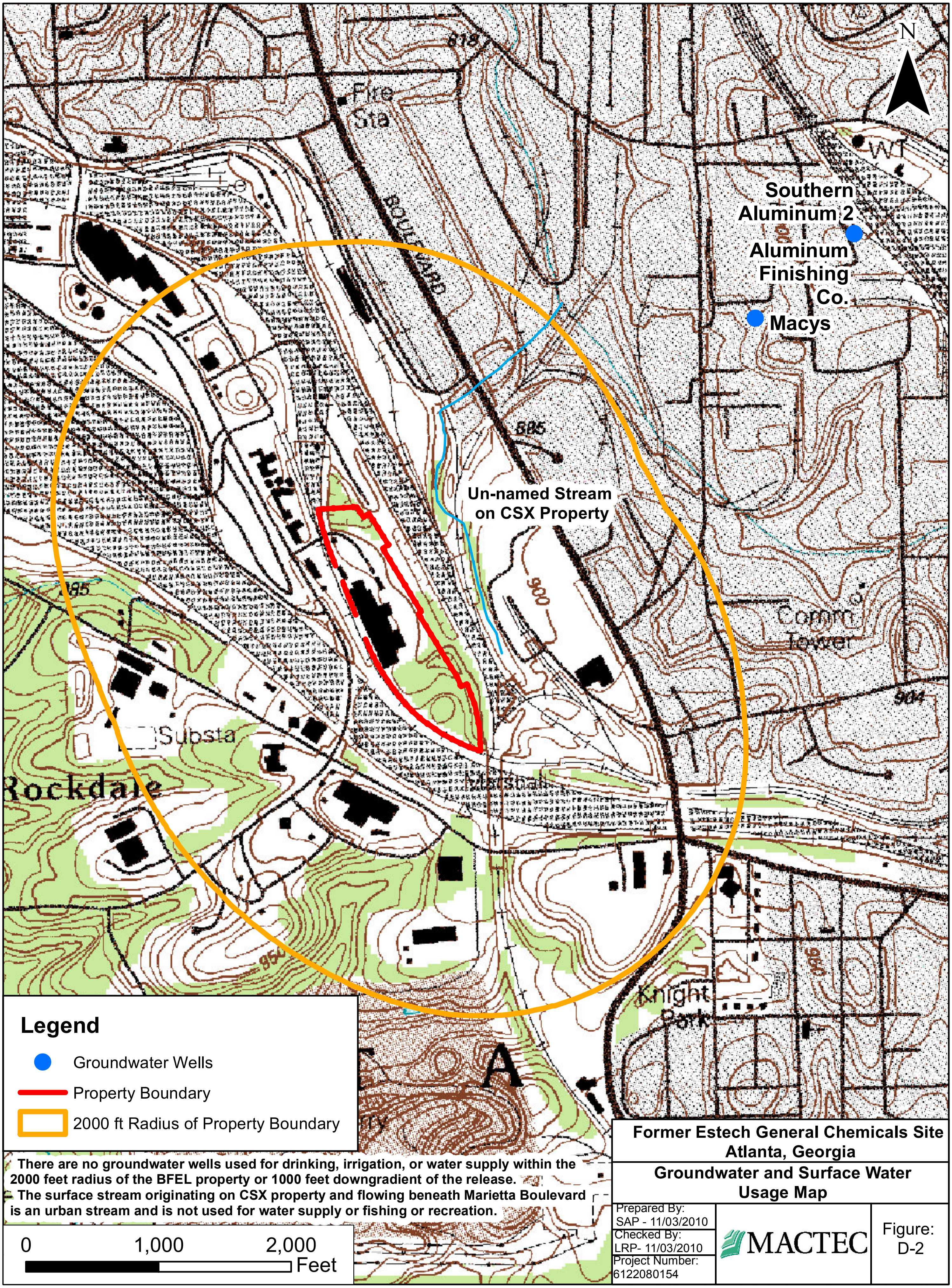


● Potentially complete exposure pathway

EXPOSURE ROUTES	Onsite Construction Worker	Offsite Railyard Worker	Ecological Recepors
Ingestion of Surface Water			●
Ingestion of Biota			●
Inhalation			
Ingestion	●		
Inhalation			
Ingestion	●		
Inhalation	●		
Leaching	●		
Ingestion	●		●
Inhalation	●		
Leaching	●		
Ingestion		●	●
Inhalation		●	
Leaching		●	
Ingestion		●	
Inhalation		●	
Leaching		●	

PREPARED/DATE: MKB 2/17/11

CHECKED/DATE: LMS 2/25/11



There are no groundwater wells used for drinking, irrigation, or water supply within the 2000 feet radius of the BFEL property or 1000 feet downgradient of the release.
The surface stream originating on CSX property and flowing beneath Marietta Boulevard is an urban stream and is not used for water supply or fishing or recreation.

Path: G:\BFEL ATL\MXDS\GWSI.mxd

Former Estech General Chemicals Site
Atlanta, Georgia

Groundwater and Surface Water Usage Map

Prepared By:
SAP - 11/03/2010
Checked By:
LRP- 11/03/2010
Project Number:
6122080154

MACTEC

Figure:
D-2

APPENDIX E

DYE TRACER STREAM FLOW STUDY AND SURFACE WATER SAMPLING

Appendix E
BFEL Atlanta
Dye Tracer Stream Flow Study and Surface Water Sampling
Unnamed Tributary of Woodall Creek

Prepared for:

BFEL Atlanta
HSRA Site No. 10196

1551 Marietta Road
Atlanta, Georgia

Prepared by:
MACTEC
3200 Town Point Drive
Kennesaw, Georgia 30144

March 4, 2011

MACTEC Project No. 6122-08-0154

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Acronym	**Definition**
VRP	Voluntary Remediation Program
µg/L	Micrograms per liter
mg/L	Milligrams per liter

EXECUTIVE SUMMARY

As part of the Voluntary Remediation Program (VRP) Application that MACTEC has prepared for the former Estech Chemicals site in Atlanta, Georgia, MACTEC performed surface water sampling and a dye tracer flow study for a small stream located on the east side of the CSX rail yard (Figure E-1). The stream is an unnamed headwater tributary of Woodall Creek. MACTEC collected surface water grab samples at 18 locations along the study reach. These samples were analyzed for total organo chlorine pesticides and total and dissolved metals including arsenic, copper, lead, and zinc. Samples from six of the stream sampling locations were also analyzed for trichlorobenzenes, sulfate, and nitrate concentrations.

The purpose of the concurrent dye tracer study was to assess the dry-weather base stream flow, travel time, and groundwater seepage inflows to the stream segment. The rhodamine dye was injected at the most upstream location (SW2010-1) of the study segment at a constant rate. A water quality meter with a rhodamine sensor was placed instream at the most downstream sampling location and programmed to continuously record rhodamine concentrations. The dye was injected continuously into the stream until the most downstream dye concentrations reached a plateau. Once dye concentrations along the stream reached a plateau, surface water samples were collected at each sampling location and analyzed for rhodamine concentrations by a contracted laboratory.

Stream flow was determined for each stream sampling location using the rhodamine concentration data. The resulting stream flow and chemical constituent concentrations were used to determine the instream mass flow of BHC-pesticides, arsenic, lead, copper, and zinc. Near the middle of the study reach, the concentration and mass of BHC-pesticides, arsenic, copper, and zinc increase significantly which indicates an influx of impacted groundwater to the stream.

1.0 INTRODUCTION

As part of the Voluntary Remediation Program (VRP) Application that MACTEC has prepared for the former Estech Chemicals site in Atlanta, Georgia, surface water chemical sampling and a dye tracer flow study was performed on a stream that borders the east side of property (Figure E-1). The stream is an unnamed headwater tributary to Woodall Creek. Constituents of concern for sampling include total organo chlorine pesticides, total and dissolved metals (arsenic, copper, lead, and zinc), total trichlorobenzenes, total sulfate, and total nitrate.

The purpose of the dye tracer study was to assess stream flow at each sampling location and flow travel time along the study segment. The following sections describe materials, methods, and results of the surface water sampling and dye tracer flow study.

2.0 SURFACE WATER SAMPLING

MACTEC performed surface water sampling and a dye tracer flow study in an unnamed headwater of Woodall Creek located on the east side of the CSX rail yard and adjoining the former Estech Chemicals site located off of Marietta Street in Atlanta, Georgia. The reach of the stream assessed included 18 stream sampling locations shown on Figure E-1. Photographs of each stream sampling location are provided in Figures E-2 through E-20.

2.1 MATERIALS AND METHODS

MACTEC collected surface water grab samples at the 18 sampling locations along the stream. Samples were collected just before completion of the dye tracer flow study on September 23, 2010 and were analyzed for the following constituents:

- Total organo chlorine pesticides using EPA Method SW8081A
- Total and dissolved metals including arsenic, copper, lead, and zinc using EPA Method SW6020

In addition to the analyses listed above, SW2010-1, SW2010-5, SW2010-11, SW2010-13, SW2010-15, SW2010-18 were analyzed for the following:

- Total trichlorobenzenes using EPA Method SW8270D
- Total sulfate and total nitrate using EPA Method SW9056

2.2 LABORATORY DATA SUMMARY

All surface water sample data are presented in Table E-1 and selected constituent results are depicted in Figures E-21 through E-24.

3.0 TRACER STUDY

The purpose of the dye tracer study was to assess the flow of the stream at each sampling location and total travel time along the study segment. Because the concentration and rate of continuous injection of the dye tracer is known and the plateau concentration of the dye tracer is determined at each sampling station, the total flow of the stream can be calculated for each sampling location. This method was chosen to assess flow of the stream rather than discrete cross sectional flow measurements because the dye tracer method provides a more thorough and accurate assessment of total flow. The continuous injection dye tracer method measures both flow through the stream channel as well as bed flow whereas channel cross sectional measurements do not include bed flow.

3.1 MATERIALS AND METHODS

A multi-parameter water quality meter, a YSI 6920, was used to monitor rhodamine concentrations at SW2010-18. The sonde was programmed to continuously record rhodamine, conductivity, pH, and temperature at one minute intervals beginning at 10:15 AM on September 22, 2010.

MACTEC injected a 104 milligrams per liter (mg/L) solution of rhodamine water tracing dye into the stream at SW2010-1 at a constant rate of 255 milliliters per minute using a peristaltic pump beginning at 11:47 AM on September 22, 2010. The dye tracer was continuously injected into the stream flow until downstream dye concentrations reached a steady state plateau (Figure E-25), which occurred at SW2010-18 approximately 39 hours after initiating injection of the dye.

The dye-pump battery was replaced three times during the dye injection event. Sometime between 20:15 on September 22, 2010, when the first battery was replaced, and September 23, 2010 at 07:40 AM, the pump stopped working due to a battery failure. The pump was restarted at 07:40 AM on September 23, 2010. The effects of the intermittent pump failure can be seen in Figure E-25 between approximately 20:00 on September 23, 2010 until approximate 02:00 AM on September 24, 2010. Steady state was reestablished by 03:00 AM on September 24, 2010 at SW2010-18.

Once rhodamine concentrations along the stream reached a plateau, water samples were collected at each sampling location and analyzed for rhodamine by a contracted laboratory (Figure E-26). The rhodamine dye concentration at SW2010-18 represents the projected plateau concentration of the tracer study from Figure E-25.

The dye-tracer study and surface water sampling event occurred during dry weather base flow conditions. The precipitation record at USGS Site 02336313 Woodall Creek at Defoors Ferry Road at Atlanta, Georgia from August 15, 2010 to September 24, 2010 indicates that the prior rain event occurred ten days before the dye-tracer study was initiated (Table E-3).

3.2 DATA SUMMARY AND ANALYSIS

Using lab-analyzed plateau rhodamine concentration data at each sample location (Figure E-26), stream flow was calculated as seen in Table E-2 and Figure E-27 using the following equation:

$$Q_D = \frac{C_I Q_I}{C_D}$$

where:

C_I	Concentration of rhodamine dye injected (at SW2010-1)
Q_I	Injection rate of rhodamine dye (at SW2010-1)
C_D	Fully mixed plateau concentration of rhodamine dye at downstream locations
Q_D	Flow of the stream at the downstream locations

Since rhodamine samples were collected after dye concentrations reached a plateau, the flow at SW2010-18 was calculated using the peak rhodamine concentration on Figure E-25 which is approximately 32.7 micrograms per liter (µg/L). This concentration represents the projected plateau concentration at SW2010-18. Dye at SW2010-1 and SW2010-2 was not thoroughly mixed due to close proximity to the dye injection point. Therefore, flow was estimated at these two locations by extrapolation of the calculated flow from the next downstream sampling locations (SW2010-2 and SW2010-3).

Using the dye calculated stream flow for each sampling location, the mass of BHC-pesticides, arsenic, copper, and zinc was calculated (Figures E-28 through E-31). At approximately 1200 feet downstream of SW2010-1 (SW2010-11), the mass of BHC-pesticides, arsenic, copper, and zinc begins to significantly increase which suggests the influx of groundwater to the stream as there are no tributaries along the study segment.

TABLES

Table E-1: Summary of Constituents Detected in Surface Water Samples Collected on September 23, 2010

		Location	SW2010-1	SW2010-2	SW2010-3	SW2010-4	SW2010-5	SW2010-6	SW2010-7	SW2010-8	SW2010-9	SW2010-10	SW2010-11	SW2010-12	SW2010-13	SW2010-14	SW2010-15	SW2010-16	SW2010-17	SW2010-18
		Sample Date	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010	9/23/2010
PARAMETER, UNITS		Distance Along Stream (ft)	0	141	328	478	735	886	963	1040	1092	1152	1222	1367	1511	1667	1761	1907	2099	2275
Total Organochlorine Pesticides (ug/L)	**Georgia Instream Concentrations Protective of Human Health**	**Georgia Instream Concentrations Protective of Aquatic Life, Chronic**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**	**(a)**
alpha-BHC	0.013	0.0049 *	<0.0057	**0.13**	**0.057**	**0.039 J**	**0.13**	**0.094**	**0.09**	**0.18**	**0.16**	**0.13**	**0.19**	**0.25**	**0.5**	**0.62**	**0.62**	**0.37**	**0.31**	**0.45**
beta-BHC	0.046	0.017 *	<0.0067	**0.16 P**	**0.15**	**0.14**	**0.23**	**0.15**	**0.16**	**0.19 P**	**0.14 P**	**0.18**	**0.45**	**0.46**	**0.63**	**0.73**	**0.75**	**0.6**	**0.48**	**0.64**
gamma-BHC (lindane)	0.063	0.95	<0.0059	0.058 P	0.06	0.028 JP	0.037 JP	0.043 J	0.029 JP	**0.12**	**0.1**	**0.084**	**0.11**	**0.13**	**0.2**	**0.22**	**0.22**	**0.15**	**0.11**	**0.17**
delta-BHC	not established	not established	<0.0048	0.22 P	0.13 P	0.11 P	0.2	0.14	0.091 P	0.19 P	0.2	0.11 P	0.13 P	0.15 P	0.32 P	0.48 P	0.44 P	0.33 P	0.21 P	0.3 P
Chlordane	0.0022	0.0043	<0.1	<0.1	<0.094	<0.094	<0.1	<0.094	<0.094	<0.1	<0.095	<0.094	<0.094	<0.094	<0.095	<0.095	<0.095	<0.094	<0.094	<0.095
4,4'-DDD	0.00084	0.00031 *	<0.0065	<0.0065	<0.0061	<0.0061	<0.0065	<0.0061	**0.014 J**	<0.0065	<0.0062	<0.0061	<0.0061	<0.0061	<0.0062	<0.0062	<0.0062	<0.0061	<0.0061	<0.0062
4,4'-DDE	0.00059	0.00022 *	<0.0077	<0.0077	<0.0073	<0.0073	<0.0077	<0.0073	<0.0073	<0.0077	<0.0073	<0.0073	<0.0073	<0.0073	<0.0073	<0.0073	<0.0073	<0.0073	<0.0073	<0.0073
4,4'-DDT	0.00059	0.001	<0.0097	<0.0097	<0.0092	<0.0092	<0.0097	<0.0092	<0.0092	<0.0097	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092
Dieldrin	0.00014	0.056	<0.0091	<0.0091	<0.0086	<0.0086	<0.0091	<0.0086	<0.0086	**0.014 J**	<0.0087	**0.011 J**	**0.012 J**	**0.012 J**	**0.015 J**	**0.015 J**	**0.017 J**	**0.012 J**	<0.0086	<0.0087
Heptachlor	0.00021	0.0038	<0.007	<0.007	<0.0066	<0.0066	<0.007	<0.0066	<0.0066	<0.007	<0.0067	<0.0066	<0.0066	<0.0066	<0.0067	<0.0067	<0.0067	<0.0066	<0.0066	<0.0067
Methoxychlor	not established	0.03	<0.013	<0.013	<0.012	<0.012	<0.013	<0.012	<0.012	<0.013	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
Toxaphene	0.00075	0.0002	<0.5	<0.5	<0.47	<0.47	<0.5	<0.47	<0.47	<0.5	<0.48	<0.47	<0.47	<0.47	<0.48	<0.48	<0.48	<0.47	<0.47	<0.48
Total Metals (mg/L)	**Acute**	**Chronic**																		
Arsenic	0.34	0.15	0.09	0.043	0.025	0.016	0.008	0.0059	0.0082	0.0053	0.0049	0.0041	0.0059	0.0067	0.0029	0.028	0.0025	0.0055	0.0029	0.0032
Copper	0.007	0.005	0.0043 J	**0.0065**	**0.0071**	**0.016**	**0.016**	**0.012**	**0.015**	**0.013**	**0.011**	**0.01**	**0.22**	**0.31**	**0.11**	**0.78**	**0.084**	**0.12**	**0.054**	**0.052**
Lead	0.03	0.0012	**0.0024**	**0.0015**	0.00096 J	**0.0046**	0.00067 J	0.00055 J	**0.0032**	**0.0022**	0.00064 J	<0.0005	**0.012**	**0.0019**	<0.0005	**0.014**	<0.0005	**0.0047**	<0.0005	<0.0005
Zinc	0.065	0.065	0.016 J	0.027	**0.084**	**0.54**	**0.97**	**0.87**	**0.81**	**0.65**	**0.62**	**0.5**	**3**	**3.2**	**2.3**	**15**	**2.4**	**2.8**	**1.9**	**2**
Dissolved Metals (mg/L)																				
Arsenic	0.34	0.15	0.025	0.0074	0.0014 J	<0.0013	0.0015 J	0.0018 J	0.0019 J	0.002 J	0.0023 J	0.0023 J	0.0016 J	0.0016 J	0.0013 J	<0.0013	<0.0013	<0.0013	0.0013 J	0.0014 J
Copper	0.007	0.005	0.0012 J	0.0034 J	0.0031 J	**0.0073**	**0.0074**	**0.0056**	**0.006**	**0.0055**	**0.0059**	**0.0054**	**0.097**	**0.092**	**0.053**	**0.048**	**0.038**	**0.03**	**0.024**	**0.02**
Lead	0.03	0.0012	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Zinc	0.065	0.065	<0.0083	0.012 J	0.038	**0.56**	**0.89**	**0.72**	**0.76**	**0.5**	**0.54**	**0.44**	**2.7**	**2.6**	**2.1**	**2.5**	**2.2**	**2.3**	**1.6**	**1.7**
Total Trichlorobenzenes (mg/L)																				
1,2,3-Trichlorobenzene	not established		<0.001	NA	NA	NA	<0.00097	NA	NA	NA	NA	NA	<0.001	NA	<0.00094	NA	<0.00095	NA	NA	<0.00094
1,2,4-Trichlorobenzene		70	<0.00056	NA	NA	NA	<0.00054	NA	NA	NA	NA	NA	<0.00056	NA	<0.00053	NA	<0.00053	NA	NA	<0.00053
Nitrate and Sulfate (mg/L)																				
Nitrate as N	not established		0.65	NA	NA	NA	0.74	NA	NA	NA	NA	NA	4.1	NA	3.3	NA	530	NA	NA	3.1
Sulfate	not established		64	NA	NA	NA	110	NA	NA	NA	NA	NA	220	NA	180	NA	330	NA	NA	190
Hardness as CaCo3 (mg/L)	not established		200	NA	NA	NA	190	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Stream Flow (cfs)	not established		0.02	0.03	0.044	0.055	0.062	0.061	0.070	0.081	0.086	0.093	0.141	0.148	0.207	0.241	0.305	0.325	0.391	0.478

Prepared by: RQ 10/15/2010
Checked by: LRP 10/25/2010

Notes:

(a) = Total pesticide results are reported to the method detection limits (MDLs) in an effort to report the lowest possible value obtained by the method.
Results reported between the MDL and the reporting limits (RLs) are considered quantitative estimates.
<0.025 = Constituent not detected above the detection limit shown.
cfs = cubic feet per second
ug/L = micrograms per liter
mg/L = milligrams per liter
J = Result reported between the MDL and RL. Result is a quantitative estimate.
P = Indentification of target analytes using gas chromatography (GC) is based on retention time.
Although 2 dissimilar GC columns confirmed the presence of the target anlyte in the sample, relative percent difference is >40%.
NA = constituent not analyzed
Bolded = Value exceeds Instream Criteria
In-Stream Concentrations for Metals are for dissolved metals. Other criteria are for total recoverable metals.

Table E-2: Flow Calculated from Rhodamine Dye Plateau Concentrations

Sample Stations	Total Distance along stream (ft)	C_d (mg/L)	Q_d (ft^3/s)	Dilution (C_i/C_d)
SW2010-01	0	NA	0.020*	NA
SW2010-02	141	NA	0.030*	NA
SW2010-03	328	0.352	0.044	296
SW2010-04	478	0.284	0.055	367
SW2010-05	735	0.253	0.062	412
SW2010-06	886	0.256	0.061	407
SW2010-07	963	0.224	0.070	466
SW2010-08	1040	0.193	0.081	539
SW2010-09	1092	0.182	0.086	571
SW2010-10	1152	0.169	0.093	616
SW2010-11	1222	0.111	0.141	943
SW2010-12	1367	0.106	0.148	985
SW2010-13	1511	0.075	0.207	1382
SW2010-14	1667	0.065	0.241	1605
SW2010-15	1761	0.051	0.305	2035
SW2010-16	1907	0.048	0.325	2166
SW2010-17	2099	0.040	0.391	2604
SW2010-18	2275	0.0327**	0.478**	3186

Prepared by: LRP 10/25/2010
Checked by: MET 10/26/2010

Notes:

$C_iQ_i=C_dQ_d$

C_dQ_d = Concentration and flow downstream of injection location

C_i = Concentration of rhodamine dye injected at SW2010-1 = 104.17 mg/L

Q_i = Injection rate of rhodamine dye at SW1010-1 = 255 mL/min

C_d = Plateau dye concentration at downstream sampling stations.

NA = Not applicable

* Dye at SW2010-1 and SW2010-2 was not thoroughly mixed due to the close proximity to the dye injection point. Therefore, flow was estimated at these two locations by extrapolation of the dye.

**The flow at SW2010-18 was estimated using the peak rhodamine concentration on Figure E-26. This concentration represents the projected plateau concentration at the downstream limit of the tracer study.

Table E-3: Real-Time Data for USGS Site 02336313 Woodall Creek at Defoors Ferry Road at Atlanta, Georgia

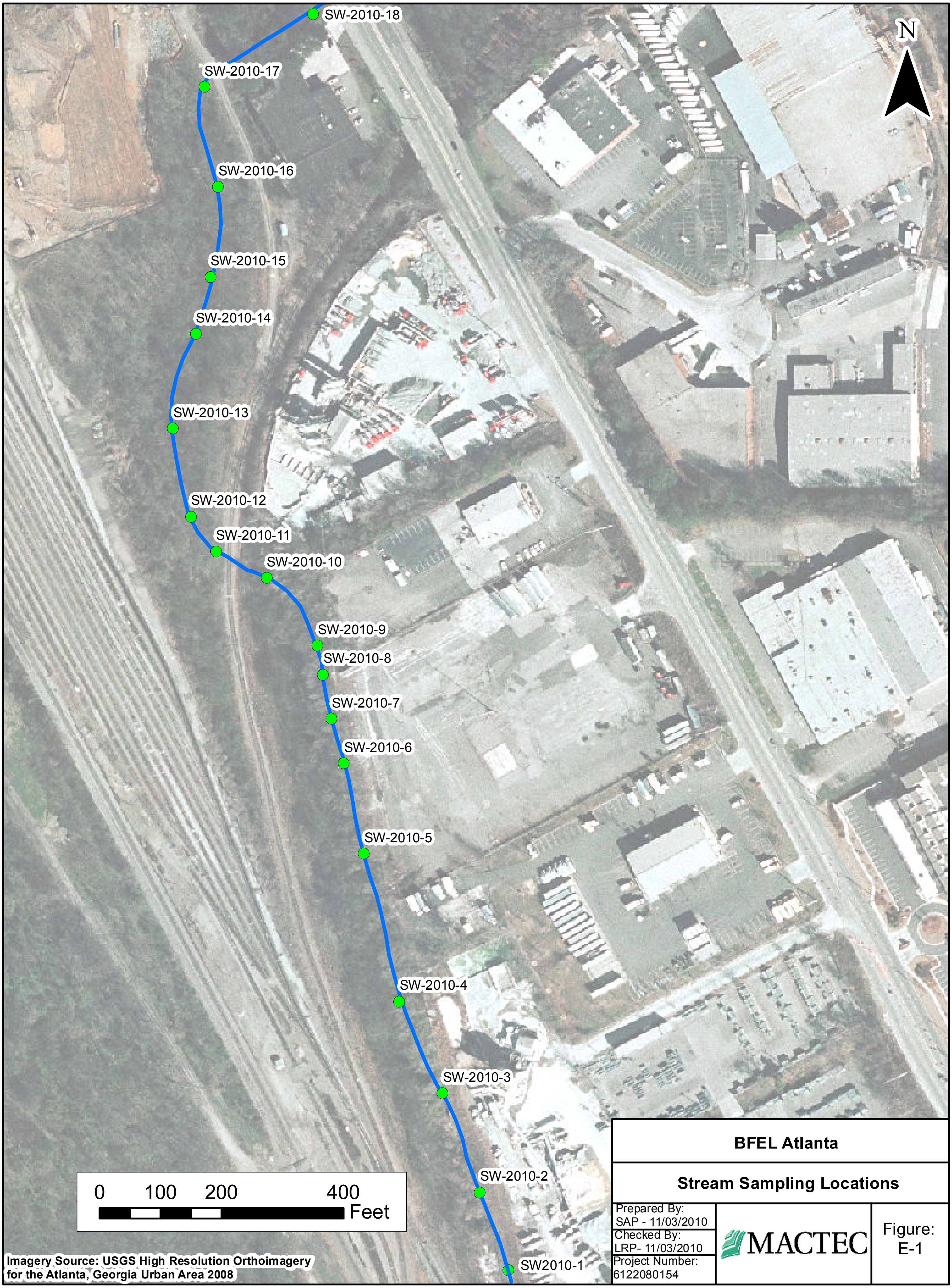
Date	Average Gage Height (feet)	Total Precipitation (inches)
8/15/2010	0.55 P	0.00 P
8/16/2010	0.54 P	0.08 P
8/17/2010	0.54 P	0.00 P
8/18/2010	0.53 P	0.00 P
8/19/2010	0.54 P	0.02 P
8/20/2010	0.94 P	0.69 P
8/21/2010	1.62 P	0.35 P
8/22/2010	0.64 P	0.02 P
8/23/2010	0.58 P	0.00 P
8/24/2010	0.57 P	0.00 P
8/25/2010	0.58 P	0.00 P
8/26/2010	0.86 P	0.66 P
8/27/2010	0.67 P	0.27 P
8/28/2010	0.63 P	0.09 P
8/29/2010	0.61 P	0.00 P
8/30/2010	0.57 P	0.00 P
8/31/2010	0.57 P	0.00 P
9/1/2010	0.56 P	0.00 P
9/2/2010	0.56 P	0.00 P
9/3/2010	0.55 P	0.00 P
9/4/2010	0.55 P	0.00 P
9/5/2010	0.58 P	0.00 P
9/6/2010	0.62 P	0.00 P
9/7/2010	0.57 P	0.00 P
9/8/2010	0.59 P	0.00 P
9/9/2010	0.55 P	0.00 P
9/10/2010	0.55 P	0.00 P
9/11/2010	0.70 P	0.57 P
9/12/2010	0.62 P	0.00 P
9/13/2010	0.56 P	0.00 P
9/14/2010	0.57 P	0.00 P
9/15/2010	0.54 P	0.00 P
9/16/2010	0.54 P	0.00 P
9/17/2010	0.54 P	0.00 P
9/18/2010	0.54 P	0.00 P
9/19/2010	0.54 P	0.00 P
9/20/2010	0.55 P	0.00 P
9/21/2010	0.54 P	0.00 P
9/22/2010	0.54 P	0.00 P
9/23/2010	0.56 P	0.00 P
9/24/2010	0.55 P	0.00 P

Created by: LRP 11/19/2010
Checked by: VUO 11/23/2010

Source:
United States Geological Survey. 2010. USGS 02336313 Woodall Creek at Defoors Ferry Road at Atlanta, Georgia. http://waterdata.usgs.gov/ga/nwis/uv/?site_no=02336313&PARAmeter_cd=00065,00060,00062

Notes:
P = Provisional data subject to change

FIGURES



Imagery Source: USGS High Resolution Orthoimagery for the Atlanta, Georgia Urban Area 2008

BFEL Atlanta

Stream Sampling Locations

Prepared By:
SAP - 11/03/2010
Checked By:
LRP- 11/03/2010
Project Number:
6122080154

MACTEC

Figure:
E-1

Path: G:\BFEL ATL\MXDS\GPS Plots 10222010.mxd

Prepared by: LRP 9/30/10

Checked by: MET

BFEL Atlanta

MACTEC

SW2010-1 Facing Downstream

Project Number: 6122080154

Figure:E-2

Prepared by: LRP 9/30/10

Checked by: MET

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MACTEC

SW2010-2 Facing Upstream

Project Number: 6122080154

Figure:E-3

Prepared by: LRP 9/30/10

Checked by: MET

BFEL Atlanta

MACTEC

SW2010-3 Facing Upstream

Project Number: 6122080154

Figure:E-4

Prepared by: LRP 9/30/10

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BFEL Atlanta	MACTEC	SW2010-4 Facing Upstream Project Number: 6122080154 Figure:E-5

Prepared by: LRP 9/30/10

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SW2010-5 Facing Upstream

Project Number: 6122080154

Figure:E-6

Prepared by: LRP 9/30/10

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BFEL Atlanta	MACTEC	SW2010-6 Facing Upstream Project Number: 6122080154 Figure:E-7

Prepared by: LRP 9/30/10

Checked by: MET

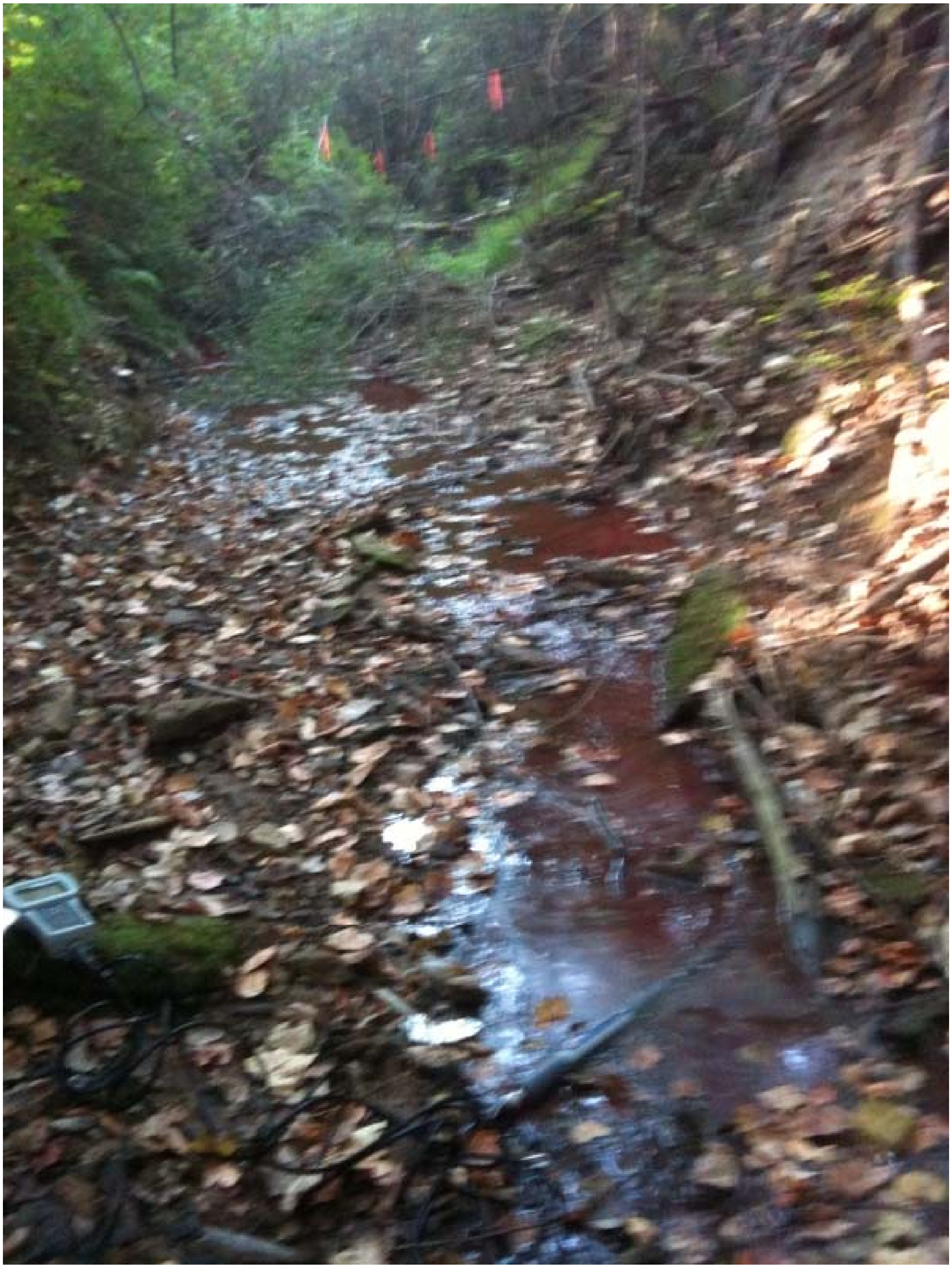
BFEL Atlanta

MACTEC

SW2010-7 Facing Upstream

Project Number: 6122080154

Figure:E-8



Prepared by: LRP 9/30/10

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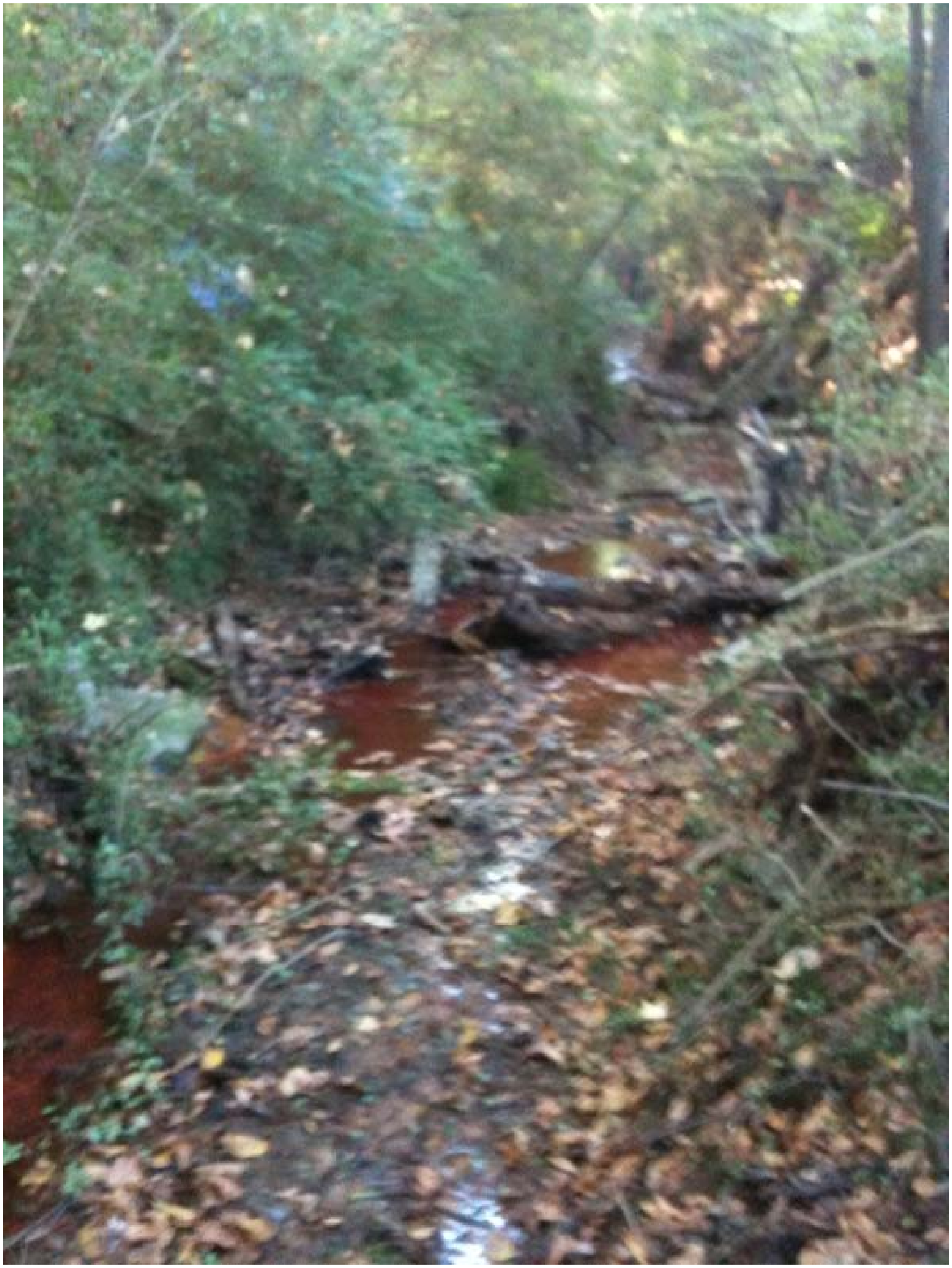
MACTEC

SW2010-8 Facing Upstream

Project Number: 6122080154

Figure:E-9



Prepared by: LRP 9/30/10

Checked by: MET

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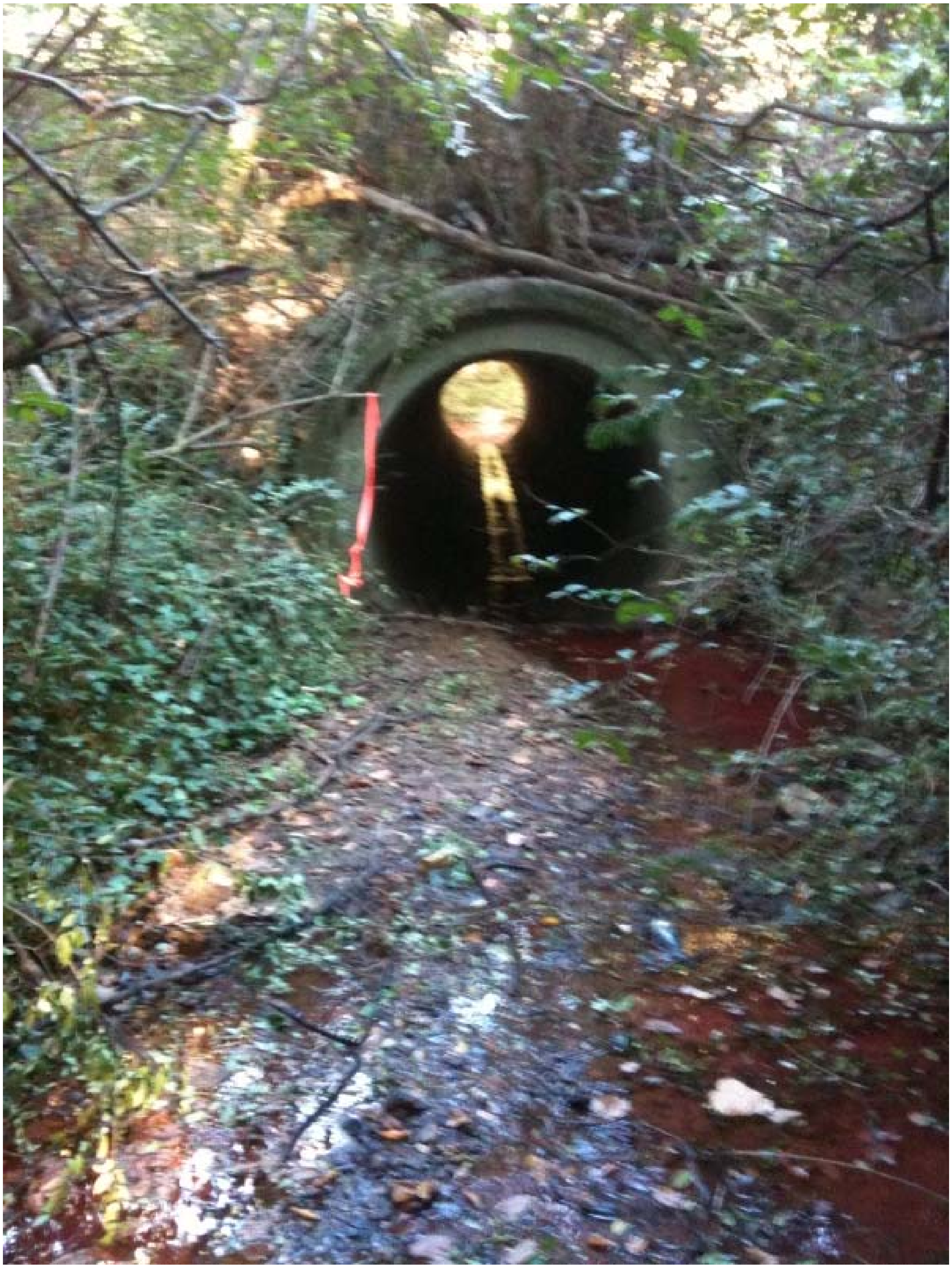
MACTEC

SW2010-9 Facing Upstream

Project Number: 6122080154

Figure:E-10



Prepared by: LRP 9/30/10

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BFEL Atlanta

MACTEC

SW2010-10 Facing Downstream

Project Number: 6122080154

Figure:E-11

Prepared by: LRP 9/30/10

Checked by: MET

BFEL Atlanta

MACTEC

SW2010-11 Facing Upstream

Project Number: 6122080154

Figure:E-12

Prepared by: LRP 9/30/10

Checked by: MET

BFEL Atlanta

MACTEC

SW2010-12 Facing Upstream

Project Number: 6122080154

Figure:E-13

Prepared by: LRP 9/30/10

Checked by: MET

BFEL Atlanta

MACTEC

SW2010-13 Facing Upstream

Project Number: 6122080154

Figure:E-14

Prepared by: LRP 9/30/10

Checked by: MET

BFEL Atlanta

MACTEC

SW2010-14 Facing Upstream

Project Number: 6122080154

Figure:E-15

Prepared by: LRP 9/30/10

Checked by: MET

BFEL Atlanta

MACTEC

SW2010-15 Facing Upstream

Project Number: 6122080154

Figure:E-16

Prepared by: LRP 9/30/10

Checked by: MET

BFEL Atlanta

MACTEC

SW2010-16 Facing Upstream

Project Number: 6122080154 Figure:E-17

Prepared by: LRP 9/30/10

Checked by: MET

BFEL Atlanta

MACTEC

SW2010-17 Facing Upstream

Project Number: 6122080154

Figure:E-18

Prepared by: LRP 9/30/10

Checked by: MET

BFEL Atlanta	MACTEC	SW2010-17 Facing Downstream Project Number: 6122080154 Figure:E-19

Prepared by: LRP 10/25/2010

Checked by: MET 10/29/2010

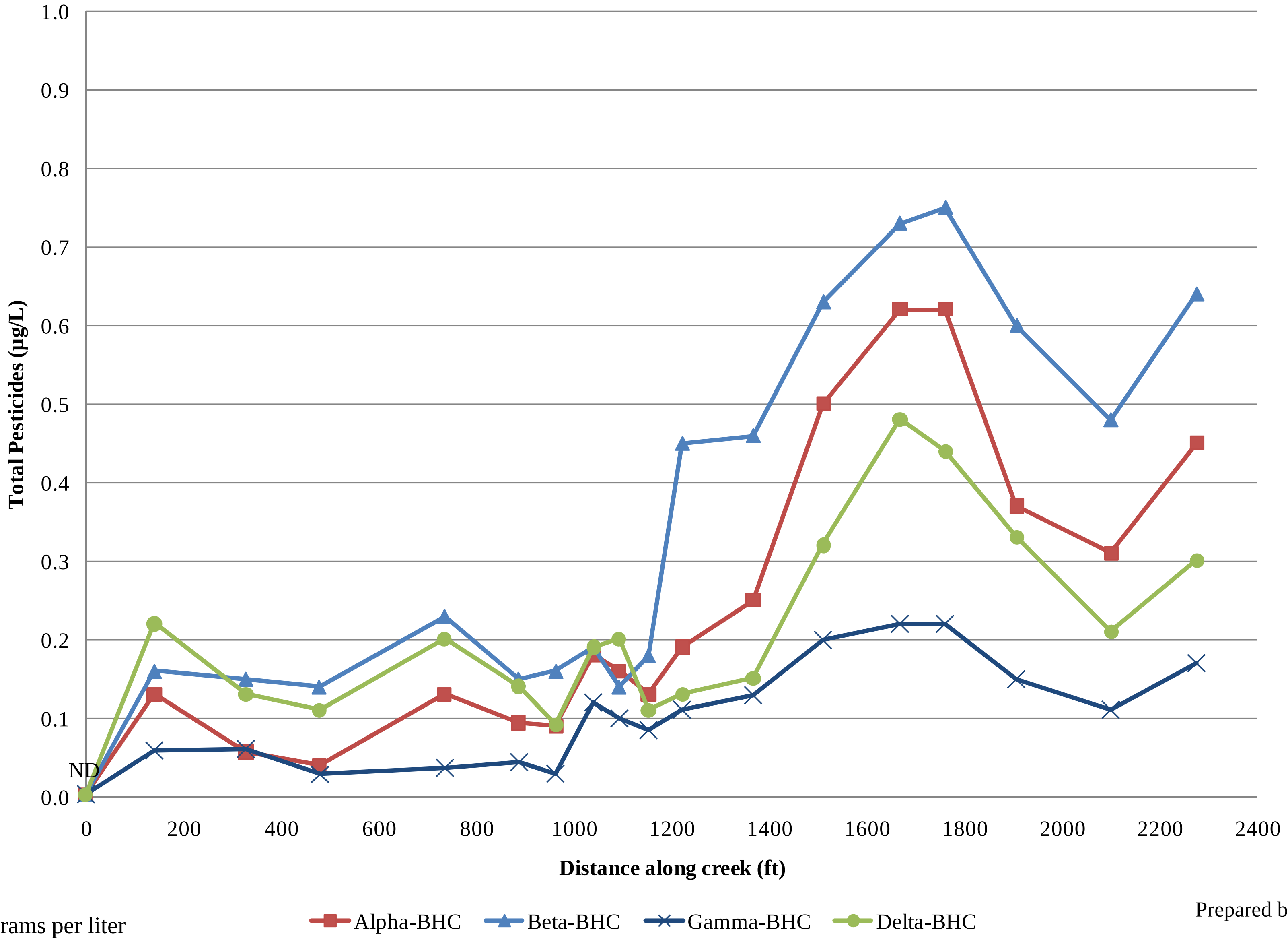
BFEL Atlanta

MACTEC

SW2010-18 Facing Downstream

Project Number: 6122-08-0154

Figure E-20



Notes:
ft – feet
µg/L – micrograms per liter
ND – Not detected

Prepared by: LRP 10/25/2010

Checked by: MET 10/29/2010

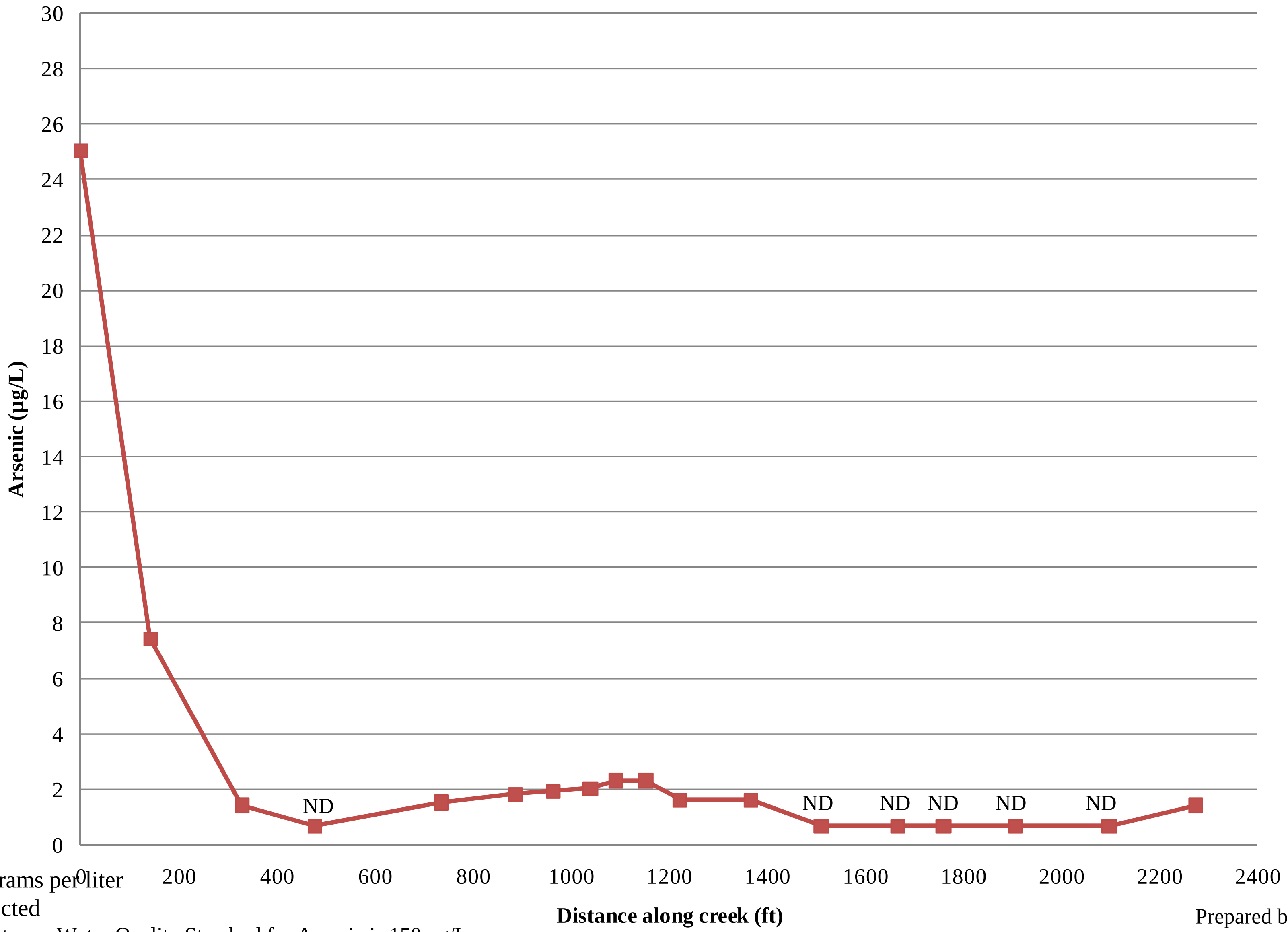
BFEL Atlanta

MACTEC

Total BHC-Pesticide Concentrations along Stream

Project Number: 6122-08-0154

Figure E-21



Notes:
ft – feet
µg/L – micrograms per liter
ND – Not detected
The Georgia Instream Water Quality Standard for Arsenic is 150 µg/L
Source: GA EPD. 2008. *Water Quality in Georgia 2006-2007*. http://www.gaepd.org/Files_PDF/305b/Y2008_303d/Y2008_Cover-Chapter3_305b.pdf

Prepared by: LRP 10/25/2010
Checked by: MET 10/29/2010

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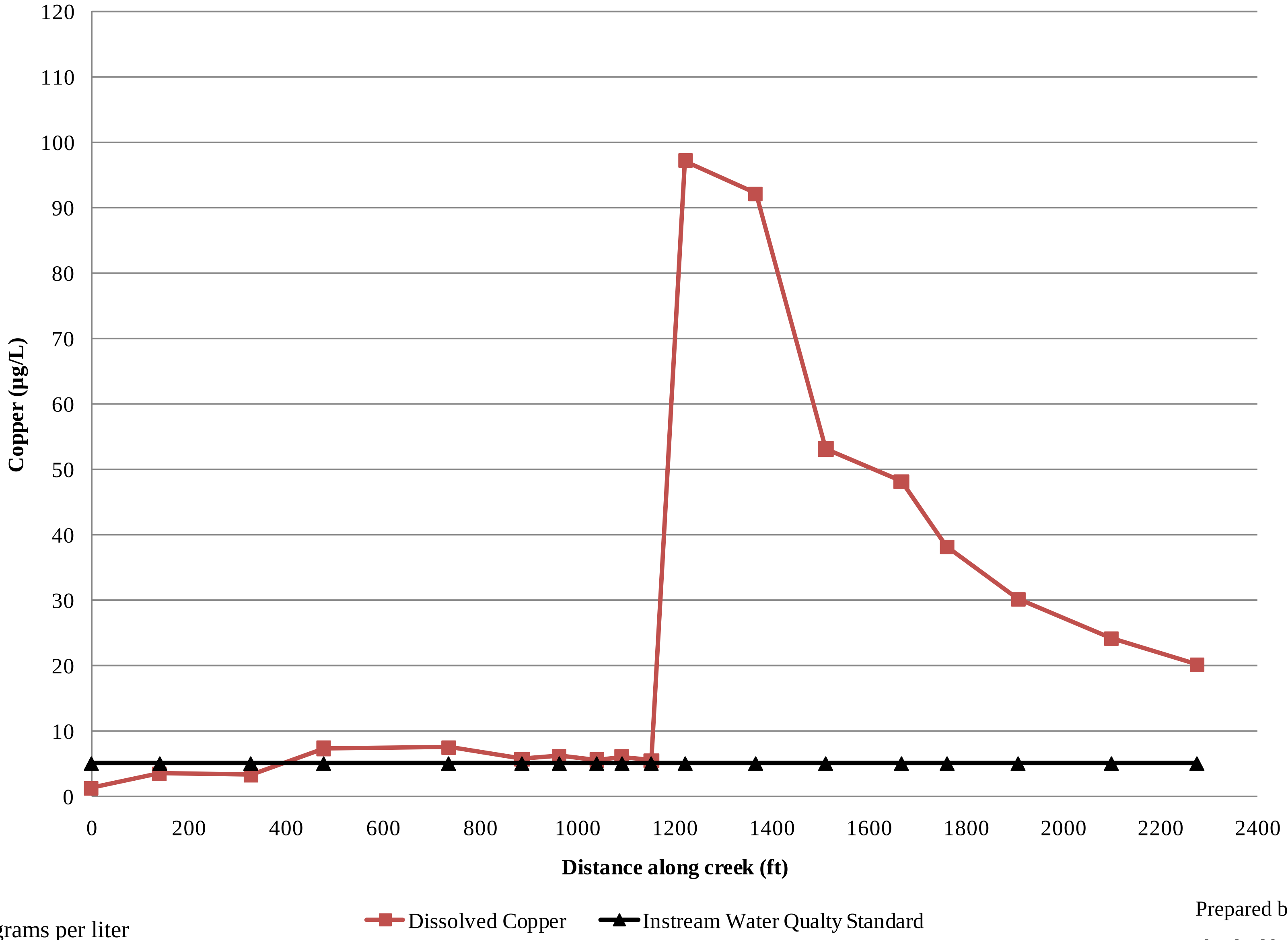
MACTEC

Dissolved Arsenic Concentrations along Stream

Project Number: 6122-08-0154

Figure E-22

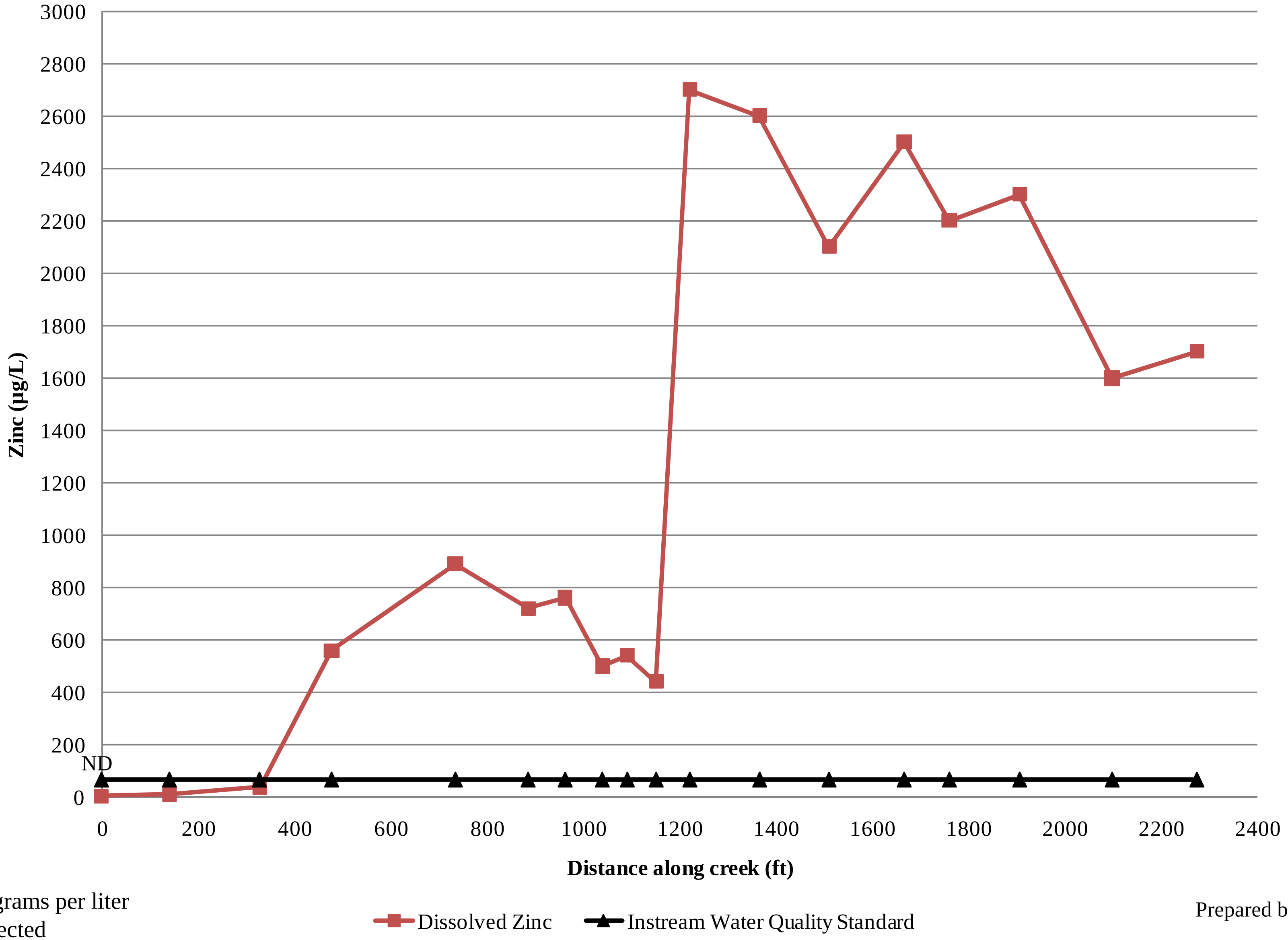


Notes:
ft – feet
µg/L – micrograms per liter
Source: GA EPD. 2008. *Water Quality in Georgia 2006-2007*. http://www.gaepd.org/Files_PDF/305b/Y2008_303d/Y2008_Cover-Chapter3_305b.pdf

Prepared by: LRP 10/25/2010

Checked by: MET 10/29/2010

BFEL Atlanta	MACTEC	Dissolved Copper Concentrations along Stream Project Number: 6122-08-0154 Figure E-23



Notes:
ft – feet
µg/L – micrograms per liter
ND – Not detected
Source: GA EPD. 2008. *Water Quality in Georgia 2006-2007*. http://www.gaepd.org/Files_PDF/305b/Y2008_303d/Y2008_Cover-Chapter3_305b.pdf

Prepared by: LRP 10/25/2010
Checked by: MET 10/29/2010

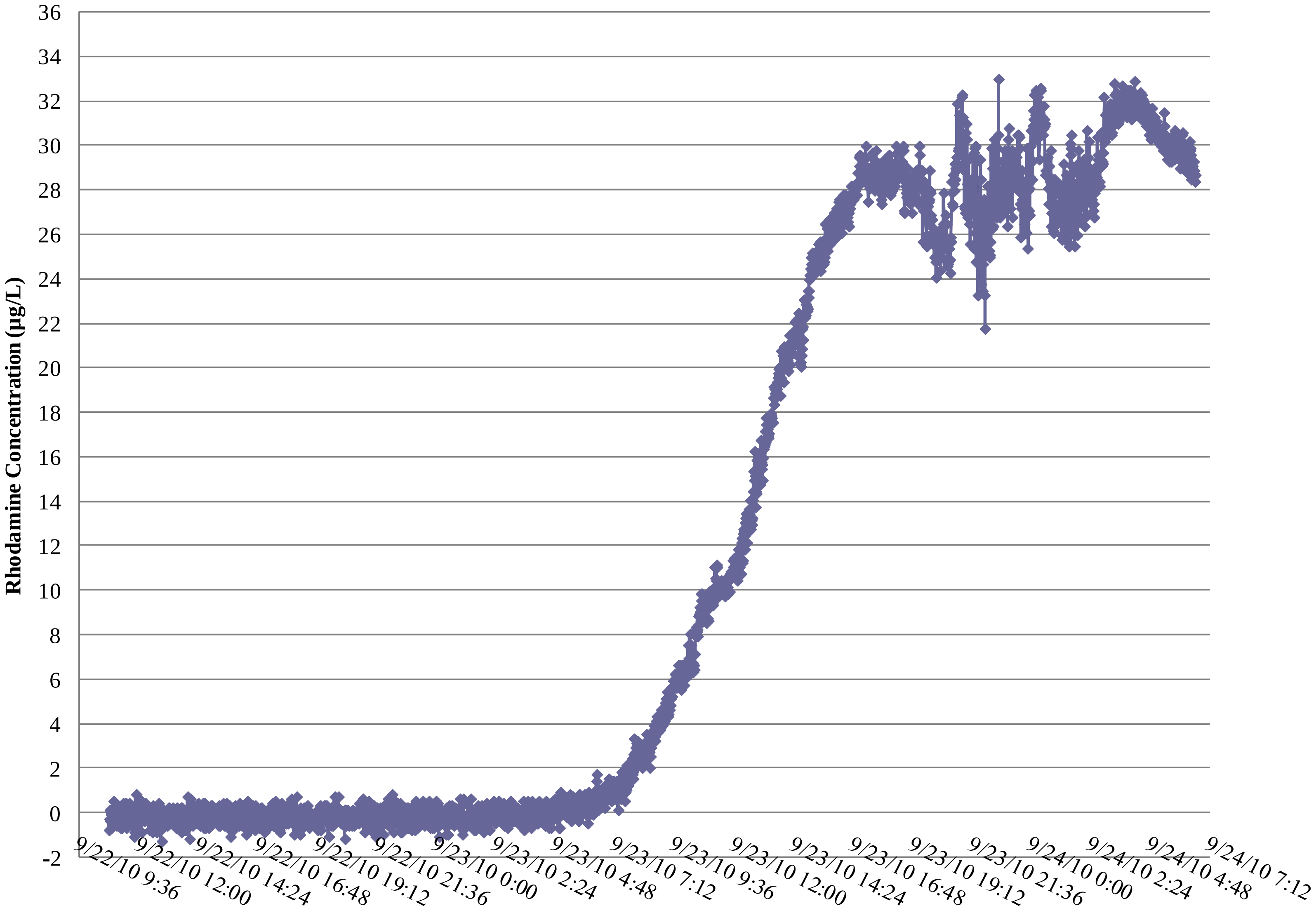
BFEL Atlanta

MACTEC

Dissolved Zinc Concentrations along Stream

Project Number: 6122-08-0154

Figure E-24



Notes:
ft – feet
µg/L – micrograms per liter

Prepared by: LRP 10/25/2010

Checked by: MET 10/29/2010

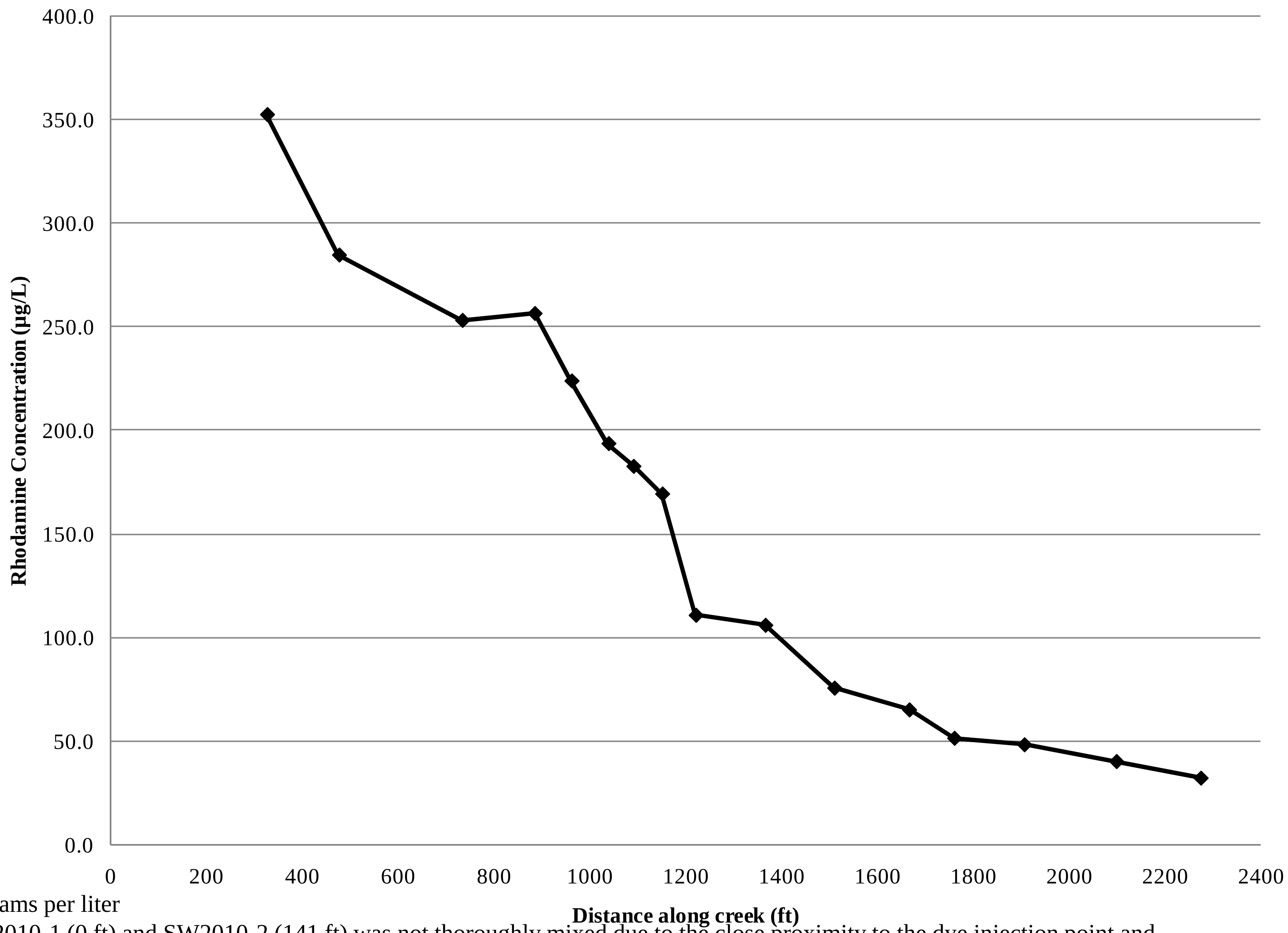
BFEL Atlanta

MACTEC

Rhodamine Dye Measured at SW2010-18

Project Number: 6122-08-0154

Figure E-25



Notes:
ft – feet
µg/L – micrograms per liter
(1) Dye at SW2010-1 (0 ft) and SW2010-2 (141 ft) was not thoroughly mixed due to the close proximity to the dye injection point and are not presented on this figure.
(2) The plateau concentration at SW2010-18 (2275 ft) was estimated using the peak rhodamine concentration on Figure E-26.

Prepared by: LRP 10/25/2010
Checked by: MET 10/29/2010

BFEL Atlanta

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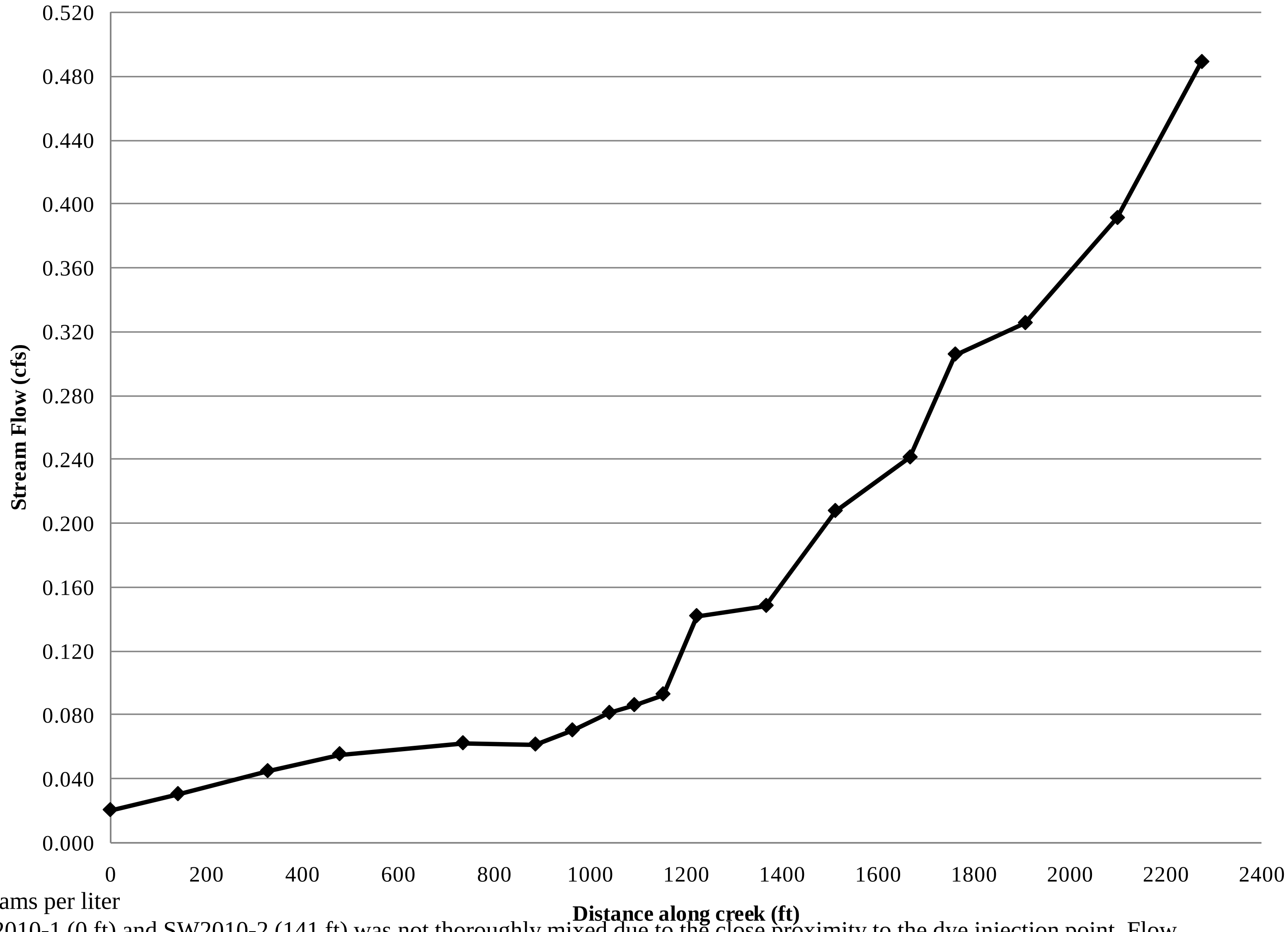
Plateau Rhodamine Dye Concentrations

Project Number: 6122-08-0154

Figure E-26



Notes:
ft – feet
µg/L – micrograms per liter
(1) Dye at SW2010-1 (0 ft) and SW2010-2 (141 ft) was not thoroughly mixed due to the close proximity to the dye injection point. Flow was estimated at these two locations by extrapolation of the dye calculated flow from the next downstream sampling locations.
(2) The flow at SW2010-18 (2275 ft) was estimated using the peak rhodamine concentration on Figure E-26.

Prepared by: LRP 10/25/2010

Checked by: MET 10/29/2010

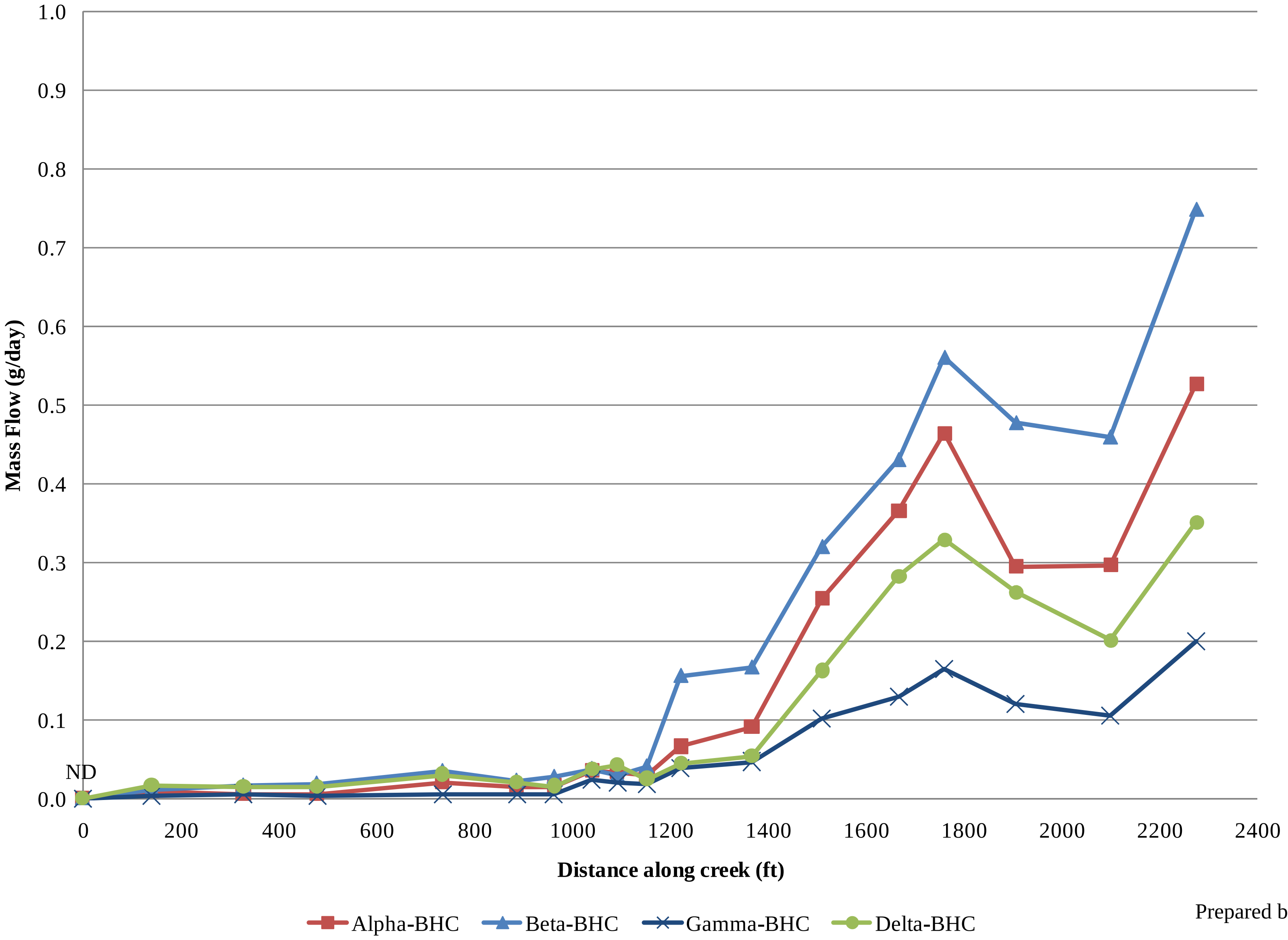
BFEL Atlanta

MACTEC

Flow Calculated from Lab-Analyzed Rhodamine Concentrations

Project Number: 6122-08-0154

Figure E-27



Notes:
g – grams
ft – feet
ND – Not detected

Prepared by: LRP 10/25/2010

Checked by: MET 10/29/2010

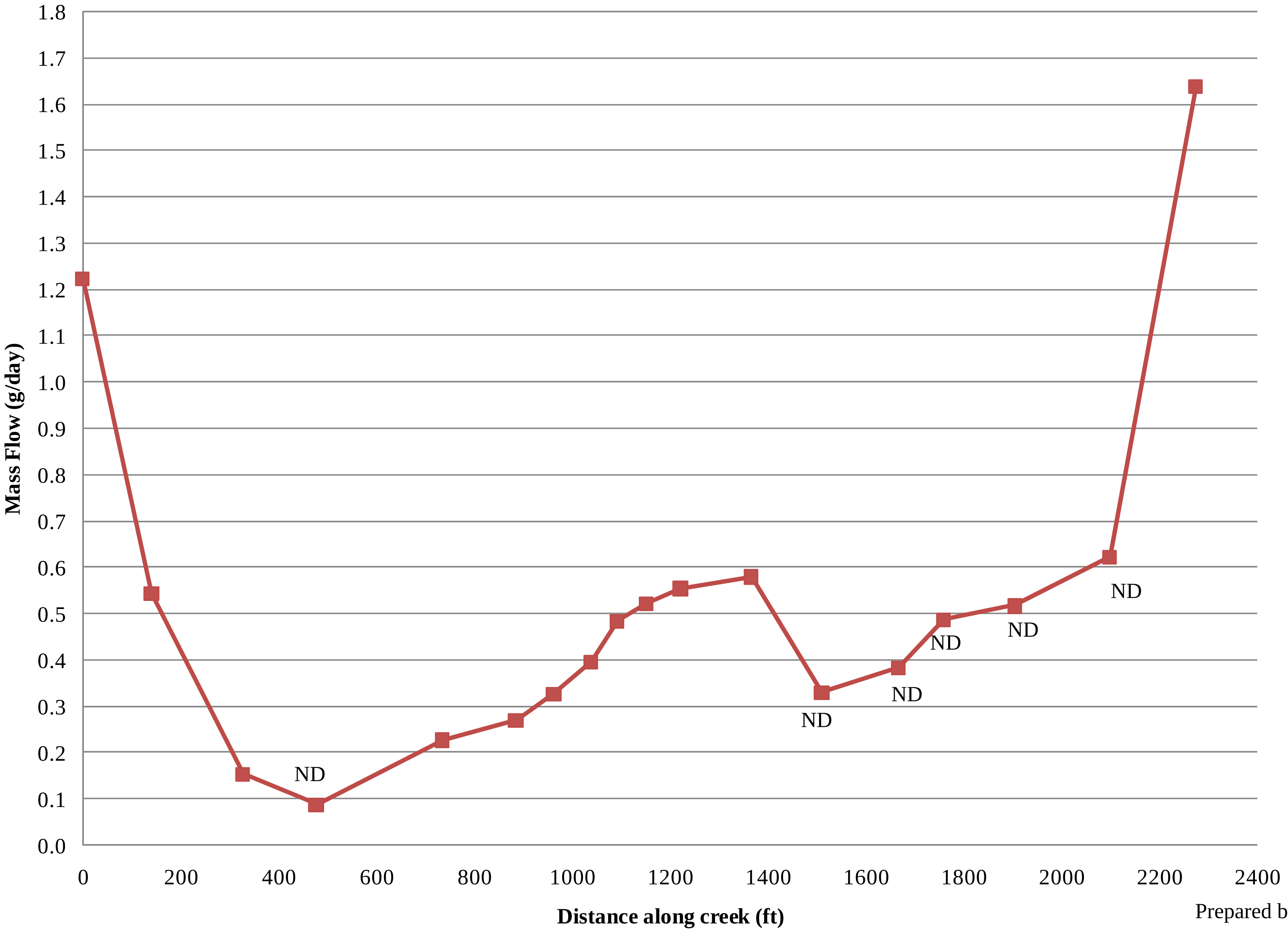
BFEL Atlanta

MACTEC

Mass Flow of Total BHC-Pesticides along Stream

Project Number: 6122-08-0154

Figure E-28



Notes:
g – grams
ft – feet
ND – Not detected

Prepared by: LRP 10/25/2010

Checked by: MET 10/29/2010

BFEL Atlanta

MACTEC

Mass Flow of Dissolved Arsenic along Stream

Project Number: 6122-08-0154

Figure E-29

Notes:
g – grams
ft - feet

Prepared by: LRP 10/25/2010

Checked by: MET 10/29/2010

BFEL Atlanta

MACTEC

Mass Flow of Dissolved Copper along Stream

Project Number: 6122-08-0154

Figure E-30

Notes:
g – grams
ft – feet
ND – Not detected

Prepared by: LRP 10/25/2010

Checked by: MET 10/29/2010

BFEL Atlanta

MACTEC

Mass Flow of Dissolved Zinc along Stream

Project Number: 6122-08-0154

Figure E-31

APPENDIX F

LABORATORY REPORTS FOR 2010 GROUNDWATER AND SURFACE WATER SAMPLES WITH LABORATORY CERTIFICATES AND FIELD REPORTS

COMMERCIAL LABORATORY STIPULATION

Georgia Rules for Commercial Environmental Laboratory Accreditation
Chapter 391-3-26

LABORATORY:	TestAmerica – Savannah		
ACCREDITOR:	NELAC: State of Florida, Department of Health, Bureau of Laboratories		
ACCREDITATION ID:	E87052		
SCOPE:	Safe Drinking Water Act (SDWA) Clean Water Act (CWA) Resource Conservation and Recovery Act (RCRA)		
EFFECTIVE:	July 1, 2010	**EXPIRATION DATE:**	June 30, 2011

LABORATORY:	TestAmerica Savannah		
ACCREDITOR:	American Association of Laboratory Accreditation (A2LA)		
ACCREDITATION ID:	6883		
SCOPE:	Safe Drinking Water Act (SDWA) Clean Water Act (CWA) Resource Conservation and Recovery Act (RCRA) Clean Air Act (CAA)		
EFFECTIVE:	September 24, 2009	**EXPIRATION DATE:**	February 28, 2011

As per the Georgia EPD Rules and Regulations for Commercial Laboratories, TestAmerica Laboratories, Inc. – Savannah is accredited by the Florida Department of Health under the National Environmental Laboratory Approval Program (NELAP) and by the American Association for Laboratory Accreditation (A2LA). If you have any further questions regarding accreditation status for TestAmerica's Savannah laboratory, please contact your Savannah Project Manager.

TestAmerica Laboratories, Inc. – Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: (912) 354-7858
FAX: (912) 352-0165
www.testamericainc.com

ANALYTICAL REPORT

Job Number: 680-59867-1

SDG Number: 68059867

Job Description: BFEL Atlanta

For:
MACTEC Engineering and Consulting Inc
3200 Town Point Drive Northwest
Suite 100
Kennesaw, GA 30144

Attention: Ms. Rhonda Quinn

Kathryn Smith

Approved for release.
Kathryn Smith
Project Manager I
11/8/2010 3:47 PM

Kathryn Smith
Project Manager I
kathye.smith@testamericainc.com
11/08/2010
Revision: 1

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

Savannah Certifications and ID #s: A2LA: 0399.01; AL: 41450; ARDEQ: 88-0692; ARDOH; CA: 03217CA; CO; CT: PH0161; DE; FL: E87052; GA: 803; Guam; HI; IL: 200022; IN; IA: 353; KS: E-10322; KY EPPC: 90084; KY UST; LA DEQ: 30690; LA DHH: LA080008; ME: 2008022; MD: 250; MA: M-GA006; MI: 9925; MS; NFESC: 249; NV: GA00006; NJ: GA769; NM; NY: 10842; NC DWQ: 269; NC DHHS: 13701; PA: 68-00474; PR: GA00006; RI: LAO00244; SC: 98001001; TN: TN0296; TX: T104704185; USEPA: GA00006; VT: VT-87052; VA: 00302; WA; WV DEP: 094; WV DHHR: 9950 C; WI DNR: 999819810; WY/EPAR8: 8TMS-Q

Job Narrative
680-59867-1

Comments
No additional comments.

Receipt
All samples were received in good condition within temperature requirements.

GC Semi VOA
Method(s) 8081A_8082: The toxaphene capping continuing calibration verification (CCV) analyzed in association with AD batch 680-176198 did not meet control limits on column two. Sample matrix is suspected to have contributed to this failure. All results for toxaphene were reported from column one.

No other analytical or quality issues were noted.

Metals
No analytical or quality issues were noted.

Organic Prep
No analytical or quality issues were noted.

METHOD / ANALYST SUMMARY

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59867-1
Sdg Number: 68059867

Method	Analyst	Analyst ID
SW846 8081A_8082	Kellar, Joshua	JK
SW846 6020	Robertson, Bryn	BR

SAMPLE SUMMARY

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59867-1
Sdg Number: 68059867

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
680-59867-1	MW-112	Water	07/28/2010 1050	07/29/2010 0919
680-59867-2	MW-26	Water	07/28/2010 1050	07/29/2010 0919
680-59867-3	MW-101	Water	07/28/2010 1440	07/29/2010 0919
680-59867-4	MW-116	Water	07/28/2010 1610	07/29/2010 0919
680-59867-5	MW-22	Water	07/28/2010 1710	07/29/2010 0919

Analytical Data

Client: MACTEC Engineering and Consulting Inc	Job Number: 680-59867-1
	Sdg Number: 68059867

Client Sample ID: **MW-112**

Lab Sample ID:	680-59867-1	Date Sampled: 07/28/2010 1050
Client Matrix:	Water	Date Received: 07/29/2010 0919

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-176076	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-175770	Initial Weight/Volume:	500 mL
Dilution:	1.0		Final Weight/Volume:	5 mL
Date Analyzed:	08/02/2010 1733		Injection Volume:	2 uL
Date Prepared:	07/30/2010 1504		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	2.4	E	0.050
beta-BHC	37	E	0.050
Chlordane (technical)	0.50	U	0.50
4,4'-DDD	0.10	U	0.10
4,4'-DDE	0.10	U	0.10
4,4'-DDT	0.10	U	0.10
delta-BHC	1.9	E p	0.050
Dieldrin	0.12		0.10
gamma-BHC (Lindane)	0.59		0.050
Heptachlor	0.050	U	0.050
Methoxychlor	0.10	U	0.10
Toxaphene	5.0	U	5.0

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	39		14 - 115
Tetrachloro-m-xylene	62		35 - 120

Client Sample ID: **MW-112**

Lab Sample ID: 680-59867-1
Client Matrix: Water

Date Sampled: 07/28/2010 1050
Date Received: 07/29/2010 0919

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-176076	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-175770	Initial Weight/Volume:	500 mL
Dilution:	1.0		Final Weight/Volume:	5 mL
Date Analyzed:	08/02/2010 1733		Injection Volume:	2 uL
Date Prepared:	07/30/2010 1504		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	29		14 - 115
Tetrachloro-m-xylene	58		35 - 120

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59867-1
Sdg Number: 68059867

Client Sample ID: **MW-112**

Lab Sample ID: 680-59867-1
Client Matrix: Water

Date Sampled: 07/28/2010 1050
Date Received: 07/29/2010 0919

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-176198	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-175770	Initial Weight/Volume:	500 mL
Dilution:	50		Final Weight/Volume:	5 mL
Date Analyzed:	08/03/2010 1311	Run Type: DL	Injection Volume:	2 uL
Date Prepared:	07/30/2010 1504		Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	2.5	U D	2.5
beta-BHC	31	D	2.5
Chlordane (technical)	25	U	25
4,4'-DDD	5.0	U	5.0
4,4'-DDE	5.0	U	5.0
4,4'-DDT	5.0	U	5.0
delta-BHC	2.5	U D	2.5
Dieldrin	5.0	U	5.0
gamma-BHC (Lindane)	2.5	U D	2.5
Heptachlor	2.5	U	2.5
Methoxychlor	5.0	U	5.0
Toxaphene	250	U	250

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	0	D	14 - 115
DCB Decachlorobiphenyl	0	D	14 - 115
Tetrachloro-m-xylene	0	D	35 - 120
Tetrachloro-m-xylene	0	D	35 - 120

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59867-1
Sdg Number: 68059867

Client Sample ID: **MW-26**

Lab Sample ID:	680-59867-2	Date Sampled:	07/28/2010 1050
Client Matrix:	Water	Date Received:	07/29/2010 0919

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-176076	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-175770	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	08/02/2010 1756		Injection Volume:	2 uL
Date Prepared:	07/30/2010 1504		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	0.11		0.048
beta-BHC	0.54		0.048
Chlordane (technical)	0.48	U	0.48
4,4'-DDD	0.095	U	0.095
4,4'-DDE	0.095	U	0.095
4,4'-DDT	0.095	U	0.095
delta-BHC	0.14		0.048
Dieldrin	0.095	U	0.095
gamma-BHC (Lindane)	0.070		0.048
Heptachlor	0.048	U	0.048
Methoxychlor	0.095	U	0.095
Toxaphene	4.8	U	4.8

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	33		14 - 115
Tetrachloro-m-xylene	56		35 - 120

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59867-1
Sdg Number: 68059867

Client Sample ID: **MW-26**

Lab Sample ID: 680-59867-2
Client Matrix: Water

Date Sampled: 07/28/2010 1050
Date Received: 07/29/2010 0919

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-176076	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-175770	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	08/02/2010 1756		Injection Volume:	2 uL
Date Prepared:	07/30/2010 1504		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	23		14 - 115
Tetrachloro-m-xylene	56		35 - 120

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59867-1
Sdg Number: 68059867

Client Sample ID: **MW-101**

Lab Sample ID:	680-59867-3	Date Sampled:	07/28/2010 1440
Client Matrix:	Water	Date Received:	07/29/2010 0919

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-176076	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-175770	Initial Weight/Volume:	1030 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	08/02/2010 1819		Injection Volume:	2 uL
Date Prepared:	07/30/2010 1504		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	0.049	U	0.049
beta-BHC	0.049	U	0.049
Chlordane (technical)	0.49	U	0.49
4,4'-DDD	0.097	U	0.097
4,4'-DDE	0.097	U	0.097
4,4'-DDT	0.097	U	0.097
delta-BHC	0.049	U	0.049
Dieldrin	0.097	U	0.097
gamma-BHC (Lindane)	0.049	U	0.049
Heptachlor	0.049	U	0.049
Methoxychlor	0.097	U	0.097
Toxaphene	4.9	U	4.9

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	27		14 - 115
Tetrachloro-m-xylene	54		35 - 120

Client Sample ID:	**MW-101**		
Lab Sample ID:	680-59867-3	Date Sampled:	07/28/2010 1440
Client Matrix:	Water	Date Received:	07/29/2010 0919

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-176076	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-175770	Initial Weight/Volume:	1030 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	08/02/2010 1819		Injection Volume:	2 uL
Date Prepared:	07/30/2010 1504		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	20		14 - 115
Tetrachloro-m-xylene	51		35 - 120

Client Sample ID: **MW-116**

Lab Sample ID:	680-59867-4	Date Sampled: 07/28/2010 1610
Client Matrix:	Water	Date Received: 07/29/2010 0919

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-176076	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-175770	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	08/02/2010 1842		Injection Volume:	2 uL
Date Prepared:	07/30/2010 1504		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	0.19		0.048
beta-BHC	0.63		0.048
Chlordane (technical)	0.48	U	0.48
4,4'-DDD	0.095	U	0.095
4,4'-DDE	0.095	U	0.095
4,4'-DDT	0.095	U	0.095
delta-BHC	0.048	U	0.048
Dieldrin	0.095	U	0.095
gamma-BHC (Lindane)	0.27		0.048
Heptachlor	0.048	U	0.048
Methoxychlor	0.095	U	0.095
Toxaphene	4.8	U	4.8

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	28		14 - 115
Tetrachloro-m-xylene	54		35 - 120

Client Sample ID: **MW-116**

Lab Sample ID: 680-59867-4
Client Matrix: Water

Date Sampled: 07/28/2010 1610
Date Received: 07/29/2010 0919

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-176076	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-175770	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	08/02/2010 1842		Injection Volume:	2 uL
Date Prepared:	07/30/2010 1504		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	20		14 - 115
Tetrachloro-m-xylene	54		35 - 120

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59867-1
Sdg Number: 68059867

Client Sample ID: **MW-22**

Lab Sample ID: 680-59867-5
Client Matrix: Water

Date Sampled: 07/28/2010 1710
Date Received: 07/29/2010 0919

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method: 8081A_8082
Preparation: 3520C
Dilution: 1.0
Date Analyzed: 08/02/2010 1905
Date Prepared: 07/30/2010 1504

Analysis Batch: 680-176076
Prep Batch: 680-175770

Instrument ID: SGJ
Initial Weight/Volume: 1030 mL
Final Weight/Volume: 10 mL
Injection Volume: 2 uL
Result Type: PRIMARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	0.79		0.049
beta-BHC	0.99	E	0.049
Chlordane (technical)	0.49	U	0.49
4,4'-DDD	0.097	U	0.097
4,4'-DDE	0.097	U	0.097
4,4'-DDT	0.097	U	0.097
delta-BHC	0.26		0.049
Dieldrin	0.097	U	0.097
gamma-BHC (Lindane)	0.47		0.049
Heptachlor	0.049	U	0.049
Methoxychlor	0.097	U	0.097
Toxaphene	4.9	U	4.9

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	57		14 - 115
Tetrachloro-m-xylene	58		35 - 120

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59867-1
Sdg Number: 68059867

Client Sample ID: **MW-22**

Lab Sample ID: 680-59867-5
Client Matrix: Water

Date Sampled: 07/28/2010 1710
Date Received: 07/29/2010 0919

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-176076	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-175770	Initial Weight/Volume:	1030 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	08/02/2010 1905		Injection Volume:	2 uL
Date Prepared:	07/30/2010 1504		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	40		14 - 115
Tetrachloro-m-xylene	56		35 - 120

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59867-1
Sdg Number: 68059867

Client Sample ID: **MW-22**

Lab Sample ID:	680-59867-5	Date Sampled:	07/28/2010 1710
Client Matrix:	Water	Date Received:	07/29/2010 0919

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-176198	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-175770	Initial Weight/Volume:	1030 mL
Dilution:	4.0		Final Weight/Volume:	10 mL
Date Analyzed:	08/03/2010 1334	Run Type: DL	Injection Volume:	2 uL
Date Prepared:	07/30/2010 1504		Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	0.62	D	0.19
beta-BHC	0.96	D	0.19
Chlordane (technical)	1.9	U	1.9
4,4'-DDD	0.39	U	0.39
4,4'-DDE	0.39	U	0.39
4,4'-DDT	0.39	U	0.39
delta-BHC	0.21	D	0.19
Dieldrin	0.39	U	0.39
gamma-BHC (Lindane)	0.41	D	0.19
Heptachlor	0.19	U	0.19
Methoxychlor	0.39	U	0.39
Toxaphene	19	U	19

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	68	D	14 - 115
DCB Decachlorobiphenyl	46	D	14 - 115
Tetrachloro-m-xylene	50	D	35 - 120
Tetrachloro-m-xylene	56	D	35 - 120

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59867-1
Sdg Number: 68059867

Client Sample ID: **MW-112**

Lab Sample ID:	680-59867-1	Date Sampled:	07/28/2010 1050
Client Matrix:	Water	Date Received:	07/29/2010 0919

6020 Metals (ICP/MS)-Total Recoverable

Method:	6020	Analysis Batch:	680-176786	Instrument ID:	ICPMSA
Preparation:	3005A	Prep Batch:	680-176280	Lab File ID:	176280176280.chr
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	08/10/2010 0031			Final Weight/Volume:	250 mL
Date Prepared:	08/04/2010 1529				

Analyte	Result (mg/L)	Qualifier	RL
Arsenic	0.015		0.0025
Lead	0.0015	U	0.0015

Client Sample ID: **MW-26**

Lab Sample ID: 680-59867-2
Client Matrix: Water

Date Sampled: 07/28/2010 1050
Date Received: 07/29/2010 0919

6020 Metals (ICP/MS)-Total Recoverable

Method: 6020
Preparation: 3005A
Dilution: 1.0
Date Analyzed: 08/10/2010 0107
Date Prepared: 08/04/2010 1529

Analysis Batch: 680-176786
Prep Batch: 680-176280

Instrument ID: ICPMSA
Lab File ID: 176280176280.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (mg/L)	Qualifier	RL
Arsenic	0.0025	U	0.0025
Lead	0.0015	U	0.0015

Client Sample ID: **MW-101**

Lab Sample ID: 680-59867-3
Client Matrix: Water

Date Sampled: 07/28/2010 1440
Date Received: 07/29/2010 0919

6020 Metals (ICP/MS)-Total Recoverable

Method:	6020	Analysis Batch: 680-176786		Instrument ID:	ICPMSA
Preparation:	3005A	Prep Batch: 680-176280		Lab File ID:	176280176280.chr
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	08/10/2010 0114			Final Weight/Volume:	250 mL
Date Prepared:	08/04/2010 1529				

Analyte	Result (mg/L)	Qualifier	RL
Arsenic	0.0025	U	0.0025
Lead	0.0035		0.0015

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59867-1
Sdg Number: 68059867

Client Sample ID: **MW-116**

Lab Sample ID: 680-59867-4
Client Matrix: Water

Date Sampled: 07/28/2010 1610
Date Received: 07/29/2010 0919

6020 Metals (ICP/MS)-Total Recoverable

Method: 6020
Preparation: 3005A
Dilution: 1.0
Date Analyzed: 08/10/2010 0121
Date Prepared: 08/04/2010 1529

Analysis Batch: 680-176786
Prep Batch: 680-176280

Instrument ID: ICPMSA
Lab File ID: 176280176280.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (mg/L)	Qualifier	RL
Arsenic	0.0025	U	0.0025
Lead	0.0073		0.0015

Client Sample ID: **MW-22**

Lab Sample ID:	680-59867-5	Date Sampled:	07/28/2010 1710
Client Matrix:	Water	Date Received:	07/29/2010 0919

6020 Metals (ICP/MS)-Total Recoverable

Method:	6020	Analysis Batch: 680-176786	Instrument ID:	ICPMSA
Preparation:	3005A	Prep Batch: 680-176280	Lab File ID:	176280176280.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	08/10/2010 0128		Final Weight/Volume:	250 mL
Date Prepared:	08/04/2010 1529			

Analyte	Result (mg/L)	Qualifier	RL
Arsenic	0.0038		0.0025
Lead	0.0040		0.0015

DATA REPORTING QUALIFIERS

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59867-1
Sdg Number: 68059867

Lab Section	Qualifier	Description
GC Semi VOA		
	U	Indicates the analyte was analyzed for but not detected.
	F	MS or MSD exceeds the control limits
	4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.
	E	Result exceeded calibration range.
	D	Surrogate or matrix spike recoveries were not obtained because the extract was diluted for analysis; also compounds analyzed at a dilution may be flagged with a D.
	p	The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.
Metals		
	U	Indicates the analyte was analyzed for but not detected.

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59867-1
Sdg Number: 68059867

Method Blank - Batch: 680-175770

Method: 8081A_8082
Preparation: 3520C

Lab Sample ID:	MB 680-175770/6-A	Analysis Batch:	680-176076	Instrument ID:	SGJ
Client Matrix:	Water	Prep Batch:	680-175770	Lab File ID:	jh02011.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	1000 mL
Date Analyzed:	08/02/2010 1505			Final Weight/Volume:	10 mL
Date Prepared:	07/30/2010 1504			Injection Volume:	2 uL
				Column ID:	PRIMARY

Analyte	Result	Qual	RL
alpha-BHC	0.050	U	0.050
beta-BHC	0.050	U	0.050
Chlordane (technical)	0.50	U	0.50
4,4'-DDD	0.10	U	0.10
4,4'-DDE	0.10	U	0.10
4,4'-DDT	0.10	U	0.10
delta-BHC	0.050	U	0.050
Dieldrin	0.10	U	0.10
gamma-BHC (Lindane)	0.050	U	0.050
Heptachlor	0.050	U	0.050
Methoxychlor	0.10	U	0.10
Toxaphene	5.0	U	5.0

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	78	14 - 115
Tetrachloro-m-xylene	66	35 - 120

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	62	14 - 115
Tetrachloro-m-xylene	65	35 - 120

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59867-1
Sdg Number: 68059867

Lab Control Sample - Batch: 680-175770

Method: 8081A_8082
Preparation: 3520C

Lab Sample ID:	LCS 680-175770/7-A	Analysis Batch: 680-176076		Instrument ID:	SGJ
Client Matrix:	Water	Prep Batch: 680-175770		Lab File ID:	jh02012.d
Dilution:	1.0	Units: ug/L		Initial Weight/Volume:	1000 mL
Date Analyzed:	08/02/2010 1528			Final Weight/Volume:	10 mL
Date Prepared:	07/30/2010 1504			Injection Volume:	2 uL
				Column ID:	PRIMARY

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
alpha-BHC	0.100	0.0753	75	29 - 112	
beta-BHC	0.100	0.0942	94	15 - 204	p
4,4'-DDD	0.200	0.190	95	37 - 179	
4,4'-DDE	0.200	0.139	70	33 - 142	
4,4'-DDT	0.200	0.217	108	27 - 141	
delta-BHC	0.100	0.0995	100	25 - 123	
Dieldrin	0.200	0.175	87	45 - 137	
gamma-BHC (Lindane)	0.100	0.0841	84	31 - 118	
Heptachlor	0.100	0.0730	73	30 - 133	
Methoxychlor	0.200	0.251	125	10 - 243	

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	77	14 - 115
Tetrachloro-m-xylene	68	35 - 120

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	58	14 - 115
Tetrachloro-m-xylene	57	35 - 120

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59867-1
Sdg Number: 68059867

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 680-175770

Method: 8081A_8082
Preparation: 3520C

LCS Lab Sample ID:	LCS 680-175770/12-A	Analysis Batch: 680-176198	Instrument ID: SGJ
Client Matrix:	Water	Prep Batch: 680-175770	Lab File ID: jh02037.d
Dilution:	1.0	Units: ug/L	Initial Weight/Volume: 1000 mL
Date Analyzed:	08/03/2010 1202		Final Weight/Volume: 10 mL
Date Prepared:	07/30/2010 1504		Injection Volume: 2 uL
			Column ID: PRIMARY

LCSD Lab Sample ID:	LCSD 680-175770/13-A	Analysis Batch: 680-176198	Instrument ID: SGJ
Client Matrix:	Water	Prep Batch: 680-175770	Lab File ID: jh02038.d
Dilution:	1.0	Units: ug/L	Initial Weight/Volume: 1000 mL
Date Analyzed:	08/03/2010 1225		Final Weight/Volume: 10 mL
Date Prepared:	07/30/2010 1504		Injection Volume: 2 uL
			Column ID: PRIMARY

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Chlordane (technical)	88	101	70 - 130	14	40		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
DCB Decachlorobiphenyl	78	84	14 - 115
Tetrachloro-m-xylene	68	60	35 - 120

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
DCB Decachlorobiphenyl	57	59	14 - 115
Tetrachloro-m-xylene	63	57	35 - 120

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59867-1
Sdg Number: 68059867

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-175770

Method: 8081A_8082
Preparation: 3520C

MS Lab Sample ID:	680-59867-1	Analysis Batch:	680-176076	Instrument ID:	SGJ
Client Matrix:	Water	Prep Batch:	680-175770	Lab File ID:	jh02022.d
Dilution:	1.0			Initial Weight/Volume:	500 mL
Date Analyzed:	08/02/2010 1928			Final Weight/Volume:	5 mL
Date Prepared:	07/30/2010 1504			Injection Volume:	2 uL
				Column ID:	PRIMARY

MSD Lab Sample ID:	680-59867-1	Analysis Batch:	680-176076	Instrument ID:	SGJ
Client Matrix:	Water	Prep Batch:	680-175770	Lab File ID:	jh02023.d
Dilution:	1.0			Initial Weight/Volume:	500 mL
Date Analyzed:	08/02/2010 1951			Final Weight/Volume:	5 mL
Date Prepared:	07/30/2010 1504			Injection Volume:	2 uL
				Column ID:	PRIMARY

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
alpha-BHC	838	397	29 - 112	15	40	E 4	E 4
beta-BHC	-13124	-1744	15 - 204	39	40	E p 4	E 4
4,4'-DDD	139	125	37 - 179	11	40		
4,4'-DDE	74	80	33 - 142	8	40	p	p
4,4'-DDT	154	152	27 - 141	1	40	F	F
delta-BHC	1034	169	25 - 123	35	40	E 4	E p 4
Dieldrin	124	101	45 - 137	13	40		
gamma-BHC (Lindane)	218	102	31 - 118	15	40	4	4
Heptachlor	0	0	30 - 133	NC	40	U F	U F
Methoxychlor	107	117	10 - 243	9	40		

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
DCB Decachlorobiphenyl	38	45	14 - 115
Tetrachloro-m-xylene	75	63	35 - 120

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
DCB Decachlorobiphenyl	29	30	14 - 115
Tetrachloro-m-xylene	65	55	35 - 120

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59867-1
Sdg Number: 68059867

Method Blank - Batch: 680-176280

Method: 6020
Preparation: 3005A
Total Recoverable

Lab Sample ID: MB 680-176280/21-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/09/2010 2304
Date Prepared: 08/04/2010 1529

Analysis Batch: 680-176786
Prep Batch: 680-176280
Units: mg/L

Instrument ID: ICPMSA
Lab File ID: 176280176280.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result	Qual	RL
Arsenic	0.0025	U	0.0025
Lead	0.0015	U	0.0015

Lab Control Sample - Batch: 680-176280

Method: 6020
Preparation: 3005A
Total Recoverable

Lab Sample ID: LCS 680-176280/22-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/09/2010 2311
Date Prepared: 08/04/2010 1529

Analysis Batch: 680-176786
Prep Batch: 680-176280
Units: mg/L

Instrument ID: ICPMSA
Lab File ID: 176280176280.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Arsenic	0.100	0.101	101	75 - 125	
Lead	0.0500	0.0475	95	75 - 125	

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59867-1
Sdg Number: 68059867

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-176280

Method: 6020
Preparation: 3005A
Total Recoverable

MS Lab Sample ID: 680-59867-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/10/2010 0052
Date Prepared: 08/04/2010 1529

Analysis Batch: 680-176786
Prep Batch: 680-176280

Instrument ID: ICPMSA
Lab File ID: 176280176280.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

MSD Lab Sample ID: 680-59867-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/10/2010 0059
Date Prepared: 08/04/2010 1529

Analysis Batch: 680-176786
Prep Batch: 680-176280

Instrument ID: ICPMSA
Lab File ID: 176280176280.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Arsenic	101	105	75 - 125	3	20		
Lead	94	96	75 - 125	2	20		

Serial Number 009613

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

FedEx #
873124009440

☒ TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.testamericainc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

○ Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE: BFEL Atlanta
PROJECT NO.: 6122080154.04
PROJECT LOCATION (STATE):
TAL (LAB) PROJECT MANAGER:
P.O. NUMBER:
CONTRACT NO.:
CLIENT (SITE) PM: Rhonda Quinn
CLIENT PHONE: 770-421-3400
CLIENT FAX: 770-421-3486
CLIENT NAME: Mactec
CLIENT E-MAIL:
CLIENT ADDRESS: 3200 Town Point Dr, Ste 100, Kennesaw, GA 30144
COMPANY CONTRACTING THIS WORK (if applicable): Mactec

PAGE 1 OF 1
STANDARD REPORT DELIVERY ○
DATE DUE
EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE
NUMBER OF COOLERS SUBMITTED PER SHIPMENT: 1

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	MATRIX TYPE: COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	REQUIRED ANALYSIS: Total Arsenic Lead 6020 PRESERVATIVE: HNO3	REQUIRED ANALYSIS: Pest 8081A PRESERVATIVE: None	REMARKS
								NUMBER OF CONTAINERS SUBMITTED		
7/28/10	1050	MW-112	G	W				1	2	
	1050	MW-26	G	W				1	2	
	1440	MW-101	G	W				1	2	
	1610	MW-116	G	W				1	2	
	1710	MW-22	G	W				1	2	
		Temp Blank								

RELINQUISHED BY: (SIGNATURE) Daniel L Howard DATE 7/28/10 ~~1800~~ DH TIME 1800
RELINQUISHED BY: (SIGNATURE) DATE TIME
RELINQUISHED BY: (SIGNATURE) DATE TIME
RECEIVED BY: (SIGNATURE) DATE TIME
RECEIVED BY: (SIGNATURE) DATE TIME
RECEIVED BY: (SIGNATURE) DATE TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE) DATE 7/29/10 TIME 0919
CUSTODY INTACT YES ○ NO ○
CUSTODY SEAL NO.
SAVANNAH LOG NO. 680-59867
LABORATORY REMARKS 4.2°C

TAL8240-680 (1207)

Login Sample Receipt Check List

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59867-1
SDG Number: 68059867

Login Number: 59867
Creator: Conner, Keaton
List Number: 1

List Source: TestAmerica Savannah

Question	T / F/ NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	N/A	

ANALYTICAL REPORT

Job Number: 680-59929-1

SDG Number: 68059929

Job Description: BFEL Atlanta

For:
MACTEC Engineering and Consulting Inc
3200 Town Point Drive Northwest
Suite 100
Kennesaw, GA 30144

Attention: Ms. Rhonda Quinn

Kathryn Smith

Approved for release.
Kathryn Smith
Project Manager I
11/11/2010 12:51 PM

Kathryn Smith
Project Manager I
kathye.smith@testamericainc.com
11/11/2010
Revision: 2

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

Savannah Certifications and ID #s: A2LA: 0399.01; AL: 41450; ARDEQ: 88-0692; ARDOH; CA: 03217CA; CO; CT: PH0161; DE; FL: E87052; GA: 803; Guam; HI; IL: 200022; IN; IA: 353; KS: E-10322; KY EPPC: 90084; KY UST; LA DEQ: 30690; LA DHH: LA080008; ME: 2008022; MD: 250; MA: M-GA006; MI: 9925; MS; NFESC: 249; NV: GA00006; NJ: GA769; NM; NY: 10842; NC DWQ: 269; NC DHHS: 13701; PA: 68-00474; PR: GA00006; RI: LAO00244; SC: 98001001; TN: TN0296; TX: T104704185; USEPA: GA00006; VT: VT-87052; VA: 00302; WA; WV DEP: 094; WV DHHR: 9950 C; WI DNR: 999819810; WY/EPAR8: 8TMS-Q

TestAmerica Laboratories, Inc.
TestAmerica Savannah   5102 LaRoche Avenue, Savannah, GA 31404
Tel (912) 354-7858 Fax (912) 352-0165 www.testamericainc.com

Job Narrative
680-59929-1

Comments
No additional comments.

Receipt
All samples were received in good condition within temperature requirements.

GC Semi VOA
No analytical or quality issues were noted.

Metals
No analytical or quality issues were noted.

Organic Prep
No analytical or quality issues were noted.

METHOD / ANALYST SUMMARY

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59929-1
Sdg Number: 68059929

Method	Analyst	Analyst ID
SW846 8081A_8082	Hao, Lili	LH
SW846 6020	Robertson, Bryn	BR

SAMPLE SUMMARY

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59929-1
Sdg Number: 68059929

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
680-59929-1	MW-108	Water	07/29/2010 1015	07/30/2010 0901
680-59929-2	MW-1B	Water	07/29/2010 1115	07/30/2010 0901
680-59929-3	MW-110	Water	07/29/2010 1215	07/30/2010 0901
680-59929-4	MW-102	Water	07/29/2010 1520	07/30/2010 0901

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59929-1
Sdg Number: 68059929

Client Sample ID: **MW-108**

Lab Sample ID:	680-59929-1	Date Sampled:	07/29/2010 1015
Client Matrix:	Water	Date Received:	07/30/2010 0901

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-176240	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-175958	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	08/03/2010 1655		Injection Volume:	2 uL
Date Prepared:	08/02/2010 1426		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	4.4	E	0.048
beta-BHC	1.7	E	0.048
Chlordane (technical)	0.48	U	0.48
4,4'-DDD	0.095	U	0.095
4,4'-DDE	0.095	U p	0.095
4,4'-DDT	0.095	U	0.095
delta-BHC	1.4	E	0.048
Dieldrin	0.098	p	0.095
gamma-BHC (Lindane)	0.20	p	0.048
Heptachlor	0.048	U	0.048
Methoxychlor	0.095	U	0.095
Toxaphene	4.8	U	4.8

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	19		14 - 115
Tetrachloro-m-xylene	74		35 - 120

Client Sample ID: **MW-108**

Lab Sample ID:	680-59929-1	Date Sampled:	07/29/2010 1015
Client Matrix:	Water	Date Received:	07/30/2010 0901

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-176240	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-175958	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	08/03/2010 1655		Injection Volume:	2 uL
Date Prepared:	08/02/2010 1426		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	18		14 - 115
Tetrachloro-m-xylene	69		35 - 120

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59929-1
Sdg Number: 68059929

Client Sample ID: **MW-108**

Lab Sample ID:	680-59929-1	Date Sampled:	07/29/2010 1015
Client Matrix:	Water	Date Received:	07/30/2010 0901

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-176383	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-175958	Initial Weight/Volume:	1050 mL
Dilution:	10		Final Weight/Volume:	10 mL
Date Analyzed:	08/04/2010 1626	Run Type: DL	Injection Volume:	2 uL
Date Prepared:	08/02/2010 1426		Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	5.8	D	0.48
beta-BHC	2.4	D	0.48
Chlordane (technical)	4.8	U	4.8
4,4'-DDD	0.95	U	0.95
4,4'-DDE	0.95	U D	0.95
4,4'-DDT	0.95	U	0.95
delta-BHC	1.8	D	0.48
Dieldrin	0.95	U D	0.95
gamma-BHC (Lindane)	0.48	U D	0.48
Heptachlor	0.48	U	0.48
Methoxychlor	0.95	U	0.95
Toxaphene	48	U	48

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	0	D	14 - 115
DCB Decachlorobiphenyl	0	D	14 - 115
Tetrachloro-m-xylene	0	D	35 - 120
Tetrachloro-m-xylene	0	D	35 - 120

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59929-1
Sdg Number: 68059929

Client Sample ID:	**MW-1B**		
Lab Sample ID:	680-59929-2	Date Sampled:	07/29/2010 1115
Client Matrix:	Water	Date Received:	07/30/2010 0901

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-176240	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-175958	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	08/03/2010 1715		Injection Volume:	2 uL
Date Prepared:	08/02/2010 1426		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	0.048	U	0.048
beta-BHC	0.048	U	0.048
Chlordane (technical)	0.48	U	0.48
4,4'-DDD	0.095	U	0.095
4,4'-DDE	0.095	U	0.095
4,4'-DDT	0.095	U	0.095
delta-BHC	0.048	U	0.048
Dieldrin	0.095	U	0.095
gamma-BHC (Lindane)	0.048	U	0.048
Heptachlor	0.048	U	0.048
Methoxychlor	0.095	U	0.095
Toxaphene	4.8	U	4.8

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	34		14 - 115
Tetrachloro-m-xylene	85		35 - 120

Client Sample ID: **MW-1B**

Lab Sample ID: 680-59929-2
Client Matrix: Water

Date Sampled: 07/29/2010 1115
Date Received: 07/30/2010 0901

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-176240	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-175958	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	08/03/2010 1715		Injection Volume:	2 uL
Date Prepared:	08/02/2010 1426		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	31		14 - 115
Tetrachloro-m-xylene	78		35 - 120

Client Sample ID: **MW-110**

Lab Sample ID:	680-59929-3	Date Sampled:	07/29/2010 1215
Client Matrix:	Water	Date Received:	07/30/2010 0901

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-176240	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-175958	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	08/03/2010 1734		Injection Volume:	2 uL
Date Prepared:	08/02/2010 1426		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	0.47		0.048
beta-BHC	0.43		0.048
Chlordane (technical)	0.48	U	0.48
4,4'-DDD	0.095	U	0.095
4,4'-DDE	0.095	U	0.095
4,4'-DDT	0.095	U	0.095
delta-BHC	0.82	E	0.048
Dieldrin	0.095	U	0.095
gamma-BHC (Lindane)	0.55		0.048
Heptachlor	0.048	U	0.048
Methoxychlor	0.095	U	0.095
Toxaphene	4.8	U	4.8

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	46		14 - 115
Tetrachloro-m-xylene	91		35 - 120

Client Sample ID: **MW-110**

Lab Sample ID: 680-59929-3
Client Matrix: Water

Date Sampled: 07/29/2010 1215
Date Received: 07/30/2010 0901

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-176240	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-175958	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	08/03/2010 1734		Injection Volume:	2 uL
Date Prepared:	08/02/2010 1426		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	42		14 - 115
Tetrachloro-m-xylene	85		35 - 120

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59929-1
Sdg Number: 68059929

Client Sample ID: **MW-110**

Lab Sample ID:	680-59929-3	Date Sampled:	07/29/2010 1215
Client Matrix:	Water	Date Received:	07/30/2010 0901

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-176383		Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-175958		Initial Weight/Volume:	1050 mL
Dilution:	4.0			Final Weight/Volume:	10 mL
Date Analyzed:	08/04/2010 1645	Run Type:	DL	Injection Volume:	2 uL
Date Prepared:	08/02/2010 1426			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	0.54	D	0.19
beta-BHC	0.29	D	0.19
Chlordane (technical)	1.9	U	1.9
4,4'-DDD	0.38	U	0.38
4,4'-DDE	0.38	U	0.38
4,4'-DDT	0.38	U	0.38
delta-BHC	0.88	D	0.19
Dieldrin	0.38	U	0.38
gamma-BHC (Lindane)	0.55	D	0.19
Heptachlor	0.19	U	0.19
Methoxychlor	0.38	U	0.38
Toxaphene	19	U	19

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	47	D	14 - 115
DCB Decachlorobiphenyl	51	D	14 - 115
Tetrachloro-m-xylene	98	D	35 - 120
Tetrachloro-m-xylene	93	D	35 - 120

Client Sample ID: **MW-102**

Lab Sample ID:	680-59929-4	Date Sampled:	07/29/2010 1520
Client Matrix:	Water	Date Received:	07/30/2010 0901

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-176240	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-175958	Initial Weight/Volume:	1030 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	08/03/2010 1753		Injection Volume:	2 uL
Date Prepared:	08/02/2010 1426		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	0.049	U	0.049
beta-BHC	0.049	U	0.049
Chlordane (technical)	0.49	U	0.49
4,4'-DDD	0.097	U	0.097
4,4'-DDE	0.097	U	0.097
4,4'-DDT	0.097	U	0.097
delta-BHC	0.049	U	0.049
Dieldrin	0.097	U	0.097
gamma-BHC (Lindane)	0.049	U	0.049
Heptachlor	0.049	U	0.049
Methoxychlor	0.097	U	0.097
Toxaphene	4.9	U	4.9

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	35		14 - 115
Tetrachloro-m-xylene	74		35 - 120

Client Sample ID: **MW-102**

Lab Sample ID:	680-59929-4	Date Sampled:	07/29/2010 1520
Client Matrix:	Water	Date Received:	07/30/2010 0901

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-176240	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-175958	Initial Weight/Volume:	1030 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	08/03/2010 1753		Injection Volume:	2 uL
Date Prepared:	08/02/2010 1426		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	35		14 - 115
Tetrachloro-m-xylene	69		35 - 120

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59929-1
Sdg Number: 68059929

Client Sample ID: **MW-108**

Lab Sample ID:	680-59929-1	Date Sampled:	07/29/2010 1015
Client Matrix:	Water	Date Received:	07/30/2010 0901

6020 Metals (ICP/MS)-Total Recoverable

Method:	6020	Analysis Batch: 680-177009	Instrument ID:	ICPMSA
Preparation:	3005A	Prep Batch: 680-176817	Lab File ID:	176817.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	08/12/2010 0107		Final Weight/Volume:	250 mL
Date Prepared:	08/10/2010 1726			

Analyte	Result (mg/L)	Qualifier	RL
Arsenic	0.0025	U	0.0025
Lead	0.0015	U	0.0015

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59929-1
Sdg Number: 68059929

Client Sample ID: **MW-1B**

Lab Sample ID: 680-59929-2
Client Matrix: Water

Date Sampled: 07/29/2010 1115
Date Received: 07/30/2010 0901

6020 Metals (ICP/MS)-Total Recoverable

Method:	6020	Analysis Batch: 680-177009	Instrument ID:	ICPMSA
Preparation:	3005A	Prep Batch: 680-176817	Lab File ID:	176817.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	08/12/2010 0142		Final Weight/Volume:	250 mL
Date Prepared:	08/10/2010 1726			

Analyte	Result (mg/L)	Qualifier	RL
Arsenic	0.0025	U	0.0025
Lead	0.0015	U	0.0015

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59929-1
Sdg Number: 68059929

Client Sample ID: **MW-110**

Lab Sample ID:	680-59929-3	Date Sampled:	07/29/2010 1215
Client Matrix:	Water	Date Received:	07/30/2010 0901

6020 Metals (ICP/MS)-Total Recoverable

Method:	6020	Analysis Batch: 680-177009	Instrument ID:	ICPMSA
Preparation:	3005A	Prep Batch: 680-176817	Lab File ID:	176817.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	08/12/2010 0150		Final Weight/Volume:	250 mL
Date Prepared:	08/10/2010 1726			

Analyte	Result (mg/L)	Qualifier	RL
Arsenic	0.0025	U	0.0025
Lead	0.0015		0.0015

Client Sample ID: **MW-102**

Lab Sample ID: 680-59929-4
Client Matrix: Water

Date Sampled: 07/29/2010 1520
Date Received: 07/30/2010 0901

6020 Metals (ICP/MS)-Total Recoverable

Method: 6020
Preparation: 3005A
Dilution: 1.0
Date Analyzed: 08/12/2010 0157
Date Prepared: 08/10/2010 1726

Analysis Batch: 680-177009
Prep Batch: 680-176817

Instrument ID: ICPMSA
Lab File ID: 176817.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (mg/L)	Qualifier	RL
Arsenic	0.0025	U	0.0025
Lead	0.0025		0.0015

DATA REPORTING QUALIFIERS

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59929-1
Sdg Number: 68059929

Lab Section	Qualifier	Description
GC Semi VOA		
	U	Indicates the analyte was analyzed for but not detected.
	F	MS or MSD exceeds the control limits
	E	Result exceeded calibration range.
	D	Surrogate or matrix spike recoveries were not obtained because the extract was diluted for analysis; also compounds analyzed at a dilution may be flagged with a D.
	p	The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.
Metals		
	U	Indicates the analyte was analyzed for but not detected.

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59929-1
Sdg Number: 68059929

Method Blank - Batch: 680-175958

Method: 8081A_8082
Preparation: 3520C

Lab Sample ID:	MB 680-175958/19-A	Analysis Batch:	680-176240	Instrument ID:	SGM
Client Matrix:	Water	Prep Batch:	680-175958	Lab File ID:	mh02093.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	1000 mL
Date Analyzed:	08/03/2010 1322			Final Weight/Volume:	10 mL
Date Prepared:	08/02/2010 1426			Injection Volume:	
				Column ID:	PRIMARY

Analyte	Result	Qual	RL
alpha-BHC	0.050	U	0.050
beta-BHC	0.050	U	0.050
Chlordane (technical)	0.50	U	0.50
4,4'-DDD	0.10	U	0.10
4,4'-DDE	0.10	U	0.10
4,4'-DDT	0.10	U	0.10
delta-BHC	0.050	U	0.050
Dieldrin	0.10	U	0.10
gamma-BHC (Lindane)	0.050	U	0.050
Heptachlor	0.050	U	0.050
Methoxychlor	0.10	U	0.10
Toxaphene	5.0	U	5.0

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	85	14 - 115
Tetrachloro-m-xylene	88	35 - 120

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	82	14 - 115
Tetrachloro-m-xylene	84	35 - 120

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59929-1
Sdg Number: 68059929

Lab Control Sample - Batch: 680-175958

Method: 8081A_8082
Preparation: 3520C

Lab Sample ID: LCS 680-175958/20-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/03/2010 1341
Date Prepared: 08/02/2010 1426

Analysis Batch: 680-176240
Prep Batch: 680-175958
Units: ug/L

Instrument ID: SGM
Lab File ID: mh02094.d
Initial Weight/Volume: 1000 mL
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
alpha-BHC	0.100	0.0997	100	29 - 112	
beta-BHC	0.100	0.0890	89	15 - 204	
4,4'-DDD	0.200	0.221	110	37 - 179	
4,4'-DDE	0.200	0.177	88	33 - 142	
4,4'-DDT	0.200	0.217	108	27 - 141	
delta-BHC	0.100	0.115	115	25 - 123	
Dieldrin	0.200	0.208	104	45 - 137	
gamma-BHC (Lindane)	0.100	0.103	103	31 - 118	
Heptachlor	0.100	0.104	104	30 - 133	
Methoxychlor	0.200	0.152	76	10 - 243	

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	93	14 - 115
Tetrachloro-m-xylene	83	35 - 120

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	78	14 - 115
Tetrachloro-m-xylene	78	35 - 120

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59929-1
Sdg Number: 68059929

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 680-175958

Method: 8081A_8082
Preparation: 3520C

LCS Lab Sample ID:	LCS 680-175958/30-A	Analysis Batch:	680-176240	Instrument ID:	SGM
Client Matrix:	Water	Prep Batch:	680-175958	Lab File ID:	mh02096.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	1000 mL
Date Analyzed:	08/03/2010 1420			Final Weight/Volume:	10 mL
Date Prepared:	08/02/2010 1426			Injection Volume:	
				Column ID:	PRIMARY

LCSD Lab Sample ID:	LCSD 680-175958/31-A	Analysis Batch:	680-176240	Instrument ID:	SGM
Client Matrix:	Water	Prep Batch:	680-175958	Lab File ID:	mh02097.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	1000 mL
Date Analyzed:	08/03/2010 1439			Final Weight/Volume:	10 mL
Date Prepared:	08/02/2010 1426			Injection Volume:	
				Column ID:	PRIMARY

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Chlordane (technical)	106	120	70 - 130	13	40		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
DCB Decachlorobiphenyl	84	89	14 - 115
Tetrachloro-m-xylene	88	95	35 - 120

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
DCB Decachlorobiphenyl	81	85	14 - 115
Tetrachloro-m-xylene	76	81	35 - 120

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59929-1
Sdg Number: 68059929

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-175958

Method: 8081A_8082
Preparation: 3520C

MS Lab Sample ID:	680-59924-C-4-A MS	Analysis Batch:	680-176240	Instrument ID:	SGM
Client Matrix:	Water	Prep Batch:	680-175958	Lab File ID:	mh02112.d
Dilution:	1.0			Initial Weight/Volume:	500 mL
Date Analyzed:	08/03/2010 1930			Final Weight/Volume:	5 mL
Date Prepared:	08/02/2010 1426			Injection Volume:	2 uL
				Column ID:	PRIMARY

MSD Lab Sample ID:	680-59924-C-4-B MSD	Analysis Batch:	680-176240	Instrument ID:	SGM
Client Matrix:	Water	Prep Batch:	680-175958	Lab File ID:	mh02113.d
Dilution:	1.0			Initial Weight/Volume:	500 mL
Date Analyzed:	08/03/2010 1950			Final Weight/Volume:	5 mL
Date Prepared:	08/02/2010 1426			Injection Volume:	2 uL
				Column ID:	PRIMARY

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
alpha-BHC	106	110	29 - 112	4	40		
beta-BHC	104	117	15 - 204	12	40		
4,4'-DDD	142	140	37 - 179	2	40		
4,4'-DDE	106	97	33 - 142	10	40		
4,4'-DDT	133	126	27 - 141	5	40		
delta-BHC	155	164	25 - 123	6	40	F	F
Dieldrin	124	122	45 - 137	2	40		
gamma-BHC (Lindane)	121	128	31 - 118	6	40	F	F
Heptachlor	117	119	30 - 133	2	40		
Methoxychlor	80	74	10 - 243	8	40		

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
DCB Decachlorobiphenyl	110	83	14 - 115
Tetrachloro-m-xylene	92	85	35 - 120

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
DCB Decachlorobiphenyl	97	81	14 - 115
Tetrachloro-m-xylene	75	70	35 - 120

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59929-1
Sdg Number: 68059929

Method Blank - Batch: 680-176817

Method: 6020
Preparation: 3005A
Total Recoverable

Lab Sample ID: MB 680-176817/17-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/12/2010 0052
Date Prepared: 08/10/2010 1726

Analysis Batch: 680-177009
Prep Batch: 680-176817
Units: mg/L

Instrument ID: ICPMSA
Lab File ID: 176817.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result	Qual	RL
Arsenic	0.0025	U	0.0025
Lead	0.0015	U	0.0015

Lab Control Sample - Batch: 680-176817

Method: 6020
Preparation: 3005A
Total Recoverable

Lab Sample ID: LCS 680-176817/18-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/12/2010 0100
Date Prepared: 08/10/2010 1726

Analysis Batch: 680-177009
Prep Batch: 680-176817
Units: mg/L

Instrument ID: ICPMSA
Lab File ID: 176817.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Arsenic	0.100	0.0992	99	75 - 125	
Lead	0.0500	0.0459	92	75 - 125	

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59929-1
Sdg Number: 68059929

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-176817

Method: 6020
Preparation: 3005A
Total Recoverable

MS Lab Sample ID:	680-59929-1	Analysis Batch:	680-177009	Instrument ID:	ICPMSA
Client Matrix:	Water	Prep Batch:	680-176817	Lab File ID:	176817.chr
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	08/12/2010 0128			Final Weight/Volume:	250 mL
Date Prepared:	08/10/2010 1726				

MSD Lab Sample ID:	680-59929-1	Analysis Batch:	680-177009	Instrument ID:	ICPMSA
Client Matrix:	Water	Prep Batch:	680-176817	Lab File ID:	176817.chr
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	08/12/2010 0135			Final Weight/Volume:	250 mL
Date Prepared:	08/10/2010 1726				

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Arsenic	100	108	75 - 125	7	20		
Lead	91	97	75 - 125	6	20		

Serial Number 009614

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

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Savannah, GA 31404

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Phone: (912) 354-7858
Fax: (912) 352-0165

○ Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE BFEL Atlanta
PROJECT NO. 6122080154.04
PROJECT LOCATION (STATE)
TAL (LAB) PROJECT MANAGER
P.O. NUMBER
CONTRACT NO.
CLIENT (SITE) PM Rhonda Quinn
CLIENT PHONE 770-421-3400
CLIENT FAX 770-421-3486
CLIENT NAME Mactec
CLIENT E-MAIL
CLIENT ADDRESS 3200 Town Point Dr, Ste 100, Kennesaw, GA 30144
COMPANY CONTRACTING THIS WORK (if applicable) Mactec

PAGE 1 OF 1

STANDARD REPORT DELIVERY ○
DATE DUE

EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE

NUMBER OF COOLERS SUBMITTED PER SHIPMENT: 1

REQUIRED ANALYSIS: Tot Arsenic + Lead 6020 (PRESERVATIVE: HNO3); Pest 8081A (PRESERVATIVE: None)

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	Tot Arsenic + Lead 6020 (HNO3)	Pest 8081A (None)	REMARKS
7/29/10	1015	MW-108	G	W				1	2	
	1115	MW-1B	G	W				1	2	
	1215	MW-110	G	W				1	2	
	1520	MW-102	G	W				1	2	
		Temp Blank								

RELINQUISHED BY: (SIGNATURE) Daniel L Howard DATE 7/29/10 TIME 1630
RECEIVED BY: (SIGNATURE) DATE TIME
RELINQUISHED BY: (SIGNATURE) DATE TIME
RECEIVED BY: (SIGNATURE) DATE TIME
RELINQUISHED BY: (SIGNATURE) DATE TIME
RECEIVED BY: (SIGNATURE) DATE TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE) Betha Daughtry
DATE 7/30/10
TIME 0901
CUSTODY INTACT YES ○ NO ○
CUSTODY SEAL NO.
SAVANNAH LOG NO. 680-59920
LABORATORY REMARKS Temp 6.0

Login Sample Receipt Check List

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-59929-1
SDG Number: 68059929

Login Number: 59929
Creator: Daughtry, Beth
List Number: 1

List Source: TestAmerica Savannah

Question	T / F/ NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	N/A	

ANALYTICAL REPORT

Job Number: 680-61183-1

Job Description: BFEL Atlanta

For:
MACTEC Engineering and Consulting Inc
3200 Town Point Drive Northwest
Suite 100
Kennesaw, GA 30144

Attention: Ms. Rhonda Quinn

Kathryn Smith

Approved for release.
Kathryn Smith
Project Manager I
11/8/2010 3:50 PM

Kathryn Smith
Project Manager I
kathye.smith@testamericainc.com
11/08/2010
Revision: 1

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TestAmerica Laboratories, Inc.
TestAmerica Savannah 5102 LaRoche Avenue, Savannah, GA 31404
Tel (912) 354-7858 Fax (912) 352-0165 www.testamericainc.com

Job Narrative
680-61183-1

Comments
No additional comments.

Receipt
All samples were received in good condition within temperature requirements.

GC/MS VOA
Method(s) 8260B: The trip blank associated with these samples contained a detection above the method detection limit (MDL) for the following analytes: trichlorofluoromethane, chloromethane, and 2-butanone.

No other analytical or quality issues were noted.

GC/MS Semi VOA
No analytical or quality issues were noted.

Metals
No analytical or quality issues were noted.

General Chemistry
Method(s) 9056: Due to the high concentration of Sulfate, the matrix spike (MS) for batch 180289 recovered outside of control limits. The associated laboratory control sample (LCS) met acceptance criteria.

No other analytical or quality issues were noted.

Organic Prep
No analytical or quality issues were noted.

VOA Prep
No analytical or quality issues were noted.

METHOD / ANALYST SUMMARY

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61183-1

Method	Analyst	Analyst ID
SW846 8260B	Lanier, Carolyn	CL
SW846 8270C	Palefsky, Whitney H	WHP
SW846 6020	Robertson, Bryn	BR
SW846 9056	Brazell, Connie	CB
SW846 9056	Webb, Carol	CW

SAMPLE SUMMARY

Client: MACTEC Engineering and Consulting Inc Job Number: 680-61183-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
680-61183-1	MW-26-091310	Water	09/13/2010 1625	09/14/2010 0907
680-61183-2	MW-22-091310	Water	09/13/2010 1440	09/14/2010 0907
680-61183-3	MW-1B-091310	Water	09/13/2010 1430	09/14/2010 0907
680-61183-4	MW-112-091310	Water	09/13/2010 1720	09/14/2010 0907
680-61183-5	MW-116-091310	Water	09/13/2010 1530	09/14/2010 0907
680-61183-6	Duplicate-091310	Water	09/13/2010 1440	09/14/2010 0907
680-61183-7	MW-101-091310	Water	09/13/2010 1645	09/14/2010 0907
680-61183-8	TB-091310	Water	09/13/2010 1200	09/14/2010 0907

Client Sample ID: **MW-22-091310**

Lab Sample ID:	680-61183-2	Date Sampled: 09/13/2010 1440
Client Matrix:	Water	Date Received: 09/14/2010 0907

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-180069	Instrument ID:	MSP
Preparation:	5030B		Lab File ID:	p0141.d
Dilution:	1.0		Initial Weight/Volume:	5 mL
Date Analyzed:	09/15/2010 1857		Final Weight/Volume:	5 mL
Date Prepared:	09/15/2010 1857			

Analyte	Result (ug/L)	Qualifier	RL
1,1,1,2-Tetrachloroethane	1.0	U	1.0
1,1,1-Trichloroethane	1.0	U	1.0
1,1,2,2-Tetrachloroethane	1.0	U	1.0
1,1,2-Trichloroethane	1.0	U	1.0
1,1-Dichloroethane	1.0	U	1.0
1,1-Dichloroethene	1.0	U	1.0
1,1-Dichloropropene	1.0	U	1.0
1,2,3-Trichloropropane	1.0	U	1.0
1,2,4-Trichlorobenzene	1.0	U	1.0
1,2-Dibromoethane	1.0	U	1.0
1,2-Dichlorobenzene	1.0	U	1.0
1,2-Dichloroethane	1.0	U	1.0
1,2-Dichloropropane	1.0	U	1.0
1,3-Dichlorobenzene	1.0	U	1.0
1,3-Dichloropropane	1.0	U	1.0
1,4-Dichlorobenzene	1.0	U	1.0
2-Butanone	10	U	10
4-Methyl-2-pentanone	10	U	10
Acetone	25	U	25
Benzene	1.0	U	1.0
Carbon tetrachloride	1.0	U	1.0
Chlorobenzene	1.0	U	1.0
Chloroethane	1.0	U	1.0
Chloroform	1.0	U	1.0
Chloromethane	1.0	U	1.0
cis-1,2-Dichloroethene	2.7		1.0
Cyclohexane	1.0	U	1.0
Dibromochloromethane	1.0	U	1.0
Dibromomethane	1.0	U	1.0
Dichlorodifluoromethane	1.0	U	1.0
Ethylbenzene	1.0	U	1.0
Hexachloro-1,3-butadiene	1.0	U	1.0
Isopropylbenzene	1.0	U	1.0
Methylene Chloride	5.0	U	5.0
Naphthalene	5.0	U	5.0
Styrene	1.0	U	1.0
Tetrachloroethene	1.0	U	1.0
Tetrahydrofuran	10	U	10
Toluene	1.0	U	1.0
trans-1,2-Dichloroethene	1.0	U	1.0
Trichloroethene	1.0	U	1.0
Trichlorofluoromethane	1.0	U	1.0
Vinyl chloride	1.0	U	1.0
Xylenes, Total	2.0	U	2.0

Surrogate	%Rec	Qualifier	Acceptance Limits

Client Sample ID: **MW-22-091310**

Lab Sample ID: 680-61183-2 Date Sampled: 09/13/2010 1440
Client Matrix: Water Date Received: 09/14/2010 0907

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-180069	Instrument ID:	MSP
Preparation:	5030B		Lab File ID:	p0141.d
Dilution:	1.0		Initial Weight/Volume:	5 mL
Date Analyzed:	09/15/2010 1857		Final Weight/Volume:	5 mL
Date Prepared:	09/15/2010 1857			

Surrogate	%Rec	Qualifier	Acceptance Limits
Toluene-d8 (Surr)	94		75 - 120

Client Sample ID: **Duplicate-091310**

Lab Sample ID:	680-61183-6	Date Sampled: 09/13/2010 1440
Client Matrix:	Water	Date Received: 09/14/2010 0907

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-180069	Instrument ID:	MSP
Preparation:	5030B		Lab File ID:	p0143.d
Dilution:	1.0		Initial Weight/Volume:	5 mL
Date Analyzed:	09/15/2010 1927		Final Weight/Volume:	5 mL
Date Prepared:	09/15/2010 1927			

Analyte	Result (ug/L)	Qualifier	RL
1,1,1,2-Tetrachloroethane	1.0	U	1.0
1,1,1-Trichloroethane	1.0	U	1.0
1,1,2,2-Tetrachloroethane	1.0	U	1.0
1,1,2-Trichloroethane	1.0	U	1.0
1,1-Dichloroethane	1.0	U	1.0
1,1-Dichloroethene	1.0	U	1.0
1,1-Dichloropropene	1.0	U	1.0
1,2,3-Trichloropropane	1.0	U	1.0
1,2,4-Trichlorobenzene	1.0	U	1.0
1,2-Dibromoethane	1.0	U	1.0
1,2-Dichlorobenzene	1.0	U	1.0
1,2-Dichloroethane	1.0	U	1.0
1,2-Dichloropropane	1.0	U	1.0
1,3-Dichlorobenzene	1.0	U	1.0
1,3-Dichloropropane	1.0	U	1.0
1,4-Dichlorobenzene	1.0	U	1.0
2-Butanone	10	U	10
4-Methyl-2-pentanone	10	U	10
Acetone	25	U	25
Benzene	1.0	U	1.0
Carbon tetrachloride	1.0	U	1.0
Chlorobenzene	1.0	U	1.0
Chloroethane	1.0	U	1.0
Chloroform	1.0	U	1.0
Chloromethane	1.0	U	1.0
cis-1,2-Dichloroethene	2.9		1.0
Cyclohexane	1.0	U	1.0
Dibromochloromethane	1.0	U	1.0
Dibromomethane	1.0	U	1.0
Dichlorodifluoromethane	1.0	U	1.0
Ethylbenzene	1.0	U	1.0
Hexachloro-1,3-butadiene	1.0	U	1.0
Isopropylbenzene	1.0	U	1.0
Methylene Chloride	5.0	U	5.0
Naphthalene	5.0	U	5.0
Styrene	1.0	U	1.0
Tetrachloroethene	1.0	U	1.0
Tetrahydrofuran	10	U	10
Toluene	1.0	U	1.0
trans-1,2-Dichloroethene	1.0	U	1.0
Trichloroethene	1.0	U	1.0
Trichlorofluoromethane	1.0	U	1.0
Vinyl chloride	1.0	U	1.0
Xylenes, Total	2.0	U	2.0

Surrogate	%Rec	Qualifier	Acceptance Limits

Client Sample ID: **Duplicate-091310**

Lab Sample ID: 680-61183-6 Date Sampled: 09/13/2010 1440
Client Matrix: Water Date Received: 09/14/2010 0907

8260B Volatile Organic Compounds (GC/MS)

Method: 8260B Analysis Batch: 680-180069 Instrument ID: MSP
Preparation: 5030B Lab File ID: p0143.d
Dilution: 1.0 Initial Weight/Volume: 5 mL
Date Analyzed: 09/15/2010 1927 Final Weight/Volume: 5 mL
Date Prepared: 09/15/2010 1927

Surrogate	%Rec	Qualifier	Acceptance Limits
Toluene-d8 (Surr)	98		75 - 120

Client Sample ID: **TB-091310**

Lab Sample ID:	680-61183-8	Date Sampled:	09/13/2010 1200
Client Matrix:	Water	Date Received:	09/14/2010 0907

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-180069	Instrument ID:	MSP
Preparation:	5030B		Lab File ID:	p0139.d
Dilution:	1.0		Initial Weight/Volume:	5 mL
Date Analyzed:	09/15/2010 1828		Final Weight/Volume:	5 mL
Date Prepared:	09/15/2010 1828			

Analyte	Result (ug/L)	Qualifier	RL
1,1,1,2-Tetrachloroethane	1.0	U	1.0
1,1,1-Trichloroethane	1.0	U	1.0
1,1,2,2-Tetrachloroethane	1.0	U	1.0
1,1,2-Trichloroethane	1.0	U	1.0
1,1-Dichloroethane	1.0	U	1.0
1,1-Dichloroethene	1.0	U	1.0
1,1-Dichloropropene	1.0	U	1.0
1,2,3-Trichloropropane	1.0	U	1.0
1,2,4-Trichlorobenzene	1.0	U	1.0
1,2-Dibromoethane	1.0	U	1.0
1,2-Dichlorobenzene	1.0	U	1.0
1,2-Dichloroethane	1.0	U	1.0
1,2-Dichloropropane	1.0	U	1.0
1,3-Dichlorobenzene	1.0	U	1.0
1,3-Dichloropropane	1.0	U	1.0
1,4-Dichlorobenzene	1.0	U	1.0
2-Butanone	10	U	10
4-Methyl-2-pentanone	10	U	10
Acetone	25	U	25
Benzene	1.0	U	1.0
Carbon tetrachloride	1.0	U	1.0
Chlorobenzene	1.0	U	1.0
Chloroethane	1.0	U	1.0
Chloroform	1.0	U	1.0
Chloromethane	1.0	U	1.0
cis-1,2-Dichloroethene	1.0	U	1.0
Cyclohexane	1.0	U	1.0
Dibromochloromethane	1.0	U	1.0
Dibromomethane	1.0	U	1.0
Dichlorodifluoromethane	1.0	U	1.0
Ethylbenzene	1.0	U	1.0
Hexachloro-1,3-butadiene	1.0	U	1.0
Isopropylbenzene	1.0	U	1.0
Methylene Chloride	5.0	U	5.0
Naphthalene	5.0	U	5.0
Styrene	1.0	U	1.0
Tetrachloroethene	1.0	U	1.0
Tetrahydrofuran	10	U	10
Toluene	1.0	U	1.0
trans-1,2-Dichloroethene	1.0	U	1.0
Trichloroethene	1.0	U	1.0
Trichlorofluoromethane	1.0	U	1.0
Vinyl chloride	1.0	U	1.0
Xylenes, Total	2.0	U	2.0

Surrogate	%Rec	Qualifier	Acceptance Limits

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61183-1

Client Sample ID: **TB-091310**

Lab Sample ID:	680-61183-8	Date Sampled:	09/13/2010 1200
Client Matrix:	Water	Date Received:	09/14/2010 0907

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-180069	Instrument ID:	MSP
Preparation:	5030B		Lab File ID:	p0139.d
Dilution:	1.0		Initial Weight/Volume:	5 mL
Date Analyzed:	09/15/2010 1828		Final Weight/Volume:	5 mL
Date Prepared:	09/15/2010 1828			

Surrogate	%Rec	Qualifier	Acceptance Limits
Toluene-d8 (Surr)	95		75 - 120

Client Sample ID: **MW-26-091310**

Lab Sample ID:	680-61183-1	Date Sampled: 09/13/2010 1625
Client Matrix:	Water	Date Received: 09/14/2010 0907

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-180380	Instrument ID:	MSN
Preparation:	3520C	Prep Batch: 680-179969	Lab File ID:	n9287.d
Dilution:	1.0		Initial Weight/Volume:	500 mL
Date Analyzed:	09/17/2010 1814		Final Weight/Volume:	0.5 mL
Date Prepared:	09/15/2010 1333		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
1,2,3-Trichlorobenzene	10	U	10
1,2,4-Trichlorobenzene	10	U	10

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	70		50 - 113
2-Fluorophenol	68		36 - 110
Nitrobenzene-d5	73		45 - 112
Phenol-d5	66		38 - 116
Terphenyl-d14	71		10 - 121
2,4,6-Tribromophenol	84		40 - 139

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61183-1

Client Sample ID: **MW-22-091310**

Lab Sample ID: 680-61183-2

Client Matrix: Water

Date Sampled: 09/13/2010 1440

Date Received: 09/14/2010 0907

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-180380	Instrument ID:	MSN
Preparation:	3520C	Prep Batch: 680-179969	Lab File ID:	n9288.d
Dilution:	1.0		Initial Weight/Volume:	1050 mL
Date Analyzed:	09/17/2010 1840		Final Weight/Volume:	1 mL
Date Prepared:	09/15/2010 1333		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
1,2,3-Trichlorobenzene	9.5	U	9.5
1,2,4-Trichlorobenzene	9.5	U	9.5
1,2-Dichlorobenzene	9.5	U	9.5
1,2-Diphenylhydrazine	9.5	U	9.5
1,3-Dichlorobenzene	9.5	U	9.5
1,4-Dichlorobenzene	9.5	U	9.5
1,4-Dioxane	9.5	U	9.5
2,4,5-Trichlorophenol	9.5	U	9.5
2,4,6-Trichlorophenol	9.5	U	9.5
2,4-Dichlorophenol	9.5	U	9.5
2,4-Dimethylphenol	9.5	U	9.5
2,4-Dinitrophenol	48	U	48
2,4-Dinitrotoluene	9.5	U	9.5
2,6-Dinitrotoluene	9.5	U	9.5
2-Chloronaphthalene	9.5	U	9.5
2-Chlorophenol	9.5	U	9.5
2-Methylphenol	9.5	U	9.5
2-Nitrophenol	9.5	U	9.5
3 & 4 Methylphenol	9.5	U	9.5
3,3'-Dichlorobenzidine	57	U	57
4,6-Dinitro-2-methylphenol	48	U	48
4-Bromophenyl phenyl ether	9.5	U	9.5
4-Chloro-3-methylphenol	9.5	U	9.5
4-Chloroaniline	19	U	19
4-Chlorophenyl phenyl ether	9.5	U	9.5
4-Nitroaniline	48	U	48
4-Nitrophenol	48	U	48
Acenaphthene	9.5	U	9.5
Acenaphthylene	9.5	U	9.5
Anthracene	9.5	U	9.5
Benzo[a]anthracene	9.5	U	9.5
Benzo[a]pyrene	9.5	U	9.5
Benzo[b]fluoranthene	9.5	U	9.5
Benzo[g,h,i]perylene	9.5	U	9.5
Benzo[k]fluoranthene	9.5	U	9.5
Benzoic acid	48	U	48
Bis(2-chloroethoxy)methane	9.5	U	9.5
Bis(2-chloroethyl)ether	9.5	U	9.5
Bis(2-ethylhexyl) phthalate	9.5	U	9.5
bis(chloroisopropyl) ether	9.5	U	9.5
Butyl benzyl phthalate	9.5	U	9.5
Chrysene	9.5	U	9.5
Dibenz(a,h)anthracene	9.5	U	9.5
Diethyl phthalate	9.5	U	9.5
Dimethyl phthalate	9.5	U	9.5
Di-n-octyl phthalate	9.5	U	9.5

Client Sample ID: **MW-22-091310**

Lab Sample ID: 680-61183-2
Client Matrix: Water

Date Sampled: 09/13/2010 1440
Date Received: 09/14/2010 0907

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-180380		Instrument ID:	MSN
Preparation:	3520C	Prep Batch: 680-179969		Lab File ID:	n9288.d
Dilution:	1.0			Initial Weight/Volume:	1050 mL
Date Analyzed:	09/17/2010 1840			Final Weight/Volume:	1 mL
Date Prepared:	09/15/2010 1333			Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
Fluoranthene	9.5	U	9.5
Fluorene	9.5	U	9.5
Hexachloro-1,3-butadiene	9.5	U	9.5
Hexachlorobenzene	9.5	U	9.5
Hexachlorocyclopentadiene	9.5	U	9.5
Hexachloroethane	9.5	U	9.5
Indeno[1,2,3-cd]pyrene	9.5	U	9.5
Isophorone	9.5	U	9.5
Naphthalene	9.5	U	9.5
Nitrobenzene	9.5	U	9.5
Pentachlorophenol	48	U	48
Phenanthrene	9.5	U	9.5
Phenol	9.5	U	9.5
Pyrene	9.5	U	9.5

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	80		50 - 113
2-Fluorophenol	79		36 - 110
Nitrobenzene-d5	80		45 - 112
Phenol-d5	76		38 - 116
Terphenyl-d14	77		10 - 121

Client Sample ID: **MW-1B-091310**

Lab Sample ID:	680-61183-3	Date Sampled:	09/13/2010 1430
Client Matrix:	Water	Date Received:	09/14/2010 0907

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-180380	Instrument ID:	MSN
Preparation:	3520C	Prep Batch: 680-179969	Lab File ID:	n9289.d
Dilution:	1.0		Initial Weight/Volume:	1030 mL
Date Analyzed:	09/17/2010 1905		Final Weight/Volume:	1 mL
Date Prepared:	09/15/2010 1333		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
1,2,3-Trichlorobenzene	9.7	U	9.7
1,2,4-Trichlorobenzene	9.7	U	9.7

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	71		50 - 113
2-Fluorophenol	64		36 - 110
Nitrobenzene-d5	69		45 - 112
Phenol-d5	62		38 - 116
Terphenyl-d14	47		10 - 121
2,4,6-Tribromophenol	89		40 - 139

Analytical Data

Client: MACTEC Engineering and Consulting Inc   Job Number: 680-61183-1

Client Sample ID: **MW-112-091310**

Lab Sample ID: 680-61183-4   Date Sampled: 09/13/2010 1720
Client Matrix: Water   Date Received: 09/14/2010 0907

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-180380	Instrument ID:	MSN
Preparation:	3520C	Prep Batch: 680-179969	Lab File ID:	n9290.d
Dilution:	1.0		Initial Weight/Volume:	1030 mL
Date Analyzed:	09/17/2010 1931		Final Weight/Volume:	1 mL
Date Prepared:	09/15/2010 1333		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
1,2,3-Trichlorobenzene	9.7	U	9.7
1,2,4-Trichlorobenzene	9.7	U	9.7

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	79		50 - 113
2-Fluorophenol	77		36 - 110
Nitrobenzene-d5	80		45 - 112
Phenol-d5	73		38 - 116
Terphenyl-d14	38		10 - 121
2,4,6-Tribromophenol	89		40 - 139

Client Sample ID: **MW-116-091310**

Lab Sample ID:	680-61183-5	Date Sampled:	09/13/2010 1530
Client Matrix:	Water	Date Received:	09/14/2010 0907

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-180380	Instrument ID:	MSN
Preparation:	3520C	Prep Batch: 680-179969	Lab File ID:	n9291.d
Dilution:	1.0		Initial Weight/Volume:	1050 mL
Date Analyzed:	09/17/2010 1956		Final Weight/Volume:	1 mL
Date Prepared:	09/15/2010 1333		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
1,2,3-Trichlorobenzene	9.5	U	9.5
1,2,4-Trichlorobenzene	9.5	U	9.5

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	85		50 - 113
2-Fluorophenol	77		36 - 110
Nitrobenzene-d5	84		45 - 112
Phenol-d5	74		38 - 116
Terphenyl-d14	64		10 - 121
2,4,6-Tribromophenol	99		40 - 139

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61183-1

Client Sample ID: **Duplicate-091310**

Lab Sample ID:	680-61183-6	Date Sampled:	09/13/2010 1440
Client Matrix:	Water	Date Received:	09/14/2010 0907

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-180380	Instrument ID:	MSN
Preparation:	3520C	Prep Batch: 680-179969	Lab File ID:	n9292.d
Dilution:	1.0		Initial Weight/Volume:	1060 mL
Date Analyzed:	09/17/2010 2021		Final Weight/Volume:	1 mL
Date Prepared:	09/15/2010 1333		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
1,2,3-Trichlorobenzene	9.4	U	9.4
1,2,4-Trichlorobenzene	9.4	U	9.4
1,2-Dichlorobenzene	9.4	U	9.4
1,2-Diphenylhydrazine	9.4	U	9.4
1,3-Dichlorobenzene	9.4	U	9.4
1,4-Dichlorobenzene	9.4	U	9.4
1,4-Dioxane	9.4	U	9.4
2,4,5-Trichlorophenol	9.4	U	9.4
2,4,6-Trichlorophenol	9.4	U	9.4
2,4-Dichlorophenol	9.4	U	9.4
2,4-Dimethylphenol	9.4	U	9.4
2,4-Dinitrophenol	47	U	47
2,4-Dinitrotoluene	9.4	U	9.4
2,6-Dinitrotoluene	9.4	U	9.4
2-Chloronaphthalene	9.4	U	9.4
2-Chlorophenol	9.4	U	9.4
2-Methylphenol	9.4	U	9.4
2-Nitrophenol	9.4	U	9.4
3 & 4 Methylphenol	9.4	U	9.4
3,3'-Dichlorobenzidine	57	U	57
4,6-Dinitro-2-methylphenol	47	U	47
4-Bromophenyl phenyl ether	9.4	U	9.4
4-Chloro-3-methylphenol	9.4	U	9.4
4-Chloroaniline	19	U	19
4-Chlorophenyl phenyl ether	9.4	U	9.4
4-Nitroaniline	47	U	47
4-Nitrophenol	47	U	47
Acenaphthene	9.4	U	9.4
Acenaphthylene	9.4	U	9.4
Anthracene	9.4	U	9.4
Benzo[a]anthracene	9.4	U	9.4
Benzo[a]pyrene	9.4	U	9.4
Benzo[b]fluoranthene	9.4	U	9.4
Benzo[g,h,i]perylene	9.4	U	9.4
Benzo[k]fluoranthene	9.4	U	9.4
Benzoic acid	47	U	47
Bis(2-chloroethoxy)methane	9.4	U	9.4
Bis(2-chloroethyl)ether	9.4	U	9.4
Bis(2-ethylhexyl) phthalate	9.4	U	9.4
bis(chloroisopropyl) ether	9.4	U	9.4
Butyl benzyl phthalate	9.4	U	9.4
Chrysene	9.4	U	9.4
Dibenz(a,h)anthracene	9.4	U	9.4
Diethyl phthalate	9.4	U	9.4
Dimethyl phthalate	9.4	U	9.4
Di-n-octyl phthalate	9.4	U	9.4

Client Sample ID: **Duplicate-091310**

Lab Sample ID:	680-61183-6	Date Sampled:	09/13/2010 1440
Client Matrix:	Water	Date Received:	09/14/2010 0907

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-180380	Instrument ID:	MSN
Preparation:	3520C	Prep Batch: 680-179969	Lab File ID:	n9292.d
Dilution:	1.0		Initial Weight/Volume:	1060 mL
Date Analyzed:	09/17/2010 2021		Final Weight/Volume:	1 mL
Date Prepared:	09/15/2010 1333		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
Fluoranthene	9.4	U	9.4
Fluorene	9.4	U	9.4
Hexachloro-1,3-butadiene	9.4	U	9.4
Hexachlorobenzene	9.4	U	9.4
Hexachlorocyclopentadiene	9.4	U	9.4
Hexachloroethane	9.4	U	9.4
Indeno[1,2,3-cd]pyrene	9.4	U	9.4
Isophorone	9.4	U	9.4
Naphthalene	9.4	U	9.4
Nitrobenzene	9.4	U	9.4
Pentachlorophenol	47	U	47
Phenanthrene	9.4	U	9.4
Phenol	9.4	U	9.4
Pyrene	9.4	U	9.4

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	82		50 - 113
2-Fluorophenol	81		36 - 110
Nitrobenzene-d5	84		45 - 112
Phenol-d5	78		38 - 116
Terphenyl-d14	85		10 - 121

Client Sample ID: **MW-101-091310**

Lab Sample ID:	680-61183-7	Date Sampled: 09/13/2010 1645
Client Matrix:	Water	Date Received: 09/14/2010 0907

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-180380	Instrument ID:	MSN
Preparation:	3520C	Prep Batch: 680-179969	Lab File ID:	n9293.d
Dilution:	1.0		Initial Weight/Volume:	1030 mL
Date Analyzed:	09/17/2010 2047		Final Weight/Volume:	1 mL
Date Prepared:	09/15/2010 1333		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
1,2,3-Trichlorobenzene	9.7	U	9.7
1,2,4-Trichlorobenzene	9.7	U	9.7

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	84		50 - 113
2-Fluorophenol	82		36 - 110
Nitrobenzene-d5	82		45 - 112
Phenol-d5	75		38 - 116
Terphenyl-d14	85		10 - 121
2,4,6-Tribromophenol	99		40 - 139

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61183-1

Client Sample ID: **MW-26-091310**

Lab Sample ID: 680-61183-1

Client Matrix: Water

Date Sampled: 09/13/2010 1625

Date Received: 09/14/2010 0907

6020 Metals (ICP/MS)

Method: 6020

Preparation: 3010A

Dilution: 1.0

Date Analyzed: 09/17/2010 2148

Date Prepared: 09/15/2010 1723

Analysis Batch: 680-180521

Prep Batch: 680-180038

Instrument ID: ICPMSA

Lab File ID: 180038.chr

Initial Weight/Volume: 50 mL

Final Weight/Volume: 250 mL

Analyte	Result (ug/L)	Qualifier	RL
Copper	10		5.0
Zinc	160		20

Client Sample ID: **MW-22-091310**

Lab Sample ID: 680-61183-2
Client Matrix: Water
Date Sampled: 09/13/2010 1440
Date Received: 09/14/2010 0907

6020 Metals (ICP/MS)

Method: 6020
Preparation: 3010A
Dilution: 1.0
Date Analyzed: 09/17/2010 2224
Date Prepared: 09/15/2010 1723
Analysis Batch: 680-180521
Prep Batch: 680-180038
Instrument ID: ICPMSA
Lab File ID: 180038.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (ug/L)	Qualifier	RL
Copper	4000		5.0
Zinc	8300		20

Client Sample ID: **MW-1B-091310**

Lab Sample ID:	680-61183-3	Date Sampled: 09/13/2010 1430
Client Matrix:	Water	Date Received: 09/14/2010 0907

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-180521	Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-180038	Lab File ID:	180038.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/17/2010 2231		Final Weight/Volume:	250 mL
Date Prepared:	09/15/2010 1723			

Analyte	Result (ug/L)	Qualifier	RL
Copper	5.0	U	5.0
Zinc	20	U	20

Client Sample ID: **MW-112-091310**

Lab Sample ID:	680-61183-4	Date Sampled: 09/13/2010 1720
Client Matrix:	Water	Date Received: 09/14/2010 0907

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-180521	Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-180038	Lab File ID:	180038.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/17/2010 2239		Final Weight/Volume:	250 mL
Date Prepared:	09/15/2010 1723			

Analyte	Result (ug/L)	Qualifier	RL
Copper	54		5.0
Zinc	1000		20

Client Sample ID: **MW-116-091310**

Lab Sample ID:	680-61183-5	Date Sampled: 09/13/2010 1530
Client Matrix:	Water	Date Received: 09/14/2010 0907

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-180521	Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-180038	Lab File ID:	180038.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/17/2010 2300		Final Weight/Volume:	250 mL
Date Prepared:	09/15/2010 1723			

Analyte	Result (ug/L)	Qualifier	RL
Copper	4100		5.0

Method:	6020	Analysis Batch: 680-180521	Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-180038	Lab File ID:	180038.chr
Dilution:	5.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/18/2010 1212		Final Weight/Volume:	250 mL
Date Prepared:	09/15/2010 1723			

Analyte	Result (ug/L)	Qualifier	RL
Zinc	12000		100

Client Sample ID: **MW-101-091310**

Lab Sample ID:	680-61183-7	Date Sampled: 09/13/2010 1645
Client Matrix:	Water	Date Received: 09/14/2010 0907

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-180521	Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-180038	Lab File ID:	180038.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/17/2010 2308		Final Weight/Volume:	250 mL
Date Prepared:	09/15/2010 1723			

Analyte	Result (ug/L)	Qualifier	RL
Copper	22		5.0
Zinc	660		20

General Chemistry

Client Sample ID: **MW-26-091310**

Lab Sample ID: 680-61183-1

Client Matrix: Water

Date Sampled: 09/13/2010 1625

Date Received: 09/14/2010 0907

Analyte		Result	Qual	Units	RL	Dil	Method
Nitrate as N		4.8		mg/L	0.25	5.0	9056
	Analysis Batch: 680-180028		Date Analyzed: 09/14/2010 1246				
Sulfate		210		mg/L	10	10	9056
	Analysis Batch: 680-180289		Date Analyzed: 09/17/2010 1030				

General Chemistry

Client Sample ID: **MW-22-091310**

Lab Sample ID: 680-61183-2 Date Sampled: 09/13/2010 1440
Client Matrix: Water Date Received: 09/14/2010 0907

Analyte	Result	Qual	Units	RL	Dil	Method
Nitrate as N	1.5		mg/L	0.25	5.0	9056
Analysis Batch: 680-180028		Date Analyzed: 09/14/2010 1258				
Sulfate	750		mg/L	25	25	9056
Analysis Batch: 680-180289		Date Analyzed: 09/17/2010 1042				

General Chemistry

Client Sample ID: **MW-1B-091310**

Lab Sample ID: 680-61183-3
Client Matrix: Water

Date Sampled: 09/13/2010 1430
Date Received: 09/14/2010 0907

Analyte		Result	Qual	Units	RL	Dil	Method
Nitrate as N		4.5		mg/L	0.25	5.0	9056
	Analysis Batch: 680-180028		Date Analyzed: 09/14/2010 1310				
Sulfate		35		mg/L	5.0	5.0	9056
	Analysis Batch: 680-180289		Date Analyzed: 09/17/2010 1054				

General Chemistry

Client Sample ID: **MW-112-091310**

Lab Sample ID: 680-61183-4
Client Matrix: Water

Date Sampled: 09/13/2010 1720
Date Received: 09/14/2010 0907

Analyte	Result	Qual	Units	RL	Dil	Method
Nitrate as N	0.89		mg/L	0.25	5.0	9056
	Analysis Batch: 680-180028	Date Analyzed: 09/14/2010 1323				
Sulfate	220		mg/L	10	10	9056
	Analysis Batch: 680-180289	Date Analyzed: 09/17/2010 1107				

General Chemistry

Client Sample ID: **MW-116-091310**

Lab Sample ID: 680-61183-5 Date Sampled: 09/13/2010 1530

Client Matrix: Water Date Received: 09/14/2010 0907

Analyte	Result	Qual	Units	RL	Dil	Method
Nitrate as N	91		mg/L	5.0	100	9056
	Analysis Batch: 680-180028	Date Analyzed: 09/14/2010 1458				
Sulfate	710		mg/L	25	25	9056
	Analysis Batch: 680-180289	Date Analyzed: 09/17/2010 1119				

General Chemistry

Client Sample ID: **MW-101-091310**

Lab Sample ID: 680-61183-7
Client Matrix: Water
Date Sampled: 09/13/2010 1645
Date Received: 09/14/2010 0907

Analyte	Result	Qual	Units	RL	Dil	Method
Nitrate as N	11		mg/L	0.50	10	9056
	Analysis Batch: 680-180028	Date Analyzed: 09/14/2010 1510				
Sulfate	84		mg/L	5.0	5.0	9056
	Analysis Batch: 680-180289	Date Analyzed: 09/17/2010 1132				

DATA REPORTING QUALIFIERS

Client: MACTEC Engineering and Consulting Inc Job Number: 680-61183-1

Lab Section	Qualifier	Description
GC/MS VOA		
	U	Indicates the analyte was analyzed for but not detected.
GC/MS Semi VOA		
	U	Indicates the analyte was analyzed for but not detected.
Metals		
	U	Indicates the analyte was analyzed for but not detected.
General Chemistry		
	U	Indicates the analyte was analyzed for but not detected.
	F	MS or MSD exceeds the control limits
	E	Result exceeded calibration range.

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61183-1

Method Blank - Batch: 680-180069

Method: 8260B
Preparation: 5030B

Lab Sample ID: MB 680-180069/7
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/15/2010 1232
Date Prepared: 09/15/2010 1232

Analysis Batch: 680-180069
Prep Batch: N/A
Units: ug/L

Instrument ID: MSP
Lab File ID: pq111.d
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	RL
1,1,1,2-Tetrachloroethane	1.0	U	1.0
1,1,1-Trichloroethane	1.0	U	1.0
1,1,2,2-Tetrachloroethane	1.0	U	1.0
1,1,2-Trichloroethane	1.0	U	1.0
1,1-Dichloroethane	1.0	U	1.0
1,1-Dichloroethene	1.0	U	1.0
1,1-Dichloropropene	1.0	U	1.0
1,2,3-Trichloropropane	1.0	U	1.0
1,2,4-Trichlorobenzene	1.0	U	1.0
1,2-Dibromoethane	1.0	U	1.0
1,2-Dichlorobenzene	1.0	U	1.0
1,2-Dichloroethane	1.0	U	1.0
1,2-Dichloropropane	1.0	U	1.0
1,3-Dichlorobenzene	1.0	U	1.0
1,3-Dichloropropane	1.0	U	1.0
1,4-Dichlorobenzene	1.0	U	1.0
2-Butanone	10	U	10
4-Methyl-2-pentanone	10	U	10
Acetone	25	U	25
Benzene	1.0	U	1.0
Carbon tetrachloride	1.0	U	1.0
Chlorobenzene	1.0	U	1.0
Chloroethane	1.0	U	1.0
Chloroform	1.0	U	1.0
Chloromethane	1.0	U	1.0
cis-1,2-Dichloroethene	1.0	U	1.0
Cyclohexane	1.0	U	1.0
Dibromochloromethane	1.0	U	1.0
Dibromomethane	1.0	U	1.0
Dichlorodifluoromethane	1.0	U	1.0
Ethylbenzene	1.0	U	1.0
Hexachloro-1,3-butadiene	1.0	U	1.0
Isopropylbenzene	1.0	U	1.0
Methylene Chloride	5.0	U	5.0
Naphthalene	5.0	U	5.0
Styrene	1.0	U	1.0
Tetrachloroethene	1.0	U	1.0
Tetrahydrofuran	10	U	10
Toluene	1.0	U	1.0
trans-1,2-Dichloroethene	1.0	U	1.0
Trichloroethene	1.0	U	1.0
Trichlorofluoromethane	1.0	U	1.0
Vinyl chloride	1.0	U	1.0

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61183-1

Method Blank - Batch: 680-180069

Method: 8260B
Preparation: 5030B

Lab Sample ID: MB 680-180069/7
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/15/2010 1232
Date Prepared: 09/15/2010 1232

Analysis Batch: 680-180069
Prep Batch: N/A
Units: ug/L

Instrument ID: MSP
Lab File ID: pq111.d
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	RL
Xylenes, Total	2.0	U	2.0

Surrogate	% Rec	Acceptance Limits
Toluene-d8 (Surr)	95	75 - 120

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 680-180069

Method: 8260B
Preparation: 5030B

LCS Lab Sample ID:	LCS 680-180069/4	Analysis Batch:	680-180069	Instrument ID:	MSP
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	pq103.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	5 mL
Date Analyzed:	09/15/2010 1035			Final Weight/Volume:	5 mL
Date Prepared:	09/15/2010 1035				

LCSD Lab Sample ID:	LCSD 680-180069/5	Analysis Batch:	680-180069	Instrument ID:	MSP
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	pq105.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	5 mL
Date Analyzed:	09/15/2010 1104			Final Weight/Volume:	5 mL
Date Prepared:	09/15/2010 1104				

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
1,1,1,2-Tetrachloroethane	107	107	81 - 128	0	30		
1,1,1-Trichloroethane	101	99	76 - 127	1	30		
1,1,2,2-Tetrachloroethane	93	92	69 - 129	1	30		
1,1,2-Trichloroethane	93	93	75 - 121	0	30		
1,1-Dichloroethane	98	93	74 - 127	5	30		
1,1-Dichloroethene	103	98	62 - 141	5	30		
1,1-Dichloropropene	98	97	77 - 122	0	30		
1,2,3-Trichloropropane	93	91	70 - 130	2	30		
1,2,4-Trichlorobenzene	93	94	60 - 135	1	30		
1,2-Dibromoethane	93	91	80 - 121	3	30		
1,2-Dichlorobenzene	98	97	79 - 124	1	30		
1,2-Dichloroethane	89	87	66 - 132	3	30		
1,2-Dichloropropane	95	93	73 - 124	1	30		
1,3-Dichlorobenzene	98	98	78 - 125	1	30		
1,3-Dichloropropane	89	90	75 - 120	1	30		
1,4-Dichlorobenzene	101	99	81 - 122	2	30		
2-Butanone	97	94	33 - 157	4	30		
4-Methyl-2-pentanone	87	86	40 - 151	0	30		
Acetone	88	88	17 - 175	1	50		
Benzene	94	94	77 - 119	1	30		
Carbon tetrachloride	109	106	71 - 135	3	30		
Chlorobenzene	98	99	85 - 116	1	30		
Chloroethane	97	78	40 - 165	22	50		
Chloroform	101	96	82 - 120	5	30		
Chloromethane	103	99	48 - 142	4	50		
cis-1,2-Dichloroethene	98	92	69 - 134	7	30		
Cyclohexane	95	95	54 - 138	0	30		
Dibromochloromethane	106	106	75 - 133	0	30		
Dibromomethane	93	91	78 - 119	2	30		
Dichlorodifluoromethane	114	110	34 - 154	3	30		
Ethylbenzene	100	100	86 - 116	0	30		
Hexachloro-1,3-butadiene	107	107	62 - 142	0	30		
Isopropylbenzene	101	100	82 - 121	2	30		

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 680-180069

Method: 8260B
Preparation: 5030B

LCS Lab Sample ID:	LCS 680-180069/4	Analysis Batch:	680-180069	Instrument ID:	MSP
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	pq103.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	5 mL
Date Analyzed:	09/15/2010 1035			Final Weight/Volume:	5 mL
Date Prepared:	09/15/2010 1035				

LCSD Lab Sample ID:	LCSD 680-180069/5	Analysis Batch:	680-180069	Instrument ID:	MSP
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	pq105.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	5 mL
Date Analyzed:	09/15/2010 1104			Final Weight/Volume:	5 mL
Date Prepared:	09/15/2010 1104				

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Methylene Chloride	99	93	70 - 125	6	30		
Naphthalene	90	93	48 - 135	4	30		
Styrene	101	98	82 - 122	4	30		
Tetrachloroethene	99	97	76 - 126	2	30		
Toluene	96	95	81 - 117	2	30		
trans-1,2-Dichloroethene	101	96	72 - 131	5	30		
Trichloroethene	96	94	84 - 115	2	30		
Trichlorofluoromethane	117	108	58 - 149	8	50		
Vinyl chloride	110	108	59 - 144	2	50		
Xylenes, Total	105	102	84 - 118	3	30		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
Toluene-d8 (Surr)	95	94	75 - 120

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61183-1

Method Blank - Batch: 680-179969

Method: 8270C
Preparation: 3520C

Lab Sample ID:	MB 680-179969/11-A	Analysis Batch:	680-180380	Instrument ID:	MSN
Client Matrix:	Water	Prep Batch:	680-179969	Lab File ID:	n9284.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	1000 mL
Date Analyzed:	09/17/2010 1657			Final Weight/Volume:	1 mL
Date Prepared:	09/15/2010 1333			Injection Volume:	1 uL

Analyte	Result	Qual	RL
1,2,3-Trichlorobenzene	10	U	10
1,2,4-Trichlorobenzene	10	U	10
1,2-Dichlorobenzene	10	U	10
1,2-Diphenylhydrazine	10	U	10
1,3-Dichlorobenzene	10	U	10
1,4-Dichlorobenzene	10	U	10
1,4-Dioxane	10	U	10
2,4,5-Trichlorophenol	10	U	10
2,4,6-Trichlorophenol	10	U	10
2,4-Dichlorophenol	10	U	10
2,4-Dimethylphenol	10	U	10
2,4-Dinitrophenol	50	U	50
2,4-Dinitrotoluene	10	U	10
2,6-Dinitrotoluene	10	U	10
2-Chloronaphthalene	10	U	10
2-Chlorophenol	10	U	10
2-Methylphenol	10	U	10
2-Nitrophenol	10	U	10
3 & 4 Methylphenol	10	U	10
3,3'-Dichlorobenzidine	60	U	60
4,6-Dinitro-2-methylphenol	50	U	50
4-Bromophenyl phenyl ether	10	U	10
4-Chloro-3-methylphenol	10	U	10
4-Chloroaniline	20	U	20
4-Chlorophenyl phenyl ether	10	U	10
4-Nitroaniline	50	U	50
4-Nitrophenol	50	U	50
Acenaphthene	10	U	10
Acenaphthylene	10	U	10
Anthracene	10	U	10
Benzo[a]anthracene	10	U	10
Benzo[a]pyrene	10	U	10
Benzo[b]fluoranthene	10	U	10
Benzo[g,h,i]perylene	10	U	10
Benzo[k]fluoranthene	10	U	10
Benzoic acid	50	U	50
Bis(2-chloroethoxy)methane	10	U	10
Bis(2-chloroethyl)ether	10	U	10
Bis(2-ethylhexyl) phthalate	10	U	10
bis(chloroisopropyl) ether	10	U	10
Butyl benzyl phthalate	10	U	10
Chrysene	10	U	10
Dibenz(a,h)anthracene	10	U	10

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61183-1

Method Blank - Batch: 680-179969

Method: 8270C
Preparation: 3520C

Lab Sample ID:	MB 680-179969/11-A	Analysis Batch:	680-180380	Instrument ID:	MSN
Client Matrix:	Water	Prep Batch:	680-179969	Lab File ID:	n9284.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	1000 mL
Date Analyzed:	09/17/2010 1657			Final Weight/Volume:	1 mL
Date Prepared:	09/15/2010 1333			Injection Volume:	1 uL

Analyte	Result	Qual	RL
Diethyl phthalate	10	U	10
Dimethyl phthalate	10	U	10
Di-n-octyl phthalate	10	U	10
Fluoranthene	10	U	10
Fluorene	10	U	10
Hexachloro-1,3-butadiene	10	U	10
Hexachlorobenzene	10	U	10
Hexachlorocyclopentadiene	10	U	10
Hexachloroethane	10	U	10
Indeno[1,2,3-cd]pyrene	10	U	10
Isophorone	10	U	10
Naphthalene	10	U	10
Nitrobenzene	10	U	10
Pentachlorophenol	50	U	50
Phenanthrene	10	U	10
Phenol	10	U	10
Pyrene	10	U	10

Surrogate	% Rec	Acceptance Limits
2,4,6-Tribromophenol	96	40 - 139
2-Fluorobiphenyl	90	50 - 113
2-Fluorophenol	90	36 - 110
Nitrobenzene-d5	90	45 - 112
Phenol-d5	89	38 - 116
Terphenyl-d14	104	10 - 121

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61183-1

Lab Control Sample - Batch: 680-179969

Method: 8270C
Preparation: 3520C

Lab Sample ID:	LCS 680-179969/12-A	Analysis Batch:	680-180380	Instrument ID:	MSN
Client Matrix:	Water	Prep Batch:	680-179969	Lab File ID:	n9285.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	1000 mL
Date Analyzed:	09/17/2010 1723			Final Weight/Volume:	1 mL
Date Prepared:	09/15/2010 1333			Injection Volume:	1 uL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
1,2,4-Trichlorobenzene	100	68.3	68	41 - 110	
1,2-Dichlorobenzene	100	66.9	67	39 - 110	
1,2-Diphenylhydrazine	100	78.9	79	49 - 114	
1,3-Dichlorobenzene	100	64.7	65	36 - 110	
1,4-Dichlorobenzene	100	66.9	67	38 - 110	
1,4-Dioxane	100	53.6	54	11 - 110	
2,4,5-Trichlorophenol	100	88.3	88	47 - 122	
2,4,6-Trichlorophenol	100	83.2	83	46 - 120	
2,4-Dichlorophenol	100	82.2	82	46 - 115	
2,4-Dimethylphenol	100	56.4	56	36 - 110	
2,4-Dinitrophenol	100	134	134	10 - 189	
2,4-Dinitrotoluene	100	87.5	87	49 - 128	
2,6-Dinitrotoluene	100	85.8	86	45 - 131	
2-Chloronaphthalene	100	76.2	76	47 - 110	
2-Chlorophenol	100	80.8	81	47 - 110	
2-Methylphenol	100	80.2	80	46 - 110	
2-Nitrophenol	100	82.9	83	42 - 120	
3 & 4 Methylphenol	100	87.4	87	43 - 110	
3,3'-Dichlorobenzidine	100	67.4	67	10 - 113	
4,6-Dinitro-2-methylphenol	100	120	120	29 - 167	
4-Bromophenyl phenyl ether	100	83.8	84	42 - 110	
4-Chloro-3-methylphenol	100	85.2	85	46 - 118	
4-Chloroaniline	100	69.2	69	10 - 110	
4-Chlorophenyl phenyl ether	100	81.8	82	46 - 114	
4-Nitroaniline	100	86.7	87	36 - 125	
4-Nitrophenol	100	99.3	99	30 - 122	
Acenaphthene	100	85.4	85	45 - 117	
Acenaphthylene	100	82.1	82	51 - 112	
Anthracene	100	78.8	79	52 - 116	
Benzo[a]anthracene	100	80.5	81	49 - 124	
Benzo[a]pyrene	100	85.9	86	48 - 120	
Benzo[b]fluoranthene	100	82.4	82	46 - 126	
Benzo[g,h,i]perylene	100	82.5	82	51 - 117	
Benzo[k]fluoranthene	100	76.8	77	47 - 126	
Benzoic acid	100	112	112	10 - 138	
Bis(2-chloroethoxy)methane	100	88.8	89	50 - 112	
Bis(2-chloroethyl)ether	100	84.1	84	43 - 110	
Bis(2-ethylhexyl) phthalate	100	84.8	85	47 - 134	
bis(chloroisopropyl) ether	100	87.8	88	42 - 110	
Butyl benzyl phthalate	100	88.0	88	52 - 135	
Chrysene	100	80.9	81	51 - 123	
Dibenz(a,h)anthracene	100	77.5	78	46 - 124	
Diethyl phthalate	100	90.0	90	51 - 119	

Lab Control Sample - Batch: 680-179969

Method: 8270C
Preparation: 3520C

Lab Sample ID:	LCS 680-179969/12-A	Analysis Batch: 680-180380		Instrument ID:	MSN
Client Matrix:	Water	Prep Batch: 680-179969		Lab File ID:	n9285.d
Dilution:	1.0	Units: ug/L		Initial Weight/Volume:	1000 mL
Date Analyzed:	09/17/2010 1723			Final Weight/Volume:	1 mL
Date Prepared:	09/15/2010 1333			Injection Volume:	1 uL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Dimethyl phthalate	100	91.7	92	50 - 116	
Di-n-octyl phthalate	100	93.2	93	44 - 134	
Fluoranthene	100	81.1	81	50 - 120	
Fluorene	100	81.1	81	50 - 115	
Hexachloro-1,3-butadiene	100	64.8	65	40 - 110	
Hexachlorobenzene	100	75.2	75	48 - 119	
Hexachlorocyclopentadiene	100	21.0	21	10 - 110	
Hexachloroethane	100	62.3	62	33 - 110	
Indeno[1,2,3-cd]pyrene	100	79.3	79	40 - 126	
Isophorone	100	78.1	78	50 - 111	
Naphthalene	100	73.3	73	41 - 110	
Nitrobenzene	100	76.1	76	46 - 110	
Pentachlorophenol	100	100	100	37 - 132	
Phenanthrene	100	80.4	80	52 - 117	
Phenol	100	78.6	79	39 - 110	
Pyrene	100	78.4	78	52 - 125	

Surrogate	% Rec	Acceptance Limits
2,4,6-Tribromophenol	97	40 - 139
2-Fluorobiphenyl	81	50 - 113
2-Fluorophenol	82	36 - 110
Nitrobenzene-d5	82	45 - 112
Phenol-d5	87	38 - 116
Terphenyl-d14	85	10 - 121

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-179969

Method: 8270C
Preparation: 3520C

MS Lab Sample ID:	680-61183-1	Analysis Batch:	680-180380	Instrument ID:	MSN
Client Matrix:	Water	Prep Batch:	680-179969	Lab File ID:	n9294.d
Dilution:	1.0			Initial Weight/Volume:	500 mL
Date Analyzed:	09/17/2010 2112			Final Weight/Volume:	0.5 mL
Date Prepared:	09/15/2010 1333			Injection Volume:	1 uL

MSD Lab Sample ID:	680-61183-1	Analysis Batch:	680-180380	Instrument ID:	MSN
Client Matrix:	Water	Prep Batch:	680-179969	Lab File ID:	n9295.d
Dilution:	1.0			Initial Weight/Volume:	500 mL
Date Analyzed:	09/17/2010 2137			Final Weight/Volume:	0.5 mL
Date Prepared:	09/15/2010 1333			Injection Volume:	1 uL

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
1,2,4-Trichlorobenzene	53	55	41 - 110	3	40		

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
2,4,6-Tribromophenol	94	105	40 - 139
2-Fluorobiphenyl	77	76	50 - 113
2-Fluorophenol	66	71	36 - 110
Nitrobenzene-d5	73	74	45 - 112
Phenol-d5	67	78	38 - 116
Terphenyl-d14	81	90	10 - 121

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61183-1

Method Blank - Batch: 680-180038

Method: 6020
Preparation: 3010A

Lab Sample ID: MB 680-180038/21-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/17/2010 2134
Date Prepared: 09/15/2010 1723

Analysis Batch: 680-180521
Prep Batch: 680-180038
Units: ug/L

Instrument ID: ICPMSA
Lab File ID: 180038.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result	Qual	RL
Copper	5.0	U	5.0
Zinc	20	U	20

Lab Control Sample - Batch: 680-180038

Method: 6020
Preparation: 3010A

Lab Sample ID: LCS 680-180038/22-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/17/2010 2141
Date Prepared: 09/15/2010 1723

Analysis Batch: 680-180521
Prep Batch: 680-180038
Units: ug/L

Instrument ID: ICPMSA
Lab File ID: 180038.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Copper	100	101	101	75 - 125	
Zinc	100	93.4	93	75 - 125	

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-180038

Method: 6020
Preparation: 3010A

MS Lab Sample ID: 680-61183-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/17/2010 2210
Date Prepared: 09/15/2010 1723

Analysis Batch: 680-180521
Prep Batch: 680-180038

Instrument ID: ICPMSA
Lab File ID: 180038.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

MSD Lab Sample ID: 680-61183-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/17/2010 2217
Date Prepared: 09/15/2010 1723

Analysis Batch: 680-180521
Prep Batch: 680-180038

Instrument ID: ICPMSA
Lab File ID: 180038.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Copper	100	98	75 - 125	2	20		
Zinc	98	91	75 - 125	3	20		

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61183-1

Method Blank - Batch: 680-180028

Method: 9056
Preparation: N/A

Lab Sample ID: MB 680-180028/8
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/14/2010 1050
Date Prepared: N/A

Analysis Batch: 680-180028
Prep Batch: N/A
Units: mg/L

Instrument ID: ICG
Lab File ID: 0011.d
Initial Weight/Volume: 1 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	RL
Nitrate as N	0.25	U	0.25

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 680-180028

Method: 9056
Preparation: N/A

LCS Lab Sample ID: LCS 680-180028/9
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/14/2010 1103
Date Prepared: N/A

Analysis Batch: 680-180028
Prep Batch: N/A
Units: mg/L

Instrument ID: ICG
Lab File ID: 0012.d
Initial Weight/Volume: 1 mL
Final Weight/Volume: 5 mL
1 uL

LCSD Lab Sample ID: LCSD 680-180028/12
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/14/2010 1233
Date Prepared: N/A

Analysis Batch: 680-180028
Prep Batch: N/A
Units: mg/L

Instrument ID: ICG
Lab File ID: 0018.d
Initial Weight/Volume: 1 mL
Final Weight/Volume: 5 mL
1 uL

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Nitrate as N	96	96	90 - 110	1	30		

Matrix Spike - Batch: 680-180028

Method: 9056
Preparation: N/A

Lab Sample ID: 680-61183-7
Client Matrix: Water
Dilution: 10
Date Analyzed: 09/14/2010 1522
Date Prepared: N/A

Analysis Batch: 680-180028
Prep Batch: N/A
Units: mg/L

Instrument ID: ICG
Lab File ID: 0027.d
Initial Weight/Volume: 1 mL
Final Weight/Volume: 5 mL
1 uL

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Nitrate as N	11	9.99	20.4	96	90 - 110	E

Method Blank - Batch: 680-180289

Method: 9056
Preparation: N/A

Lab Sample ID: MB 680-180289/4
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/17/2010 0940
Date Prepared: N/A

Analysis Batch: 680-180289
Prep Batch: N/A
Units: mg/L

Instrument ID: ICG
Lab File ID: 0004.d
Initial Weight/Volume: 1 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	RL
Sulfate	5.0	U	5.0

Lab Control Sample - Batch: 680-180289

Method: 9056
Preparation: N/A

Lab Sample ID: LCS 680-180289/5
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/17/2010 0952
Date Prepared: N/A

Analysis Batch: 680-180289
Prep Batch: N/A
Units: mg/L

Instrument ID: ICG
Lab File ID: 0005.d
Initial Weight/Volume: 1 mL
Final Weight/Volume: 5 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	50.0	54.6	109	90 - 110	

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61183-1

Matrix Spike - Batch: 680-180289

Method: 9056
Preparation: N/A

Lab Sample ID:	680-61217-F-2 MS	Analysis Batch: 680-180289	Instrument ID:	ICG		
Client Matrix:	Water	Prep Batch: N/A	Lab File ID:	0016.d		
Dilution:	50	Units: mg/L	Initial Weight/Volume:		1	mL
Date Analyzed:	09/17/2010 1209		Final Weight/Volume:		5	mL
Date Prepared:	N/A				1	uL

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	1300	500	1950	124	90 - 110	F

Matrix Spike - Batch: 680-180289

Method: 9056
Preparation: N/A

Lab Sample ID:	680-61217-D-9 MS	Analysis Batch: 680-180289	Instrument ID:	ICG		
Client Matrix:	Water	Prep Batch: N/A	Lab File ID:	0026.d		
Dilution:	10	Units: mg/L	Initial Weight/Volume:		1	mL
Date Analyzed:	09/17/2010 1413		Final Weight/Volume:		5	mL
Date Prepared:	N/A				1	uL

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	310	100	416	105	90 - 110	

Serial Number 034294.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Fed Ex #s
8731 2400 9358
8731 2400 9369

TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.testamericainc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

○ Alternate Laboratory Name/Location
Phone:
Fax:

PAGE 1 OF 1

PROJECT REFERENCE: BFEL Atlanta
PROJECT NO.: 6122080154
PROJECT LOCATION (STATE): GA
TAL (LAB) PROJECT MANAGER:
P.O. NUMBER:
CONTRACT NO.:
CLIENT (SITE) PM: Rhonda Quinn
CLIENT PHONE: 770-421-3400
CLIENT FAX: 770-421-3486
CLIENT NAME: Mactec
CLIENT E-MAIL:
CLIENT ADDRESS: 3200 Town Point Dr, Ste 100, Kennesaw, GA 30144
COMPANY CONTRACTING THIS WORK (if applicable):

STANDARD REPORT DELIVERY ○
DATE DUE ____
EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE ____
NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

REQUIRED ANALYSIS

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	VOC	SVOC List + 1,2,3-TCB, 1,2,4-TCB 8270C	Cu, Zn 6020	Nitrate, Sulfate 9056	1,2,3-TCB, 1,2,4-TCB 8270C	REMARKS
PRESERVATIVE								HCl		HNO3			
								NUMBER OF CONTAINERS SUBMITTED					
9/13/10	1625	MW-26-091310	G	X						1	1	2	samples are in two coolers
	1440	MW-22-091310	G	X				3	2	1	1		
	1430	MW-1B-091310	G	X						1	1	2	
	1720	MW-112-091310	G	X						1	1	2	
	1530	MW-116-091310	G	X						1	1	2	
	1440	Duplicate-091310	G	X				3	2				
	1645	MW-101-091310	G	X						1	1	2	
↓	1200	TB-091310	G	X				2					

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
Daniel L Howard	9/13/10	1930						
RECEIVED BY: (SIGNATURE)	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SAVANNAH LOG NO.	LABORATORY REMARKS
Beth A Doughty	9/14/10	0907	YES ○ NO ○		680-61183	Temp 2.4/1.8

Login Sample Receipt Check List

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61183-1

Login Number: 61183

List Source: TestAmerica Savannah

Creator: Daughtry, Beth

List Number: 1

Question	T / F/ NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	True	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	N/A	

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 680-61217-1

Job Description: BFEL Atlanta

For:
MACTEC Engineering and Consulting Inc
3200 Town Point Drive Northwest
Suite 100
Kennesaw, GA 30144

Attention: Ms. Rhonda Quinn

Kathryn Smith

Approved for release.
Kathryn Smith
Project Manager I
11/8/2010 3:52 PM

Kathryn Smith
Project Manager I
kathye.smith@testamericainc.com
11/08/2010
Revision: 1

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

Savannah Certifications and ID #s: A2LA: 0399.01; AL: 41450; ARDEQ: 88-0692; ARDOH; CA: 03217CA; CO; CT: PH0161; DE; FL: E87052; GA: 803; Guam; HI; IL: 200022; IN; IA: 353; KS: E-10322; KY EPPC: 90084; KY UST; LA DEQ: 30690; LA DHH: LA080008; ME: 2008022; MD: 250; MA: M-GA006; MI: 9925; MS; NFESC: 249; NV: GA00006; NJ: GA769; NM; NY: 10842; NC DWQ: 269; NC DHHS: 13701; PA: 68-00474; PR: GA00006; RI: LAO00244; SC: 98001001; TN: TN0296; TX: T104704185; USEPA: GA00006; VT: VT-87052; VA: 00302; WA; WV DEP: 094; WV DHHR: 9950 C; WI DNR: 999819810; WY/EPAR8: 8TMS-Q

TestAmerica Laboratories, Inc.
TestAmerica Savannah 5102 LaRoche Avenue, Savannah, GA 31404
Tel (912) 354-7858 Fax (912) 352-0165 www.testamericainc.com

ACCREDITED IN ACCORDANCE WITH nelac

Job Narrative
680-61217-1

Comments
No additional comments.

Receipt
TestAmerica did not receive sample ID MW-25-091410.

All other samples were received in good condition within temperature requirements.

GC/MS Semi VOA
No analytical or quality issues were noted.

GC Semi VOA
Method(s) 8081A_8082: This method incorporates the use of second column confirmation. Corrective action for unacceptable percent recovery is not taken for surrogate or spike compounds unless the results from both columns are outside criteria. Any results which fall outside criteria are qualified and reported.

Method(s) 8081A_8082: Due to the level of dilution required for the following sample(s), surrogate recoveries are not reported: DUPLICATE CSX-091410 (680-61217-3), MW-109-091410 (680-61217-2), MW-111-091410 (680-61217-4), MW-114-091410 (680-61217-5).

No other analytical or quality issues were noted.

Metals
No analytical or quality issues were noted.

General Chemistry
Method(s) 9056: The following sample(s) required a dilution which was performed outside of the analytical holding time: MW-114-091410 (680-61217-5).

No other analytical or quality issues were noted.

Organic Prep
No analytical or quality issues were noted.

METHOD / ANALYST SUMMARY

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61217-1

Method	Analyst	Analyst ID
SW846 8270C	Haynes, Carion	CRH
SW846 8081A_8082	Kellar, Joshua	JK
SW846 6020	Robertson, Bryn	BR
SW846 9056	Dalton, Gloria	GJ
SW846 9056	Webb, Carol	CW

SAMPLE SUMMARY

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61217-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
680-61217-1	MW-108-091410	Water	09/14/2010 1012	09/15/2010 0912
680-61217-2	MW-109-091410	Water	09/14/2010 1115	09/15/2010 0912
680-61217-3	DUPLICATE CSX-091410	Water	09/14/2010 1200	09/15/2010 0912
680-61217-4	MW-111-091410	Water	09/14/2010 1350	09/15/2010 0912
680-61217-5	MW-114-091410	Water	09/14/2010 1630	09/15/2010 0912
680-61217-6	MW-102-091410	Water	09/14/2010 1010	09/15/2010 0912
680-61217-7	MW-117-091410	Water	09/14/2010 1450	09/15/2010 0912
680-61217-8	MW-115-091410	Water	09/14/2010 1620	09/15/2010 0912
680-61217-9	MW-110-091410	Water	09/14/2010 1220	09/15/2010 0912

Analytical Data

Client: MACTEC Engineering and Consulting Inc | Job Number: 680-61217-1

Client Sample ID: **MW-108-091410**

Lab Sample ID:	680-61217-1	Date Sampled:	09/14/2010 1012
Client Matrix:	Water	Date Received:	09/15/2010 0912

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-180419	Instrument ID:	MSN
Preparation:	3520C	Prep Batch: 680-180267	Lab File ID:	n9330.d
Dilution:	1.0		Initial Weight/Volume:	1050 mL
Date Analyzed:	09/20/2010 1541		Final Weight/Volume:	1 mL
Date Prepared:	09/18/2010 1253		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
1,2,3-Trichlorobenzene	9.5	U	9.5
1,2,4-Trichlorobenzene	9.5	U	9.5

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	70		50 - 113
2-Fluorophenol	74		36 - 110
Nitrobenzene-d5	76		45 - 112
Phenol-d5	79		38 - 116
Terphenyl-d14	91		10 - 121
2,4,6-Tribromophenol	91		40 - 139

Client Sample ID: **MW-109-091410**

Lab Sample ID:	680-61217-2	Date Sampled: 09/14/2010 1115
Client Matrix:	Water	Date Received: 09/15/2010 0912

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-180419	Instrument ID:	MSN
Preparation:	3520C	Prep Batch: 680-180267	Lab File ID:	n9331.d
Dilution:	1.0		Initial Weight/Volume:	1050 mL
Date Analyzed:	09/20/2010 1607		Final Weight/Volume:	1 mL
Date Prepared:	09/18/2010 1253		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
1,2,3-Trichlorobenzene	9.5	U	9.5
1,2,4-Trichlorobenzene	9.5	U	9.5

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	70		50 - 113
2-Fluorophenol	69		36 - 110
Nitrobenzene-d5	73		45 - 112
Phenol-d5	68		38 - 116
Terphenyl-d14	77		10 - 121
2,4,6-Tribromophenol	90		40 - 139

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61217-1

Client Sample ID: **DUPLICATE CSX-091410**

Lab Sample ID:	680-61217-3	Date Sampled:	09/14/2010 1200
Client Matrix:	Water	Date Received:	09/15/2010 0912

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-180419	Instrument ID:	MSN
Preparation:	3520C	Prep Batch: 680-180267	Lab File ID:	n9332.d
Dilution:	1.0		Initial Weight/Volume:	1050 mL
Date Analyzed:	09/20/2010 1633		Final Weight/Volume:	1 mL
Date Prepared:	09/18/2010 1253		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
1,2,3-Trichlorobenzene	9.5	U	9.5
1,2,4-Trichlorobenzene	9.5	U	9.5

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	68		50 - 113
2-Fluorophenol	70		36 - 110
Nitrobenzene-d5	76		45 - 112
Phenol-d5	67		38 - 116
Terphenyl-d14	24		10 - 121
2,4,6-Tribromophenol	89		40 - 139

Client Sample ID: **MW-111-091410**

Lab Sample ID:	680-61217-4	Date Sampled:	09/14/2010 1350
Client Matrix:	Water	Date Received:	09/15/2010 0912

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-180419		Instrument ID:	MSN
Preparation:	3520C	Prep Batch: 680-180267		Lab File ID:	n9333.d
Dilution:	1.0			Initial Weight/Volume:	1030 mL
Date Analyzed:	09/20/2010 1659			Final Weight/Volume:	1 mL
Date Prepared:	09/18/2010 1253			Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
1,2,3-Trichlorobenzene	9.7	U	9.7
1,2,4-Trichlorobenzene	9.7	U	9.7

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	69		50 - 113
2-Fluorophenol	67		36 - 110
Nitrobenzene-d5	73		45 - 112
Phenol-d5	63		38 - 116
Terphenyl-d14	35		10 - 121
2,4,6-Tribromophenol	82		40 - 139

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61217-1

Client Sample ID: **MW-114-091410**

Lab Sample ID:	680-61217-5	Date Sampled:	09/14/2010 1630
Client Matrix:	Water	Date Received:	09/15/2010 0912

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-180419	Instrument ID:	MSN
Preparation:	3520C	Prep Batch: 680-180267	Lab File ID:	n9334.d
Dilution:	1.0		Initial Weight/Volume:	1030 mL
Date Analyzed:	09/20/2010 1725		Final Weight/Volume:	1 mL
Date Prepared:	09/18/2010 1253		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
1,2,3-Trichlorobenzene	9.7	U	9.7
1,2,4-Trichlorobenzene	9.7	U	9.7

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	70		50 - 113
2-Fluorophenol	78		36 - 110
Nitrobenzene-d5	80		45 - 112
Phenol-d5	75		38 - 116
Terphenyl-d14	52		10 - 121
2,4,6-Tribromophenol	96		40 - 139

Client: MACTEC Engineering and Consulting Inc | Job Number: 680-61217-1

Client Sample ID: **MW-102-091410**

Lab Sample ID:	680-61217-6	Date Sampled:	09/14/2010 1010
Client Matrix:	Water	Date Received:	09/15/2010 0912

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-180419	Instrument ID:	MSN
Preparation:	3520C	Prep Batch: 680-180267	Lab File ID:	n9335.d
Dilution:	1.0		Initial Weight/Volume:	1060 mL
Date Analyzed:	09/20/2010 1751		Final Weight/Volume:	1 mL
Date Prepared:	09/18/2010 1253		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
1,2,3-Trichlorobenzene	9.4	U	9.4
1,2,4-Trichlorobenzene	9.4	U	9.4

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	72		50 - 113
2-Fluorophenol	79		36 - 110
Nitrobenzene-d5	79		45 - 112
Phenol-d5	72		38 - 116
Terphenyl-d14	89		10 - 121
2,4,6-Tribromophenol	89		40 - 139

Client: MACTEC Engineering and Consulting Inc Job Number: 680-61217-1

Client Sample ID: **MW-117-091410**

Lab Sample ID: 680-61217-7 Date Sampled: 09/14/2010 1450
Client Matrix: Water Date Received: 09/15/2010 0912

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-180419	Instrument ID:	MSN
Preparation:	3520C	Prep Batch: 680-180267	Lab File ID:	n9336.d
Dilution:	1.0		Initial Weight/Volume:	1060 mL
Date Analyzed:	09/20/2010 1816		Final Weight/Volume:	1 mL
Date Prepared:	09/18/2010 1253		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
1,2,3-Trichlorobenzene	9.4	U	9.4
1,2,4-Trichlorobenzene	9.4	U	9.4

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	71		50 - 113
2-Fluorophenol	81		36 - 110
Nitrobenzene-d5	82		45 - 112
Phenol-d5	71		38 - 116
Terphenyl-d14	80		10 - 121
2,4,6-Tribromophenol	88		40 - 139

Client Sample ID: **MW-115-091410**

Lab Sample ID:	680-61217-8	Date Sampled: 09/14/2010 1620
Client Matrix:	Water	Date Received: 09/15/2010 0912

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-180419	Instrument ID:	MSN
Preparation:	3520C	Prep Batch: 680-180267	Lab File ID:	n9337.d
Dilution:	1.0		Initial Weight/Volume:	1060 mL
Date Analyzed:	09/20/2010 1842		Final Weight/Volume:	1 mL
Date Prepared:	09/18/2010 1253		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
1,2,3-Trichlorobenzene	9.4	U	9.4
1,2,4-Trichlorobenzene	9.4	U	9.4

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	53		50 - 113
2-Fluorophenol	55		36 - 110
Nitrobenzene-d5	59		45 - 112
Phenol-d5	53		38 - 116
Terphenyl-d14	52		10 - 121
2,4,6-Tribromophenol	70		40 - 139

Client Sample ID: **MW-110-091410**

Lab Sample ID:	680-61217-9	Date Sampled:	09/14/2010 1220
Client Matrix:	Water	Date Received:	09/15/2010 0912

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-180419	Instrument ID:	MSN
Preparation:	3520C	Prep Batch: 680-180267	Lab File ID:	n9338.d
Dilution:	1.0		Initial Weight/Volume:	1050 mL
Date Analyzed:	09/20/2010 1908		Final Weight/Volume:	1 mL
Date Prepared:	09/18/2010 1253		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
1,2,3-Trichlorobenzene	9.5	U	9.5
1,2,4-Trichlorobenzene	9.5	U	9.5

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	71		50 - 113
2-Fluorophenol	70		36 - 110
Nitrobenzene-d5	75		45 - 112
Phenol-d5	65		38 - 116
Terphenyl-d14	75		10 - 121
2,4,6-Tribromophenol	76		40 - 139

Client Sample ID: **MW-109-091410**

Lab Sample ID:	680-61217-2	Date Sampled: 09/14/2010 1115
Client Matrix:	Water	Date Received: 09/15/2010 0912

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180528	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-180283	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/20/2010 1321		Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	27	E	0.048
beta-BHC	4.0	E	0.048
Chlordane (technical)	0.48	U	0.48
4,4'-DDD	0.095	U	0.095
4,4'-DDE	0.095	U	0.095
4,4'-DDT	0.095	U	0.095
delta-BHC	6.6	E	0.048
Dieldrin	0.095	U	0.095
gamma-BHC (Lindane)	18	E	0.048
Heptachlor	0.048	U	0.048
Methoxychlor	0.095	U	0.095
Toxaphene	4.8	U	4.8

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	33		14 - 115
Tetrachloro-m-xylene	47	p	35 - 120

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61217-1

Client Sample ID: **MW-109-091410**

Lab Sample ID: 680-61217-2

Client Matrix: Water

Date Sampled: 09/14/2010 1115

Date Received: 09/15/2010 0912

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180528	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-180283	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/20/2010 1321		Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	25		14 - 115
Tetrachloro-m-xylene	81		35 - 120

Client Sample ID: **MW-109-091410**

Lab Sample ID:	680-61217-2	Date Sampled:	09/14/2010 1115
Client Matrix:	Water	Date Received:	09/15/2010 0912

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180528		Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-180283		Initial Weight/Volume:	1050 mL
Dilution:	10			Final Weight/Volume:	10 mL
Date Analyzed:	09/20/2010 2035	Run Type:	DL	Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	2.8	D	0.48
beta-BHC	0.48	U D	0.48
Chlordane (technical)	4.8	U	4.8
4,4'-DDD	0.95	U	0.95
4,4'-DDE	0.95	U	0.95
4,4'-DDT	0.95	U	0.95
delta-BHC	0.48	U D	0.48
Dieldrin	0.95	U	0.95
gamma-BHC (Lindane)	1.9	D	0.48
Heptachlor	0.48	U	0.48
Methoxychlor	0.95	U	0.95
Toxaphene	48	U	48

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	0	D	14 - 115
DCB Decachlorobiphenyl	0	D	14 - 115
Tetrachloro-m-xylene	0	D	35 - 120
Tetrachloro-m-xylene	0	D	35 - 120

Client Sample ID: **DUPLICATE CSX-091410**

Lab Sample ID:	680-61217-3	Date Sampled: 09/14/2010 1200
Client Matrix:	Water	Date Received: 09/15/2010 0912

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180528	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-180283	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/20/2010 1341		Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	27	E	0.048
beta-BHC	3.9	E	0.048
Chlordane (technical)	0.48	U	0.48
4,4'-DDD	0.095	U	0.095
4,4'-DDE	0.095	U	0.095
4,4'-DDT	0.095	U	0.095
delta-BHC	6.6	E	0.048
Dieldrin	0.095	U	0.095
gamma-BHC (Lindane)	18	E	0.048
Heptachlor	0.048	U	0.048
Methoxychlor	0.095	U	0.095
Toxaphene	4.8	U	4.8

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	35		14 - 115
Tetrachloro-m-xylene	86		35 - 120

Client Sample ID: **DUPLICATE CSX-091410**

Lab Sample ID: 680-61217-3
Client Matrix: Water

Date Sampled: 09/14/2010 1200
Date Received: 09/15/2010 0912

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method: 8081A_8082
Preparation: 3520C
Dilution: 1.0
Date Analyzed: 09/20/2010 1341
Date Prepared: 09/18/2010 1253

Analysis Batch: 680-180528
Prep Batch: 680-180283

Instrument ID: SGM
Initial Weight/Volume: 1050 mL
Final Weight/Volume: 10 mL
Injection Volume: 2 uL
Result Type: SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	28		14 - 115
Tetrachloro-m-xylene	63		35 - 120

Client Sample ID:	**DUPLICATE CSX-091410**	
Lab Sample ID:	680-61217-3	Date Sampled: 09/14/2010 1200
Client Matrix:	Water	Date Received: 09/15/2010 0912

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180528	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-180283	Initial Weight/Volume:	1050 mL
Dilution:	100		Final Weight/Volume:	10 mL
Date Analyzed:	09/20/2010 2054	Run Type: DL	Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253		Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	23	D	4.8
beta-BHC	4.8	U D	4.8
Chlordane (technical)	48	U	48
4,4'-DDD	9.5	U	9.5
4,4'-DDE	9.5	U	9.5
4,4'-DDT	9.5	U	9.5
delta-BHC	4.8	U D	4.8
Dieldrin	9.5	U	9.5
gamma-BHC (Lindane)	16	D	4.8
Heptachlor	4.8	U	4.8
Methoxychlor	9.5	U	9.5
Toxaphene	480	U	480

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	0	D	14 - 115
DCB Decachlorobiphenyl	0	D	14 - 115
Tetrachloro-m-xylene	0	D	35 - 120
Tetrachloro-m-xylene	0	D	35 - 120

Client Sample ID:	**MW-111-091410**	
Lab Sample ID:	680-61217-4	Date Sampled: 09/14/2010 1350
Client Matrix:	Water	Date Received: 09/15/2010 0912

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180528	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-180283	Initial Weight/Volume:	500 mL
Dilution:	1.0		Final Weight/Volume:	5 mL
Date Analyzed:	09/20/2010 1400		Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	17	E	0.050
beta-BHC	4.8	E	0.050
Chlordane (technical)	0.50	U	0.50
4,4'-DDD	0.10	U	0.10
4,4'-DDE	0.10	U	0.10
4,4'-DDT	0.10	U	0.10
delta-BHC	33	E	0.050
Dieldrin	0.14		0.10
gamma-BHC (Lindane)	8.7	E	0.050
Heptachlor	0.050	U	0.050
Methoxychlor	0.10	U	0.10
Toxaphene	5.0	U	5.0

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	63		14 - 115
Tetrachloro-m-xylene	60	p	35 - 120

Client Sample ID: **MW-111-091410**

Lab Sample ID: 680-61217-4
Client Matrix: Water
Date Sampled: 09/14/2010 1350
Date Received: 09/15/2010 0912

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method: 8081A_8082
Preparation: 3520C
Dilution: 1.0
Date Analyzed: 09/20/2010 1400
Date Prepared: 09/18/2010 1253

Analysis Batch: 680-180528
Prep Batch: 680-180283

Instrument ID: SGM
Initial Weight/Volume: 500 mL
Final Weight/Volume: 5 mL
Injection Volume: 2 uL
Result Type: SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	49		14 - 115
Tetrachloro-m-xylene	125	X	35 - 120

Client Sample ID: **MW-111-091410**

Lab Sample ID:	680-61217-4	Date Sampled: 09/14/2010 1350
Client Matrix:	Water	Date Received: 09/15/2010 0912

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180528		Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-180283		Initial Weight/Volume:	500 mL
Dilution:	200			Final Weight/Volume:	5 mL
Date Analyzed:	09/20/2010 2114	Run Type:	DL	Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	14	D	10
beta-BHC	10	U D	10
Chlordane (technical)	100	U	100
4,4'-DDD	20	U	20
4,4'-DDE	20	U	20
4,4'-DDT	20	U	20
delta-BHC	30	D	10
Dieldrin	20	U	20
gamma-BHC (Lindane)	10	U D	10
Heptachlor	10	U	10
Methoxychlor	20	U	20
Toxaphene	1000	U	1000

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	0	D	14 - 115
DCB Decachlorobiphenyl	0	D	14 - 115
Tetrachloro-m-xylene	0	D	35 - 120
Tetrachloro-m-xylene	0	D	35 - 120

Client Sample ID: **MW-114-091410**

Lab Sample ID:	680-61217-5	Date Sampled: 09/14/2010 1630
Client Matrix:	Water	Date Received: 09/15/2010 0912

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180528	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-180283	Initial Weight/Volume:	500 mL
Dilution:	1.0		Final Weight/Volume:	5 mL
Date Analyzed:	09/20/2010 1420		Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	0.24		0.050
beta-BHC	4.8	E	0.050
Chlordane (technical)	0.50	U	0.50
4,4'-DDD	0.10	U	0.10
4,4'-DDE	0.10	U	0.10
4,4'-DDT	0.10	U	0.10
delta-BHC	0.11	p	0.050
Dieldrin	0.10	U	0.10
gamma-BHC (Lindane)	0.27		0.050
Heptachlor	0.050	U	0.050
Methoxychlor	0.10	U	0.10
Toxaphene	5.0	U	5.0

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	65		14 - 115
Tetrachloro-m-xylene	76		35 - 120

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61217-1

Client Sample ID: **MW-114-091410**

Lab Sample ID:	680-61217-5	Date Sampled:	09/14/2010 1630
Client Matrix:	Water	Date Received:	09/15/2010 0912

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180528	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-180283	Initial Weight/Volume:	500 mL
Dilution:	1.0		Final Weight/Volume:	5 mL
Date Analyzed:	09/20/2010 1420		Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	52		14 - 115
Tetrachloro-m-xylene	62		35 - 120

Client Sample ID: **MW-114-091410**

Lab Sample ID: 680-61217-5
Client Matrix: Water

Date Sampled: 09/14/2010 1630
Date Received: 09/15/2010 0912

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180528		Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-180283		Initial Weight/Volume:	500 mL
Dilution:	10			Final Weight/Volume:	5 mL
Date Analyzed:	09/20/2010 2134	Run Type:	DL	Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	0.50	U D	0.50
beta-BHC	4.6	D	0.50
Chlordane (technical)	5.0	U	5.0
4,4'-DDD	1.0	U	1.0
4,4'-DDE	1.0	U	1.0
4,4'-DDT	1.0	U	1.0
delta-BHC	0.50	U	0.50
Dieldrin	1.0	U	1.0
gamma-BHC (Lindane)	0.50	U D	0.50
Heptachlor	0.50	U	0.50
Methoxychlor	1.0	U	1.0
Toxaphene	50	U	50

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	0	D	14 - 115
DCB Decachlorobiphenyl	0	D	14 - 115
Tetrachloro-m-xylene	0	D	35 - 120
Tetrachloro-m-xylene	0	D	35 - 120

Client Sample ID: **MW-117-091410**

Lab Sample ID:	680-61217-7	Date Sampled: 09/14/2010 1450
Client Matrix:	Water	Date Received: 09/15/2010 0912

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180528	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-180283	Initial Weight/Volume:	500 mL
Dilution:	1.0		Final Weight/Volume:	5 mL
Date Analyzed:	09/20/2010 1439		Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	0.050	U	0.050
beta-BHC	0.050	U	0.050
Chlordane (technical)	0.50	U	0.50
4,4'-DDD	0.10	U	0.10
4,4'-DDE	0.10	U	0.10
4,4'-DDT	0.10	U	0.10
delta-BHC	0.050	U	0.050
Dieldrin	0.10	U	0.10
gamma-BHC (Lindane)	0.050	U	0.050
Heptachlor	0.050	U	0.050
Methoxychlor	0.10	U	0.10
Toxaphene	5.0	U	5.0

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	84		14 - 115
Tetrachloro-m-xylene	81		35 - 120

Client Sample ID: **MW-117-091410**

Lab Sample ID:	680-61217-7	Date Sampled: 09/14/2010 1450
Client Matrix:	Water	Date Received: 09/15/2010 0912

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180528	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-180283	Initial Weight/Volume:	500 mL
Dilution:	1.0		Final Weight/Volume:	5 mL
Date Analyzed:	09/20/2010 1439		Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	78		14 - 115
Tetrachloro-m-xylene	70		35 - 120

Client Sample ID: **MW-115-091410**

Lab Sample ID:	680-61217-8	Date Sampled:	09/14/2010 1620
Client Matrix:	Water	Date Received:	09/15/2010 0912

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180528	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-180283	Initial Weight/Volume:	1060 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/20/2010 1459		Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	0.24		0.047
beta-BHC	0.13		0.047
Chlordane (technical)	0.47	U	0.47
4,4'-DDD	0.094	U	0.094
4,4'-DDE	0.094	U	0.094
4,4'-DDT	0.094	U	0.094
delta-BHC	0.047	U	0.047
Dieldrin	0.094	U	0.094
gamma-BHC (Lindane)	0.073		0.047
Heptachlor	0.047	U	0.047
Methoxychlor	0.094	U	0.094
Toxaphene	4.7	U	4.7

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	52		14 - 115
Tetrachloro-m-xylene	47	p	35 - 120

Client Sample ID: **MW-115-091410**

Lab Sample ID: 680-61217-8

Client Matrix: Water

Date Sampled: 09/14/2010 1620

Date Received: 09/15/2010 0912

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method: 8081A_8082

Preparation: 3520C

Dilution: 1.0

Date Analyzed: 09/20/2010 1459

Date Prepared: 09/18/2010 1253

Analysis Batch: 680-180528

Prep Batch: 680-180283

Instrument ID: SGM

Initial Weight/Volume: 1060 mL

Final Weight/Volume: 10 mL

Injection Volume: 2 uL

Result Type: SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	52		14 - 115
Tetrachloro-m-xylene	75		35 - 120

Client Sample ID: **MW-108-091410**

Lab Sample ID:	680-61217-1	Date Sampled: 09/14/2010 1012
Client Matrix:	Water	Date Received: 09/15/2010 0912

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-180521	Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-180038	Lab File ID:	180038.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/17/2010 2351		Final Weight/Volume:	250 mL
Date Prepared:	09/15/2010 1723			

Analyte	Result (ug/L)	Qualifier	RL
Copper	300		5.0
Zinc	3600		20

Client Sample ID: **MW-109-091410**

Lab Sample ID: 680-61217-2
Client Matrix: Water

Date Sampled: 09/14/2010 1115
Date Received: 09/15/2010 0912

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-180521	Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-180038	Lab File ID:	180038.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/17/2010 2358		Final Weight/Volume:	250 mL
Date Prepared:	09/15/2010 1723			

Analyte	Result (ug/L)	Qualifier	RL
Arsenic	61		2.5
Copper	79		5.0
Lead	610		1.5

Method:	6020	Analysis Batch: 680-180521	Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-180038	Lab File ID:	180038.chr
Dilution:	10		Initial Weight/Volume:	50 mL
Date Analyzed:	09/18/2010 1220		Final Weight/Volume:	250 mL
Date Prepared:	09/15/2010 1723			

Analyte	Result (ug/L)	Qualifier	RL
Zinc	25000		200

Client Sample ID: **DUPLICATE CSX-091410**

Lab Sample ID: 680-61217-3 Date Sampled: 09/14/2010 1200
Client Matrix: Water Date Received: 09/15/2010 0912

6020 Metals (ICP/MS)

Method: 6020 Analysis Batch: 680-180521 Instrument ID: ICPMSA
Preparation: 3010A Prep Batch: 680-180038 Lab File ID: 180038.chr
Dilution: 1.0 Initial Weight/Volume: 50 mL
Date Analyzed: 09/18/2010 0005 Final Weight/Volume: 250 mL
Date Prepared: 09/15/2010 1723

Analyte	Result (ug/L)	Qualifier	RL
Arsenic	74		2.5
Copper	98		5.0
Lead	700		1.5

Method: 6020 Analysis Batch: 680-180521 Instrument ID: ICPMSA
Preparation: 3010A Prep Batch: 680-180038 Lab File ID: 180038.chr
Dilution: 10 Initial Weight/Volume: 50 mL
Date Analyzed: 09/18/2010 1227 Final Weight/Volume: 250 mL
Date Prepared: 09/15/2010 1723

Analyte	Result (ug/L)	Qualifier	RL
Zinc	28000		200

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61217-1

Client Sample ID: **MW-111-091410**

Lab Sample ID:	680-61217-4	Date Sampled: 09/14/2010 1350
Client Matrix:	Water	Date Received: 09/15/2010 0912

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-180521	Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-180038	Lab File ID:	180038.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/18/2010 0027		Final Weight/Volume:	250 mL
Date Prepared:	09/15/2010 1723			

Analyte	Result (ug/L)	Qualifier	RL
Arsenic	2.5	U	2.5
Copper	39		5.0
Lead	1.5	U	1.5
Zinc	4400		20

Client Sample ID: **MW-114-091410**

Lab Sample ID: 680-61217-5
Client Matrix: Water

Date Sampled: 09/14/2010 1630
Date Received: 09/15/2010 0912

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-180521		Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-180038		Lab File ID:	180038.chr
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	09/18/2010 0034			Final Weight/Volume:	250 mL
Date Prepared:	09/15/2010 1723				

Analyte	Result (ug/L)	Qualifier	RL
Arsenic	2.5	U	2.5
Copper	2200		5.0
Lead	4.0		1.5
Zinc	8700		20

Client Sample ID: **MW-102-091410**

Lab Sample ID:	680-61217-6	Date Sampled: 09/14/2010 1010
Client Matrix:	Water	Date Received: 09/15/2010 0912

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-180521	Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-180038	Lab File ID:	180038.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/18/2010 0041		Final Weight/Volume:	250 mL
Date Prepared:	09/15/2010 1723			

Analyte	Result (ug/L)	Qualifier	RL
Copper	5.0	U	5.0
Zinc	20	U	20

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61217-1

Client Sample ID: **MW-117-091410**

Lab Sample ID: 680-61217-7

Client Matrix: Water

Date Sampled: 09/14/2010 1450

Date Received: 09/15/2010 0912

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-180521	Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-180038	Lab File ID:	180038.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/18/2010 0049		Final Weight/Volume:	250 mL
Date Prepared:	09/15/2010 1723			

Analyte	Result (ug/L)	Qualifier	RL
Arsenic	2.5	U	2.5
Copper	38		5.0
Lead	1.5	U	1.5
Zinc	1600		20

Client Sample ID: **MW-115-091410**

Lab Sample ID:	680-61217-8	Date Sampled: 09/14/2010 1620
Client Matrix:	Water	Date Received: 09/15/2010 0912

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-180521	Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-180038	Lab File ID:	180038.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/18/2010 0056		Final Weight/Volume:	250 mL
Date Prepared:	09/15/2010 1723			

Analyte	Result (ug/L)	Qualifier	RL
Arsenic	2.5	U	2.5
Copper	6700		5.0
Lead	1.5	U	1.5

Method:	6020	Analysis Batch: 680-180521	Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-180038	Lab File ID:	180038.chr
Dilution:	5.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/18/2010 1234		Final Weight/Volume:	250 mL
Date Prepared:	09/15/2010 1723			

Analyte	Result (ug/L)	Qualifier	RL
Zinc	20000		100

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61217-1

Client Sample ID: **MW-110-091410**

Lab Sample ID: 680-61217-9

Client Matrix: Water

Date Sampled: 09/14/2010 1220

Date Received: 09/15/2010 0912

6020 Metals (ICP/MS)

Method: 6020

Preparation: 3010A

Dilution: 1.0

Date Analyzed: 09/18/2010 0103

Date Prepared: 09/15/2010 1723

Analysis Batch: 680-180521

Prep Batch: 680-180038

Instrument ID: ICPMSA

Lab File ID: 180038.chr

Initial Weight/Volume: 50 mL

Final Weight/Volume: 250 mL

Analyte	Result (ug/L)	Qualifier	RL
Copper	390		5.0
Zinc	5700		20

General Chemistry

Client Sample ID: **MW-108-091410**

Lab Sample ID: 680-61217-1 Date Sampled: 09/14/2010 1012
Client Matrix: Water Date Received: 09/15/2010 0912

Analyte	Result	Qual	Units	RL	Dil	Method
Nitrate as N	0.42		mg/L	0.25	5.0	9056
	Analysis Batch: 680-180065	Date Analyzed: 09/15/2010 1853				
Sulfate	320		mg/L	10	10	9056
	Analysis Batch: 680-180289	Date Analyzed: 09/17/2010 1144				

General Chemistry

Client Sample ID: **MW-109-091410**

Lab Sample ID: 680-61217-2
Client Matrix: Water

Date Sampled: 09/14/2010 1115
Date Received: 09/15/2010 0912

Analyte	Result	Qual	Units	RL	Dil	Method
Nitrate as N	0.38		mg/L	0.25	5.0	9056
	Analysis Batch: 680-180065	Date Analyzed: 09/15/2010 1906				
Sulfate	1300		mg/L	50	50	9056
	Analysis Batch: 680-180289	Date Analyzed: 09/17/2010 1156				

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61217-1

General Chemistry

Client Sample ID: **DUPLICATE CSX-091410**

Lab Sample ID: 680-61217-3

Client Matrix: Water

Date Sampled: 09/14/2010 1200

Date Received: 09/15/2010 0912

Analyte	Result	Qual	Units	RL	Dil	Method
Nitrate as N	0.38		mg/L	0.25	5.0	9056
	Analysis Batch: 680-180065	Date Analyzed: 09/15/2010 1918				
Sulfate	1400		mg/L	50	50	9056
	Analysis Batch: 680-180289	Date Analyzed: 09/17/2010 1246				

General Chemistry

Client Sample ID: **MW-111-091410**

Lab Sample ID: 680-61217-4

Client Matrix: Water

Date Sampled: 09/14/2010 1350

Date Received: 09/15/2010 0912

Analyte	Result	Qual	Units	RL	Dil	Method
Nitrate as N	0.25	U	mg/L	0.25	5.0	9056
Analysis Batch: 680-180065	Date Analyzed: 09/15/2010 2134					
Sulfate	240		mg/L	25	25	9056
Analysis Batch: 680-180289	Date Analyzed: 09/17/2010 1259					

General Chemistry

Client Sample ID: **MW-114-091410**

Lab Sample ID: 680-61217-5
Client Matrix: Water

Date Sampled: 09/14/2010 1630
Date Received: 09/15/2010 0912

Analyte		Result	Qual	Units	RL	Dil	Method
Nitrate as N		16	E	mg/L	0.25	5.0	9056
	Analysis Batch: 680-180065	Date Analyzed: 09/15/2010 2212					
Nitrate as N		19	H	mg/L	1.0	20	9056
Run Type: DL	Analysis Batch: 680-180236	Date Analyzed: 09/16/2010 1817					
Sulfate		290		mg/L	25	25	9056
	Analysis Batch: 680-180289	Date Analyzed: 09/17/2010 1311					

General Chemistry

Client Sample ID: **MW-102-091410**

Lab Sample ID: 680-61217-6

Client Matrix: Water

Date Sampled: 09/14/2010 1010

Date Received: 09/15/2010 0912

Analyte	Result	Qual	Units	RL	Dil	Method
Nitrate as N	5.1		mg/L	0.25	5.0	9056
	Analysis Batch: 680-180065	Date Analyzed: 09/15/2010 1841				
Sulfate	160		mg/L	5.0	5.0	9056
	Analysis Batch: 680-180289	Date Analyzed: 09/17/2010 1323				

General Chemistry

Client Sample ID: **MW-117-091410**

Lab Sample ID: 680-61217-7 Date Sampled: 09/14/2010 1450
Client Matrix: Water Date Received: 09/15/2010 0912

Analyte	Result	Qual	Units	RL	Dil	Method
Nitrate as N	2.5		mg/L	0.25	5.0	9056
Analysis Batch: 680-180065			Date Analyzed: 09/15/2010 2147			
Sulfate	260		mg/L	10	10	9056
Analysis Batch: 680-180289			Date Analyzed: 09/17/2010 1336			

General Chemistry

Client Sample ID: **MW-115-091410**

Lab Sample ID: 680-61217-8
Client Matrix: Water
Date Sampled: 09/14/2010 1620
Date Received: 09/15/2010 0912

Analyte	Result	Qual	Units	RL	Dil	Method
Nitrate as N	3.2		mg/L	0.25	5.0	9056
Analysis Batch: 680-180065	Date Analyzed: 09/15/2010 2159					
Sulfate	430		mg/L	25	25	9056
Analysis Batch: 680-180289	Date Analyzed: 09/17/2010 1348					

General Chemistry

Client Sample ID: **MW-110-091410**

Lab Sample ID: 680-61217-9		Date Sampled: 09/14/2010 1220
Client Matrix: Water		Date Received: 09/15/2010 0912

Analyte		Result	Qual	Units	RL	Dil	Method
Nitrate as N		9.8		mg/L	0.25	5.0	9056
	Analysis Batch: 680-180065		Date Analyzed: 09/15/2010 1930				
Sulfate		310		mg/L	10	10	9056
	Analysis Batch: 680-180289		Date Analyzed: 09/17/2010 1401				

DATA REPORTING QUALIFIERS

Client: MACTEC Engineering and Consulting Inc — Job Number: 680-61217-1

Lab Section	Qualifier	Description
GC/MS Semi VOA		
	U	Indicates the analyte was analyzed for but not detected.
GC Semi VOA		
	U	Indicates the analyte was analyzed for but not detected.
	F	MS or MSD exceeds the control limits
	4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.
	E	Result exceeded calibration range.
	F	RPD of the MS and MSD exceeds the control limits
	D	Sample results are obtained from a dilution; the surrogate or matrix spike recoveries reported are calculated from diluted samples.
	X	Surrogate is outside control limits
	D	Surrogate or matrix spike recoveries were not obtained because the extract was diluted for analysis; also compounds analyzed at a dilution may be flagged with a D.
	p	The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.
Metals		
	U	Indicates the analyte was analyzed for but not detected.
General Chemistry		
	U	Indicates the analyte was analyzed for but not detected.
	F	MS or MSD exceeds the control limits
	E	Result exceeded calibration range.
	H	Sample was prepped or analyzed beyond the specified holding time

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61217-1

Method Blank - Batch: 680-180267

Method: 8270C
Preparation: 3520C

Lab Sample ID: MB 680-180267/19-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/20/2010 1424
Date Prepared: 09/18/2010 1253

Analysis Batch: 680-180419
Prep Batch: 680-180267
Units: ug/L

Instrument ID: MSN
Lab File ID: n9327.d
Initial Weight/Volume: 1000 mL
Final Weight/Volume: 1 mL
Injection Volume: 1 uL

Analyte	Result	Qual	RL
1,2,3-Trichlorobenzene	10	U	10
1,2,4-Trichlorobenzene	10	U	10

Surrogate	% Rec	Acceptance Limits
2-Fluorobiphenyl	62	50 - 113
2-Fluorophenol	66	36 - 110
Nitrobenzene-d5	65	45 - 112
Phenol-d5	62	38 - 116
Terphenyl-d14	90	10 - 121
2,4,6-Tribromophenol	63	40 - 139

Lab Control Sample - Batch: 680-180267

Method: 8270C
Preparation: 3520C

Lab Sample ID:	LCS 680-180267/20-A	Analysis Batch:	680-180419	Instrument ID:	MSN
Client Matrix:	Water	Prep Batch:	680-180267	Lab File ID:	n9328.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	1000 mL
Date Analyzed:	09/20/2010 1450			Final Weight/Volume:	1 mL
Date Prepared:	09/18/2010 1253			Injection Volume:	1 uL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
1,2,4-Trichlorobenzene	100	64.4	64	41 - 110	

Surrogate	% Rec	Acceptance Limits
2-Fluorobiphenyl	81	50 - 113
2-Fluorophenol	80	36 - 110
Nitrobenzene-d5	83	45 - 112
Phenol-d5	83	38 - 116
Terphenyl-d14	90	10 - 121
2,4,6-Tribromophenol	94	40 - 139

Lab Control Sample - Batch: 680-180267

Method: 8270C
Preparation: 3520C

Lab Sample ID:	LCS 680-180267/23-A	Analysis Batch:	680-180419	Instrument ID:	MSN
Client Matrix:	Water	Prep Batch:	680-180267	Lab File ID:	n9329.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	1000 mL
Date Analyzed:	09/20/2010 1515			Final Weight/Volume:	1 mL
Date Prepared:	09/18/2010 1253			Injection Volume:	1 uL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
1,2,3-Trichlorobenzene	100	56.6	57	14 - 130	

Surrogate	% Rec	Acceptance Limits
2-Fluorobiphenyl	71	50 - 113
2-Fluorophenol	75	36 - 110
Nitrobenzene-d5	73	45 - 112
Phenol-d5	75	38 - 116
Terphenyl-d14	76	10 - 121
2,4,6-Tribromophenol	84	40 - 139

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61217-1

Method Blank - Batch: 680-180283

Method: 8081A_8082
Preparation: 3520C

Lab Sample ID: MB 680-180283/16-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/20/2010 1122
Date Prepared: 09/18/2010 1253

Analysis Batch: 680-180528
Prep Batch: 680-180283
Units: ug/L

Instrument ID: SGM
Lab File ID: mi20009.d
Initial Weight/Volume: 1000 mL
Final Weight/Volume: 10 mL
Injection Volume: 2 uL
Column ID: PRIMARY

Analyte	Result	Qual	RL
alpha-BHC	0.050	U	0.050
beta-BHC	0.050	U	0.050
Chlordane (technical)	0.50	U	0.50
4,4'-DDD	0.10	U	0.10
4,4'-DDE	0.10	U	0.10
4,4'-DDT	0.10	U	0.10
delta-BHC	0.050	U	0.050
Dieldrin	0.10	U	0.10
gamma-BHC (Lindane)	0.050	U	0.050
Heptachlor	0.050	U	0.050
Methoxychlor	0.10	U	0.10
Toxaphene	5.0	U	5.0

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	77	14 - 115
Tetrachloro-m-xylene	72	35 - 120

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	76	14 - 115
Tetrachloro-m-xylene	62	35 - 120

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61217-1

Lab Control Sample - Batch: 680-180283

Method: 8081A_8082
Preparation: 3520C

Lab Sample ID: LCS 680-180283/17-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/20/2010 1142
Date Prepared: 09/18/2010 1253

Analysis Batch: 680-180528
Prep Batch: 680-180283
Units: ug/L

Instrument ID: SGM
Lab File ID: mi20010.d
Initial Weight/Volume: 1000 mL
Final Weight/Volume: 10 mL
Injection Volume: 2 uL
Column ID: PRIMARY

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
alpha-BHC	0.100	0.107	107	29 - 112	
beta-BHC	0.100	0.168	168	15 - 204	
4,4'-DDD	0.200	0.217	108	37 - 179	
4,4'-DDE	0.200	0.151	76	33 - 142	
4,4'-DDT	0.200	0.242	121	27 - 141	
delta-BHC	0.100	0.106	106	25 - 123	
Dieldrin	0.200	0.222	111	45 - 137	
gamma-BHC (Lindane)	0.100	0.112	112	31 - 118	
Heptachlor	0.100	0.0860	86	30 - 133	
Methoxychlor	0.200	0.243	122	10 - 243	

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	80	14 - 115
Tetrachloro-m-xylene	88	35 - 120

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	77	14 - 115
Tetrachloro-m-xylene	72	35 - 120

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	89	14 - 115
Tetrachloro-m-xylene	88	35 - 120

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	87	14 - 115
Tetrachloro-m-xylene	76	35 - 120

Lab Control Sample - Batch: 680-180283

Method: 8081A_8082
Preparation: 3520C

Lab Sample ID: LCS 680-180283/25-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/20/2010 1222
Date Prepared: 09/18/2010 1253

Analysis Batch: 680-180528
Prep Batch: 680-180283
Units: ug/L

Instrument ID: SGM
Lab File ID: mi20012.d
Initial Weight/Volume: 1000 mL
Final Weight/Volume: 10 mL
Injection Volume: 2 uL
Column ID: PRIMARY

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Chlordane (technical)	5.00	4.81	96	70 - 130	

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61217-1

Lab Control Sample - Batch: 680-180283

Method: 8081A_8082
Preparation: 3520C

Lab Sample ID: LCS 680-180283/25-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/20/2010 1222
Date Prepared: 09/18/2010 1253

Analysis Batch: 680-180528
Prep Batch: 680-180283
Units: ug/L

Instrument ID: SGM
Lab File ID: mi20012.d
Initial Weight/Volume: 1000 mL
Final Weight/Volume: 10 mL
Injection Volume: 2 uL
Column ID: PRIMARY

Analyte	Spike Amount	Result	% Rec.	Limit	Qual

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	69	14 - 115
Tetrachloro-m-xylene	90	35 - 120

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	66	14 - 115
Tetrachloro-m-xylene	77	35 - 120

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-180283

Method: 8081A_8082
Preparation: 3520C

MS Lab Sample ID:	680-61217-4	Analysis Batch:	680-180528	Instrument ID:	SGM
Client Matrix:	Water	Prep Batch:	680-180283	Lab File ID:	mi20029.d
Dilution:	1.0			Initial Weight/Volume:	500 mL
Date Analyzed:	09/20/2010 1757			Final Weight/Volume:	5 mL
Date Prepared:	09/18/2010 1253			Injection Volume:	2 uL
				Column ID:	PRIMARY

MSD Lab Sample ID:	680-61217-4	Analysis Batch:	680-180528	Instrument ID:	SGM
Client Matrix:	Water	Prep Batch:	680-180283	Lab File ID:	mi20030.d
Dilution:	1.0			Initial Weight/Volume:	500 mL
Date Analyzed:	09/20/2010 1817			Final Weight/Volume:	5 mL
Date Prepared:	09/18/2010 1253			Injection Volume:	2 uL
				Column ID:	PRIMARY

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
alpha-BHC	-4794	-929	29 - 112	27	40	E 4	E 4
beta-BHC	-612	-99	15 - 204	12	40	E 4	E 4
4,4'-DDD	148	160	37 - 179	8	40		
4,4'-DDE	68	107	33 - 142	44	40	p	F
4,4'-DDT	169	106	27 - 141	45	40	F	p F
delta-BHC	-5570	-1620	25 - 123	13	40	E 4	E 4
Dieldrin	87	104	45 - 137	10	40		
gamma-BHC (Lindane)	-1805	-511	31 - 118	17	40	E 4	E 4
Heptachlor	17095	21959	30 - 133	25	40	E p F	E p F
Methoxychlor	159	110	10 - 243	36	40		p

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
DCB Decachlorobiphenyl	49	52	14 - 115
Tetrachloro-m-xylene	91	90	35 - 120

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
DCB Decachlorobiphenyl	36	38	14 - 115
Tetrachloro-m-xylene	73	86	35 - 120

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
DCB Decachlorobiphenyl	59	74	14 - 115
Tetrachloro-m-xylene	70	85	35 - 120

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
DCB Decachlorobiphenyl	51	63	14 - 115
Tetrachloro-m-xylene	66	65	35 - 120

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-180283

Method: 8081A_8082
Preparation: 3520C

MS Lab Sample ID:	680-61217-7	Analysis Batch:	680-180528	Instrument ID:	SGM
Client Matrix:	Water	Prep Batch:	680-180283	Lab File ID:	mi20035.d
Dilution:	1.0			Initial Weight/Volume:	500 mL
Date Analyzed:	09/20/2010 1955			Final Weight/Volume:	5 mL
Date Prepared:	09/18/2010 1253			Injection Volume:	2 uL
				Column ID:	PRIMARY

MSD Lab Sample ID:	680-61217-7	Analysis Batch:	680-180528	Instrument ID:	SGM
Client Matrix:	Water	Prep Batch:	680-180283	Lab File ID:	mi20036.d
Dilution:	1.0			Initial Weight/Volume:	500 mL
Date Analyzed:	09/20/2010 2015			Final Weight/Volume:	5 mL
Date Prepared:	09/18/2010 1253			Injection Volume:	2 uL
				Column ID:	PRIMARY

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Chlordane (technical)	93	97	70 - 130	4	40		

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
DCB Decachlorobiphenyl	70	78	14 - 115
Tetrachloro-m-xylene	71	74	35 - 120

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
DCB Decachlorobiphenyl	67	75	14 - 115
Tetrachloro-m-xylene	60	67	35 - 120

Method Blank - Batch: 680-180038

Method: 6020
Preparation: 3010A

Lab Sample ID: MB 680-180038/21-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/17/2010 2134
Date Prepared: 09/15/2010 1723

Analysis Batch: 680-180521
Prep Batch: 680-180038
Units: ug/L

Instrument ID: ICPMSA
Lab File ID: 180038.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result	Qual	RL
Arsenic	2.5	U	2.5
Copper	5.0	U	5.0
Lead	1.5	U	1.5
Zinc	20	U	20

Lab Control Sample - Batch: 680-180038

Method: 6020
Preparation: 3010A

Lab Sample ID: LCS 680-180038/22-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/17/2010 2141
Date Prepared: 09/15/2010 1723

Analysis Batch: 680-180521
Prep Batch: 680-180038
Units: ug/L

Instrument ID: ICPMSA
Lab File ID: 180038.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Arsenic	100	96.6	97	75 - 125	
Copper	100	101	101	75 - 125	
Lead	50.0	48.0	96	75 - 125	
Zinc	100	93.4	93	75 - 125	

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61217-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-180038

Method: 6020
Preparation: 3010A

MS Lab Sample ID:	680-61183-C-1-B MS	Analysis Batch:	680-180521	Instrument ID:	ICPMSA
Client Matrix:	Water	Prep Batch:	680-180038	Lab File ID:	180038.chr
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	09/17/2010 2210			Final Weight/Volume:	250 mL
Date Prepared:	09/15/2010 1723				

MSD Lab Sample ID:	680-61183-C-1-C MSD	Analysis Batch:	680-180521	Instrument ID:	ICPMSA
Client Matrix:	Water	Prep Batch:	680-180038	Lab File ID:	180038.chr
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	09/17/2010 2217			Final Weight/Volume:	250 mL
Date Prepared:	09/15/2010 1723				

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Arsenic	101	98	75 - 125	2	20		
Copper	100	98	75 - 125	2	20		
Lead	95	92	75 - 125	3	20		
Zinc	98	91	75 - 125	3	20		

Client: MACTEC Engineering and Consulting Inc | Job Number: 680-61217-1

Method Blank - Batch: 680-180065

Method: 9056
Preparation: N/A

Lab Sample ID: MB 680-180065/2
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/15/2010 1751
Date Prepared: N/A

Analysis Batch: 680-180065
Prep Batch: N/A
Units: mg/L

Instrument ID: ICG
Lab File ID: 0035.d
Initial Weight/Volume: 1 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	RL
Nitrate as N	0.25	U	0.25

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 680-180065

Method: 9056
Preparation: N/A

LCS Lab Sample ID: LCS 680-180065/3
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/15/2010 1804
Date Prepared: N/A

Analysis Batch: 680-180065
Prep Batch: N/A
Units: mg/L

Instrument ID: ICG
Lab File ID: 0036.d
Initial Weight/Volume: 1 mL
Final Weight/Volume: 5 mL
1 uL

LCSD Lab Sample ID: LCSD 680-180065/4
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/15/2010 1816
Date Prepared: N/A

Analysis Batch: 680-180065
Prep Batch: N/A
Units: mg/L

Instrument ID: ICG
Lab File ID: 0037.d
Initial Weight/Volume: 1 mL
Final Weight/Volume: 5 mL
1 uL

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Nitrate as N	96	96	90 - 110	0	30		

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61217-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-180065

Method: 9056
Preparation: N/A

MS Lab Sample ID:	680-61217-9	Analysis Batch:	680-180065	Instrument ID:	ICG
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	0044.d
Dilution:	5.0			Initial Weight/Volume:	1 mL
Date Analyzed:	09/15/2010 1943			Final Weight/Volume:	5 mL
Date Prepared:	N/A				1 uL

MSD Lab Sample ID:	680-61217-9	Analysis Batch:	680-180065	Instrument ID:	ICG
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	0045.d
Dilution:	5.0			Initial Weight/Volume:	1 mL
Date Analyzed:	09/15/2010 1955			Final Weight/Volume:	5 mL
Date Prepared:	N/A				1 uL

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Nitrate as N	77	74	90 - 110	1	30	E F	E F

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61217-1

Method Blank - Batch: 680-180236

Method: 9056
Preparation: N/A

Lab Sample ID: MB 680-180236/2
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/16/2010 1740
Date Prepared: N/A

Analysis Batch: 680-180236
Prep Batch: N/A
Units: mg/L

Instrument ID: ICG
Lab File ID: 0036.d
Initial Weight/Volume: 1 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	RL
Nitrate as N	0.25	U	0.25

Lab Control Sample - Batch: 680-180236

Method: 9056
Preparation: N/A

Lab Sample ID: LCS 680-180236/3
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/16/2010 1752
Date Prepared: N/A

Analysis Batch: 680-180236
Prep Batch: N/A
Units: mg/L

Instrument ID: ICG
Lab File ID: 0037.d
Initial Weight/Volume: 1 mL
Final Weight/Volume: 5 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Nitrate as N	2.50	2.41	96	90 - 110	

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-180236

Method: 9056
Preparation: N/A

MS Lab Sample ID: 680-61277-F-6 MS
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/16/2010 1957
Date Prepared: N/A

Analysis Batch: 680-180236
Prep Batch: N/A

Instrument ID: ICG
Lab File ID: 0047.d
Initial Weight/Volume: 1 mL
Final Weight/Volume: 5 mL
1 uL

MSD Lab Sample ID: 680-61277-F-6 MSD
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/16/2010 2009
Date Prepared: N/A

Analysis Batch: 680-180236
Prep Batch: N/A

Instrument ID: ICG
Lab File ID: 0048.d
Initial Weight/Volume: 1 mL
Final Weight/Volume: 5 mL
1 uL

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Nitrate as N	95	96	90 - 110	1	30		

Method Blank - Batch: 680-180289

Method: 9056
Preparation: N/A

Lab Sample ID:	MB 680-180289/4	Analysis Batch: 680-180289		Instrument ID:	ICG
Client Matrix:	Water	Prep Batch: N/A		Lab File ID:	0004.d
Dilution:	5.0	Units:	mg/L	Initial Weight/Volume:	1 mL
Date Analyzed:	09/17/2010 0940			Final Weight/Volume:	5 mL
Date Prepared:	N/A				

Analyte	Result	Qual	RL
Sulfate	5.0	U	5.0

Lab Control Sample - Batch: 680-180289

Method: 9056
Preparation: N/A

Lab Sample ID:	LCS 680-180289/5	Analysis Batch: 680-180289		Instrument ID:	ICG
Client Matrix:	Water	Prep Batch: N/A		Lab File ID:	0005.d
Dilution:	5.0	Units:	mg/L	Initial Weight/Volume:	1 mL
Date Analyzed:	09/17/2010 0952			Final Weight/Volume:	5 mL
Date Prepared:	N/A				

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	50.0	54.6	109	90 - 110	

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61217-1

Matrix Spike - Batch: 680-180289

Method: 9056
Preparation: N/A

Lab Sample ID: 680-61217-2
Client Matrix: Water
Dilution: 50
Date Analyzed: 09/17/2010 1209
Date Prepared: N/A

Analysis Batch: 680-180289
Prep Batch: N/A
Units: mg/L

Instrument ID: ICG
Lab File ID: 0016.d
Initial Weight/Volume: 1 mL
Final Weight/Volume: 5 mL
1 uL

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	1300	500	1950	124	90 - 110	F

Matrix Spike - Batch: 680-180289

Method: 9056
Preparation: N/A

Lab Sample ID: 680-61217-9
Client Matrix: Water
Dilution: 10
Date Analyzed: 09/17/2010 1413
Date Prepared: N/A

Analysis Batch: 680-180289
Prep Batch: N/A
Units: mg/L

Instrument ID: ICG
Lab File ID: 0026.d
Initial Weight/Volume: 1 mL
Final Weight/Volume: 5 mL
1 uL

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	310	100	416	105	90 - 110	

Serial Number 009615

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

FedEx #
873123914870
873123914881
873123914892
873123914970

TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.testamericainc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

○ Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE: BFEL-ATLANTA
PROJECT NO.: 6122-08-0154
PROJECT LOCATION (STATE): GA
TAL (LAB) PROJECT MANAGER: Kathy Smith
P.O. NUMBER:
CONTRACT NO.:
CLIENT (SITE) PM: Rhonda Quinn
CLIENT PHONE: 770-421-3400
CLIENT FAX: 770-421-3486
CLIENT NAME: MACTEC
CLIENT E-MAIL: RmQuinn@mactec.com
CLIENT ADDRESS: 3200 Town Point Dr, Ste 100 Kennesaw, GA 30144
COMPANY CONTRACTING THIS WORK (if applicable):

PAGE 1 OF 1
STANDARD REPORT DELIVERY ○
DATE DUE
EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE
NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	6020 Cu + Zn	9056 NO3 + SO4	8270C 1,2,3 + 1,2,4 TCB	6020 As, Pb, Cu, Zn	8081A Pesticides	REMARKS
PRESERVATIVE								HNO3	4°C	4°C	HNO3		
								NUMBER OF CONTAINERS SUBMITTED					
9-14-10	10:12	mw-108-091410	G	✓				1	1	2			Samples are in 4 coolers
9-14-10	11:15	mw-109-091410	G	✓					1	2	1	2	
9-14-10	12:00	Duplicate CSX-091410	G	✓					1	2	1	2	
9-14-10	13:50	mw-111-091410	G	✓					1	2	1	2	
9-14-10	16:30	mw-114-091410	G	✓					1	2	1	2	
9-14-10	10:10	mw-102-091410	G	✓				1	1	2			
9-14-10	14:50	mw-117-091410	G	✓					1	2	1	2	
9-14-10	16:20	mw-115-091410	G	✓					1	2	1	2	
9-14-10	12:20	mw-110-091410	G	✓				1	1	2			
9-14-10	17:45	mw-25-091410	G	✓					1	2	1	2	

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
Daniel L Howard	9/14/10	2000						
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SAVANNAH LOG NO.	LABORATORY REMARKS
	9/15/10	0912	YES ● NO ○		680-61217	TEMPS (°C): 1.4, 3.6, 2.4, 3.2

TAL8240-680 (1207)

Login Sample Receipt Check List

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61217-1

Login Number: 61217

List Source: TestAmerica Savannah

Creator: Swafford, Frances

List Number: 1

Question	**T / F/ NA**	**Comment**
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the sample IDs on the containers and the COC.	False	Did not rec. MW-25-091410
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	False	Rec. 1 lt amber broken MW-115-091410
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 680-61277-1

Job Description: BFEL Atlanta

For:
MACTEC Engineering and Consulting Inc
3200 Town Point Drive Northwest
Suite 100
Kennesaw, GA 30144

Attention: Ms. Rhonda Quinn

Kathryn Smith

Approved for release.
Kathryn Smith
Project Manager I
11/8/2010 3:54 PM

Kathryn Smith
Project Manager I
kathye.smith@testamericainc.com
11/08/2010
Revision: 1

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

Savannah Certifications and ID #s: A2LA: 0399.01; AL: 41450; ARDEQ: 88-0692; ARDOH; CA: 03217CA; CO; CT: PH0161; DE; FL: E87052; GA: 803; Guam; HI; IL: 200022; IN; IA: 353; KS: E-10322; KY EPPC: 90084; KY UST; LA DEQ: 30690; LA DHH: LA080008; ME: 2008022; MD: 250; MA: M-GA006; MI: 9925; MS; NFESC: 249; NV: GA00006; NJ: GA769; NM; NY: 10842; NC DWQ: 269; NC DHHS: 13701; PA: 68-00474; PR: GA00006; RI: LAO00244; SC: 98001001; TN: TN0296; TX: T104704185; USEPA: GA00006; VT: VT-87052; VA: 00302; WA; WV DEP: 094; WV DHHR: 9950 C; WI DNR: 999819810; WY/EPAR8: 8TMS-Q

TestAmerica Laboratories, Inc.
TestAmerica Savannah 5102 LaRoche Avenue, Savannah, GA 31404
Tel (912) 354-7858 Fax (912) 352-0165 www.testamericainc.com

ACCREDITED IN ACCORDANCE WITH nelac

Job Narrative
680-61277-1

Comments
No additional comments.

Receipt
All samples were received in good condition within temperature requirements.

GC/MS VOA
Method(s) 8260B: The equipment rinse blank associated with these samples contained a detection above 1/2 reporting limit (RL), for acetone, and detections above the method detection limit (MDL) for methylene chloride and tetrahydrofuran.

No other analytical or quality issues were noted.

GC/MS Semi VOA
Method(s) 8270C: The following sample(s) was diluted due to the abundance of target analytes: MW-104D-091510 (680-61277-8). As such, surrogate recoveries are not reported, and elevated reporting limits (RLs) are provided.

No other analytical or quality issues were noted.

GC Semi VOA
Method(s) 8081A_8082: This method incorporates the use of second column confirmation. Corrective action for unacceptable percent recovery is not taken for surrogate or spike compounds unless the results from both columns are outside criteria. Any results which fall outside criteria are qualified and reported.

Method(s) 8081A_8082: Due to the level of dilution required for the following sample(s), surrogate recoveries are not reported: MW-106D-091510 (680-61277-9).

No other analytical or quality issues were noted.

Metals
No analytical or quality issues were noted.

General Chemistry
No analytical or quality issues were noted.

Organic Prep
No analytical or quality issues were noted.

VOA Prep
No analytical or quality issues were noted.

METHOD / ANALYST SUMMARY

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61277-1

Method	Analyst	Analyst ID
SW846 8260B	Bearden, Robert	RB
SW846 8260B	Lanier, Carolyn	CL
SW846 8270C	Haynes, Carion	CRH
SW846 8081A_8082	Kellar, Joshua	JK
SW846 6020	Robertson, Bryn	BR
MCAWW 353.2	Ross, Jon	JR
SW846 9056	Brazell, Connie	CB
SW846 9056	Webb, Carol	CW

SAMPLE SUMMARY

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61277-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
680-61277-1	MW-25-091410	Water	09/14/2010 1745	09/16/2010 0920
680-61277-2TB	TB-091510	Water	09/15/2010 0930	09/16/2010 0920
680-61277-3RB	Equipment Rinse Blank	Water	09/15/2010 1000	09/16/2010 0920
680-61277-4	MW-104A-091510	Water	09/15/2010 1140	09/16/2010 0920
680-61277-5	MW-113-091510	Water	09/15/2010 1220	09/16/2010 0920
680-61277-6	MW-107D-091510	Water	09/15/2010 1600	09/16/2010 0920
680-61277-7	MW-105-091510	Water	09/15/2010 1517	09/16/2010 0920
680-61277-8	MW-104D-091510	Water	09/15/2010 1655	09/16/2010 0920
680-61277-9	MW-106D-091510	Water	09/15/2010 1700	09/16/2010 0920

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61277-1

Client Sample ID: **TB-091510**

Lab Sample ID:	680-61277-2TB	Date Sampled:	09/15/2010 0930
Client Matrix:	Water	Date Received:	09/16/2010 0920

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-180841	Instrument ID:	MSO
Preparation:	5030B		Lab File ID:	o0507.d
Dilution:	1.0		Initial Weight/Volume:	5 mL
Date Analyzed:	09/22/2010 1545		Final Weight/Volume:	5 mL
Date Prepared:	09/22/2010 1545			

Analyte	Result (ug/L)	Qualifier	RL
1,1,1,2-Tetrachloroethane	1.0	U	1.0
1,1,1-Trichloroethane	1.0	U	1.0
1,1,2,2-Tetrachloroethane	1.0	U	1.0
1,1,2-Trichloroethane	1.0	U	1.0
1,1-Dichloroethane	1.0	U	1.0
1,1-Dichloroethene	1.0	U	1.0
1,1-Dichloropropene	1.0	U	1.0
1,2,3-Trichloropropane	1.0	U	1.0
1,2,4-Trichlorobenzene	1.0	U	1.0
1,2-Dibromoethane	1.0	U	1.0
1,2-Dichlorobenzene	1.0	U	1.0
1,2-Dichloroethane	1.0	U	1.0
1,2-Dichloropropane	1.0	U	1.0
1,3-Dichlorobenzene	1.0	U	1.0
1,3-Dichloropropane	1.0	U	1.0
1,4-Dichlorobenzene	1.0	U	1.0
2-Butanone	10	U	10
4-Methyl-2-pentanone	10	U	10
Acetone	25	U	25
Benzene	1.0	U	1.0
Carbon tetrachloride	1.0	U	1.0
Chlorobenzene	1.0	U	1.0
Chloroethane	1.0	U	1.0
Chloroform	1.0	U	1.0
Chloromethane	1.0	U	1.0
cis-1,2-Dichloroethene	1.0	U	1.0
Cyclohexane	1.0	U	1.0
Dibromochloromethane	1.0	U	1.0
Dibromomethane	1.0	U	1.0
Dichlorodifluoromethane	1.0	U	1.0
Ethylbenzene	1.0	U	1.0
Hexachloro-1,3-butadiene	1.0	U	1.0
Isopropylbenzene	1.0	U	1.0
Methylene Chloride	5.0	U	5.0
Naphthalene	5.0	U	5.0
Styrene	1.0	U	1.0
Tetrachloroethene	1.0	U	1.0
Tetrahydrofuran	10	U *	10
Toluene	1.0	U	1.0
trans-1,2-Dichloroethene	1.0	U	1.0
Trichloroethene	1.0	U	1.0
Trichlorofluoromethane	1.0	U	1.0
Vinyl chloride	1.0	U	1.0
Xylenes, Total	2.0	U	2.0

Surrogate	%Rec	Qualifier	Acceptance Limits

Analytical Data

Client: MACTEC Engineering and Consulting Inc Job Number: 680-61277-1

Client Sample ID: **TB-091510**

Lab Sample ID: 680-61277-2TB Date Sampled: 09/15/2010 0930
Client Matrix: Water Date Received: 09/16/2010 0920

8260B Volatile Organic Compounds (GC/MS)

Method: 8260B Analysis Batch: 680-180841 Instrument ID: MSO
Preparation: 5030B Lab File ID: o0507.d
Dilution: 1.0 Initial Weight/Volume: 5 mL
Date Analyzed: 09/22/2010 1545 Final Weight/Volume: 5 mL
Date Prepared: 09/22/2010 1545

Surrogate	%Rec	Qualifier	Acceptance Limits
Toluene-d8 (Surr)	96		75 - 120

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61277-1

Client Sample ID: **Equipment Rinse Blank**

Lab Sample ID:	680-61277-3RB	Date Sampled:	09/15/2010 1000
Client Matrix:	Water	Date Received:	09/16/2010 0920

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-180841	Instrument ID:	MSO
Preparation:	5030B		Lab File ID:	o0535.d
Dilution:	1.0		Initial Weight/Volume:	5 mL
Date Analyzed:	09/22/2010 2225		Final Weight/Volume:	5 mL
Date Prepared:	09/22/2010 2225			

Analyte	Result (ug/L)	Qualifier	RL
1,1,1,2-Tetrachloroethane	1.0	U	1.0
1,1,1-Trichloroethane	1.0	U	1.0
1,1,2,2-Tetrachloroethane	1.0	U	1.0
1,1,2-Trichloroethane	1.0	U	1.0
1,1-Dichloroethane	1.0	U	1.0
1,1-Dichloroethene	1.0	U	1.0
1,1-Dichloropropene	1.0	U	1.0
1,2,3-Trichloropropane	1.0	U	1.0
1,2,4-Trichlorobenzene	1.0	U	1.0
1,2-Dibromoethane	1.0	U	1.0
1,2-Dichlorobenzene	1.0	U	1.0
1,2-Dichloroethane	1.0	U	1.0
1,2-Dichloropropane	1.0	U	1.0
1,3-Dichlorobenzene	1.0	U	1.0
1,3-Dichloropropane	1.0	U	1.0
1,4-Dichlorobenzene	1.0	U	1.0
2-Butanone	10	U	10
4-Methyl-2-pentanone	10	U	10
Acetone	25	U	25
Benzene	1.0	U	1.0
Carbon tetrachloride	1.0	U	1.0
Chlorobenzene	1.0	U	1.0
Chloroethane	1.0	U	1.0
Chloroform	1.0	U	1.0
Chloromethane	1.0	U	1.0
cis-1,2-Dichloroethene	1.0	U	1.0
Cyclohexane	1.0	U	1.0
Dibromochloromethane	1.0	U	1.0
Dibromomethane	1.0	U	1.0
Dichlorodifluoromethane	1.0	U	1.0
Ethylbenzene	1.0	U	1.0
Hexachloro-1,3-butadiene	1.0	U	1.0
Isopropylbenzene	1.0	U	1.0
Methylene Chloride	5.0	U	5.0
Naphthalene	5.0	U	5.0
Styrene	1.0	U	1.0
Tetrachloroethene	1.0	U	1.0
Tetrahydrofuran	10	U *	10
Toluene	1.0	U	1.0
trans-1,2-Dichloroethene	1.0	U	1.0
Trichloroethene	1.0	U	1.0
Trichlorofluoromethane	1.0	U	1.0
Vinyl chloride	1.0	U	1.0
Xylenes, Total	2.0	U	2.0

Surrogate	%Rec	Qualifier	Acceptance Limits

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61277-1

Client Sample ID: **Equipment Rinse Blank**

Lab Sample ID: 680-61277-3RB

Client Matrix: Water

Date Sampled: 09/15/2010 1000

Date Received: 09/16/2010 0920

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-180841	Instrument ID:	MSO
Preparation:	5030B		Lab File ID:	o0535.d
Dilution:	1.0		Initial Weight/Volume:	5 mL
Date Analyzed:	09/22/2010 2225		Final Weight/Volume:	5 mL
Date Prepared:	09/22/2010 2225			

Surrogate	%Rec	Qualifier	Acceptance Limits
Toluene-d8 (Surr)	99		75 - 120

Client: MACTEC Engineering and Consulting Inc | Job Number: 680-61277-1

Client Sample ID: **MW-104A-091510**

Lab Sample ID: 680-61277-4
Client Matrix: Water

Date Sampled: 09/15/2010 1140
Date Received: 09/16/2010 0920

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-180857	Instrument ID:	MSP2
Preparation:	5030B		Lab File ID:	p0334.d
Dilution:	1.0		Initial Weight/Volume:	5 mL
Date Analyzed:	09/23/2010 1503		Final Weight/Volume:	5 mL
Date Prepared:	09/23/2010 1503			

Analyte	Result (ug/L)	Qualifier	RL
1,1,1,2-Tetrachloroethane	1.0	U	1.0
1,1,1-Trichloroethane	1.0	U	1.0
1,1,2,2-Tetrachloroethane	1.0	U	1.0
1,1,2-Trichloroethane	1.0	U	1.0
1,1-Dichloroethane	1.0	U	1.0
1,1-Dichloroethene	1.0	U	1.0
1,1-Dichloropropene	1.0	U	1.0
1,2,3-Trichloropropane	1.0	U	1.0
1,2,4-Trichlorobenzene	1.0	U	1.0
1,2-Dibromoethane	1.0	U	1.0
1,2-Dichlorobenzene	1.0	U	1.0
1,2-Dichloroethane	1.0	U	1.0
1,2-Dichloropropane	1.0	U	1.0
1,3-Dichlorobenzene	1.0	U	1.0
1,3-Dichloropropane	1.0	U	1.0
1,4-Dichlorobenzene	1.0	U	1.0
2-Butanone	10	U	10
4-Methyl-2-pentanone	10	U	10
Acetone	25	U	25
Benzene	1.0	U	1.0
Carbon tetrachloride	1.0	U	1.0
Chlorobenzene	1.0	U	1.0
Chloroethane	1.0	U	1.0
Chloroform	1.0	U	1.0
Chloromethane	1.0	U	1.0
cis-1,2-Dichloroethene	1.0	U	1.0
Cyclohexane	1.0	U	1.0
Dibromochloromethane	1.0	U	1.0
Dibromomethane	1.0	U	1.0
Dichlorodifluoromethane	1.0	U	1.0
Ethylbenzene	1.0	U	1.0
Hexachloro-1,3-butadiene	1.0	U	1.0
Isopropylbenzene	1.0	U	1.0
Methylene Chloride	5.0	U	5.0
Naphthalene	5.0	U	5.0
Styrene	1.0	U	1.0
Tetrachloroethene	1.0	U	1.0
Tetrahydrofuran	10	U	10
Toluene	1.0	U	1.0
trans-1,2-Dichloroethene	1.0	U	1.0
Trichloroethene	1.0	U	1.0
Trichlorofluoromethane	1.0	U	1.0
Vinyl chloride	1.0	U	1.0
Xylenes, Total	2.0	U	2.0

Surrogate	%Rec	Qualifier	Acceptance Limits

Client Sample ID: **MW-104A-091510**

Lab Sample ID:	680-61277-4	Date Sampled: 09/15/2010 1140
Client Matrix:	Water	Date Received: 09/16/2010 0920

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-180857	Instrument ID:	MSP2
Preparation:	5030B		Lab File ID:	p0334.d
Dilution:	1.0		Initial Weight/Volume:	5 mL
Date Analyzed:	09/23/2010 1503		Final Weight/Volume:	5 mL
Date Prepared:	09/23/2010 1503			

Surrogate	%Rec	Qualifier	Acceptance Limits
Toluene-d8 (Surr)	102		75 - 120

Client Sample ID: **MW-104D-091510**

Lab Sample ID: 680-61277-8 Date Sampled: 09/15/2010 1655
Client Matrix: Water Date Received: 09/16/2010 0920

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-180841	Instrument ID:	MSO
Preparation:	5030B		Lab File ID:	o0515.d
Dilution:	200		Initial Weight/Volume:	5 mL
Date Analyzed:	09/22/2010 1740		Final Weight/Volume:	5 mL
Date Prepared:	09/22/2010 1740			

Analyte	Result (ug/L)	Qualifier	RL
1,1,1,2-Tetrachloroethane	200	U	200
1,1,1-Trichloroethane	200	U	200
1,1,2,2-Tetrachloroethane	200	U	200
1,1,2-Trichloroethane	200	U	200
1,1-Dichloroethane	200	U	200
1,1-Dichloroethene	200	U	200
1,1-Dichloropropene	200	U	200
1,2,3-Trichloropropane	200	U	200
1,2,4-Trichlorobenzene	200	U	200
1,2-Dibromoethane	200	U	200
1,2-Dichlorobenzene	200	U	200
1,2-Dichloroethane	200	U	200
1,2-Dichloropropane	200	U	200
1,3-Dichlorobenzene	200	U	200
1,3-Dichloropropane	200	U	200
1,4-Dichlorobenzene	200	U	200
2-Butanone	420000	E	2000
4-Methyl-2-pentanone	150000	E	2000
Acetone	390000	E	5000
Benzene	330		200
Carbon tetrachloride	200	U	200
Chlorobenzene	200	U	200
Chloroethane	390		200
Chloroform	200	U	200
Chloromethane	200	U	200
cis-1,2-Dichloroethene	200	U	200
Cyclohexane	200	U	200
Dibromochloromethane	200	U	200
Dibromomethane	200	U	200
Dichlorodifluoromethane	200	U	200
Ethylbenzene	3900		200
Hexachloro-1,3-butadiene	200	U	200
Isopropylbenzene	200	U	200
Methylene Chloride	1000	U	1000
Naphthalene	1000	U	1000
Styrene	200	U	200
Tetrachloroethene	200	U	200
Tetrahydrofuran	77000	E *	2000
Toluene	77000	E	200
trans-1,2-Dichloroethene	200	U	200
Trichloroethene	200	U	200
Trichlorofluoromethane	200	U	200
Vinyl chloride	200	U	200
Xylenes, Total	18000		400

Surrogate	%Rec	Qualifier	Acceptance Limits

Client Sample ID: **MW-104D-091510**

Lab Sample ID:	680-61277-8	Date Sampled:	09/15/2010 1655
Client Matrix:	Water	Date Received:	09/16/2010 0920

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-180841	Instrument ID:	MSO
Preparation:	5030B		Lab File ID:	o0515.d
Dilution:	200		Initial Weight/Volume:	5 mL
Date Analyzed:	09/22/2010 1740		Final Weight/Volume:	5 mL
Date Prepared:	09/22/2010 1740			

Surrogate	%Rec	Qualifier	Acceptance Limits
Toluene-d8 (Surr)	105		75 - 120

Client Sample ID: **MW-104D-091510**

Lab Sample ID: 680-61277-8
Client Matrix: Water
Date Sampled: 09/15/2010 1655
Date Received: 09/16/2010 0920

8260B Volatile Organic Compounds (GC/MS)

Method: 8260B
Preparation: 5030B
Dilution: 2000
Date Analyzed: 09/22/2010 2157
Date Prepared: 09/22/2010 2157
Analysis Batch: 680-180841
Run Type: DL
Instrument ID: MSO
Lab File ID: o0533.d
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	Result (ug/L)	Qualifier	RL
1,1,1,2-Tetrachloroethane	2000	U	2000
1,1,1-Trichloroethane	2000	U	2000
1,1,2,2-Tetrachloroethane	2000	U	2000
1,1,2-Trichloroethane	2000	U	2000
1,1-Dichloroethane	2000	U	2000
1,1-Dichloroethene	2000	U	2000
1,1-Dichloropropene	2000	U	2000
1,2,3-Trichloropropane	2000	U	2000
1,2,4-Trichlorobenzene	2000	U	2000
1,2-Dibromoethane	2000	U	2000
1,2-Dichlorobenzene	2000	U	2000
1,2-Dichloroethane	2000	U	2000
1,2-Dichloropropane	2000	U	2000
1,3-Dichlorobenzene	2000	U	2000
1,3-Dichloropropane	2000	U	2000
1,4-Dichlorobenzene	2000	U	2000
2-Butanone	380000	D	20000
4-Methyl-2-pentanone	140000	D	20000
Acetone	370000	D	50000
Benzene	2000	U	2000
Carbon tetrachloride	2000	U	2000
Chlorobenzene	2000	U	2000
Chloroethane	2000	U	2000
Chloroform	2000	U	2000
Chloromethane	2000	U	2000
cis-1,2-Dichloroethene	2000	U	2000
Cyclohexane	2000	U	2000
Dibromochloromethane	2000	U	2000
Dibromomethane	2000	U	2000
Dichlorodifluoromethane	2000	U	2000
Ethylbenzene	3400	D	2000
Hexachloro-1,3-butadiene	2000	U	2000
Isopropylbenzene	2000	U	2000
Methylene Chloride	10000	U D	10000
Naphthalene	10000	U	10000
Styrene	2000	U	2000
Tetrachloroethene	2000	U	2000
Tetrahydrofuran	69000	D *	20000
Toluene	62000	D	2000
trans-1,2-Dichloroethene	2000	U	2000
Trichloroethene	2000	U	2000
Trichlorofluoromethane	2000	U	2000
Vinyl chloride	2000	U	2000
Xylenes, Total	14000	D	4000

Surrogate	%Rec	Qualifier	Acceptance Limits

Client Sample ID:	**MW-104D-091510**	
Lab Sample ID:	680-61277-8	Date Sampled: 09/15/2010 1655
Client Matrix:	Water	Date Received: 09/16/2010 0920

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-180841	Instrument ID:	MSO
Preparation:	5030B		Lab File ID:	o0533.d
Dilution:	2000		Initial Weight/Volume:	5 mL
Date Analyzed:	09/22/2010 2157	Run Type: DL	Final Weight/Volume:	5 mL
Date Prepared:	09/22/2010 2157			

Surrogate	%Rec	Qualifier	Acceptance Limits
Toluene-d8 (Surr)	104		75 - 120

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61277-1

Client Sample ID:	**MW-25-091410**		
Lab Sample ID:	680-61277-1	Date Sampled:	09/14/2010 1745
Client Matrix:	Water	Date Received:	09/16/2010 0920

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-180565	Instrument ID:	MSN
Preparation:	3520C	Prep Batch: 680-180267	Lab File ID:	n9362.d
Dilution:	1.0		Initial Weight/Volume:	1030 mL
Date Analyzed:	09/21/2010 1316		Final Weight/Volume:	1 mL
Date Prepared:	09/18/2010 1253		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
1,2,3-Trichlorobenzene	9.7	U	9.7
1,2,4-Trichlorobenzene	9.7	U	9.7

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	74		50 - 113
2-Fluorophenol	77		36 - 110
Nitrobenzene-d5	81		45 - 112
Phenol-d5	74		38 - 116
Terphenyl-d14	82		10 - 121
2,4,6-Tribromophenol	80		40 - 139

Client Sample ID: **Equipment Rinse Blank**

Lab Sample ID:	680-61277-3RB	Date Sampled:	09/15/2010 1000
Client Matrix:	Water	Date Received:	09/16/2010 0920

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-180565	Instrument ID:	MSN
Preparation:	3520C	Prep Batch: 680-180267	Lab File ID:	n9363.d
Dilution:	1.0		Initial Weight/Volume:	1030 mL
Date Analyzed:	09/21/2010 1341		Final Weight/Volume:	1 mL
Date Prepared:	09/18/2010 1253		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
1,2,4-Trichlorobenzene	9.7	U	9.7
1,2-Dichlorobenzene	9.7	U	9.7
1,2-Diphenylhydrazine	9.7	U	9.7
1,3-Dichlorobenzene	9.7	U	9.7
1,4-Dichlorobenzene	9.7	U	9.7
1,4-Dioxane	9.7	U	9.7
2,4,5-Trichlorophenol	9.7	U	9.7
2,4,6-Trichlorophenol	9.7	U	9.7
2,4-Dichlorophenol	9.7	U	9.7
2,4-Dimethylphenol	9.7	U	9.7
2,4-Dinitrophenol	49	U	49
2,4-Dinitrotoluene	9.7	U	9.7
2,6-Dinitrotoluene	9.7	U	9.7
2-Chloronaphthalene	9.7	U	9.7
2-Chlorophenol	9.7	U	9.7
2-Methylphenol	9.7	U	9.7
2-Nitrophenol	9.7	U	9.7
3 & 4 Methylphenol	9.7	U	9.7
3,3'-Dichlorobenzidine	58	U	58
4,6-Dinitro-2-methylphenol	49	U	49
4-Bromophenyl phenyl ether	9.7	U	9.7
4-Chloro-3-methylphenol	9.7	U	9.7
4-Chloroaniline	19	U	19
4-Chlorophenyl phenyl ether	9.7	U	9.7
4-Nitroaniline	49	U	49
4-Nitrophenol	49	U	49
Acenaphthene	9.7	U	9.7
Acenaphthylene	9.7	U	9.7
Anthracene	9.7	U	9.7
Benzo[a]anthracene	9.7	U	9.7
Benzo[a]pyrene	9.7	U	9.7
Benzo[b]fluoranthene	9.7	U	9.7
Benzo[g,h,i]perylene	9.7	U	9.7
Benzo[k]fluoranthene	9.7	U	9.7
Benzoic acid	49	U	49
Bis(2-chloroethoxy)methane	9.7	U	9.7
Bis(2-chloroethyl)ether	9.7	U	9.7
Bis(2-ethylhexyl) phthalate	9.7	U	9.7
bis(chloroisopropyl) ether	9.7	U	9.7
Butyl benzyl phthalate	9.7	U	9.7
Chrysene	9.7	U	9.7
Dibenz(a,h)anthracene	9.7	U	9.7
Diethyl phthalate	9.7	U	9.7
Dimethyl phthalate	9.7	U	9.7
Di-n-octyl phthalate	9.7	U	9.7
Fluoranthene	9.7	U	9.7

Client Sample ID: **Equipment Rinse Blank**

Lab Sample ID: 680-61277-3RB
Client Matrix: Water
Date Sampled: 09/15/2010 1000
Date Received: 09/16/2010 0920

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3520C
Dilution: 1.0
Date Analyzed: 09/21/2010 1341
Date Prepared: 09/18/2010 1253
Analysis Batch: 680-180565
Prep Batch: 680-180267
Instrument ID: MSN
Lab File ID: n9363.d
Initial Weight/Volume: 1030 mL
Final Weight/Volume: 1 mL
Injection Volume: 1 uL

Analyte	Result (ug/L)	Qualifier	RL
Fluorene	9.7	U	9.7
Hexachloro-1,3-butadiene	9.7	U	9.7
Hexachlorobenzene	9.7	U	9.7
Hexachlorocyclopentadiene	9.7	U	9.7
Hexachloroethane	9.7	U	9.7
Indeno[1,2,3-cd]pyrene	9.7	U	9.7
Isophorone	9.7	U	9.7
Naphthalene	9.7	U	9.7
Nitrobenzene	9.7	U	9.7
Pentachlorophenol	49	U	49
Phenanthrene	9.7	U	9.7
Phenol	9.7	U	9.7
Pyrene	9.7	U	9.7
1,2,3-Trichlorobenzene	9.7	U	9.7

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	80		50 - 113
2-Fluorophenol	81		36 - 110
Nitrobenzene-d5	86		45 - 112
Phenol-d5	76		38 - 116
Terphenyl-d14	93		10 - 121

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61277-1

Client Sample ID: **MW-104A-091510**

Lab Sample ID: 680-61277-4

Client Matrix: Water

Date Sampled: 09/15/2010 1140

Date Received: 09/16/2010 0920

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C

Preparation: 3520C

Dilution: 1.0

Date Analyzed: 09/21/2010 1407

Date Prepared: 09/18/2010 1253

Analysis Batch: 680-180565

Prep Batch: 680-180267

Instrument ID: MSN

Lab File ID: n9364.d

Initial Weight/Volume: 1060 mL

Final Weight/Volume: 1 mL

Injection Volume: 1 uL

Analyte	Result (ug/L)	Qualifier	RL
1,2,4-Trichlorobenzene	9.4	U	9.4
1,2-Dichlorobenzene	9.4	U	9.4
1,2-Diphenylhydrazine	9.4	U	9.4
1,3-Dichlorobenzene	9.4	U	9.4
1,4-Dichlorobenzene	9.4	U	9.4
1,4-Dioxane	73		9.4
2,4,5-Trichlorophenol	9.4	U	9.4
2,4,6-Trichlorophenol	9.4	U	9.4
2,4-Dichlorophenol	9.4	U	9.4
2,4-Dimethylphenol	9.4	U	9.4
2,4-Dinitrophenol	47	U	47
2,4-Dinitrotoluene	9.4	U	9.4
2,6-Dinitrotoluene	9.4	U	9.4
2-Chloronaphthalene	9.4	U	9.4
2-Chlorophenol	9.4	U	9.4
2-Methylphenol	9.4	U	9.4
2-Nitrophenol	9.4	U	9.4
3 & 4 Methylphenol	9.4	U	9.4
3,3'-Dichlorobenzidine	57	U	57
4,6-Dinitro-2-methylphenol	47	U	47
4-Bromophenyl phenyl ether	9.4	U	9.4
4-Chloro-3-methylphenol	9.4	U	9.4
4-Chloroaniline	19	U	19
4-Chlorophenyl phenyl ether	9.4	U	9.4
4-Nitroaniline	47	U	47
4-Nitrophenol	47	U	47
Acenaphthene	9.4	U	9.4
Acenaphthylene	9.4	U	9.4
Anthracene	9.4	U	9.4
Benzo[a]anthracene	9.4	U	9.4
Benzo[a]pyrene	9.4	U	9.4
Benzo[b]fluoranthene	9.4	U	9.4
Benzo[g,h,i]perylene	9.4	U	9.4
Benzo[k]fluoranthene	9.4	U	9.4
Benzoic acid	47	U	47
Bis(2-chloroethoxy)methane	9.4	U	9.4
Bis(2-chloroethyl)ether	9.4	U	9.4
Bis(2-ethylhexyl) phthalate	9.4	U	9.4
bis(chloroisopropyl) ether	9.4	U	9.4
Butyl benzyl phthalate	9.4	U	9.4
Chrysene	9.4	U	9.4
Dibenz(a,h)anthracene	9.4	U	9.4
Diethyl phthalate	9.4	U	9.4
Dimethyl phthalate	9.4	U	9.4
Di-n-octyl phthalate	9.4	U	9.4
Fluoranthene	9.4	U	9.4

Client Sample ID: **MW-104A-091510**

Lab Sample ID:	680-61277-4	Date Sampled: 09/15/2010 1140
Client Matrix:	Water	Date Received: 09/16/2010 0920

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-180565	Instrument ID:	MSN
Preparation:	3520C	Prep Batch: 680-180267	Lab File ID:	n9364.d
Dilution:	1.0		Initial Weight/Volume:	1060 mL
Date Analyzed:	09/21/2010 1407		Final Weight/Volume:	1 mL
Date Prepared:	09/18/2010 1253		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
Fluorene	9.4	U	9.4
Hexachloro-1,3-butadiene	9.4	U	9.4
Hexachlorobenzene	9.4	U	9.4
Hexachlorocyclopentadiene	9.4	U	9.4
Hexachloroethane	9.4	U	9.4
Indeno[1,2,3-cd]pyrene	9.4	U	9.4
Isophorone	9.4	U	9.4
Naphthalene	9.4	U	9.4
Nitrobenzene	9.4	U	9.4
Pentachlorophenol	47	U	47
Phenanthrene	9.4	U	9.4
Phenol	9.4	U	9.4
Pyrene	9.4	U	9.4
1,2,3-Trichlorobenzene	9.4	U	9.4

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	62		50 - 113
2-Fluorophenol	60		36 - 110
Nitrobenzene-d5	65		45 - 112
Phenol-d5	56		38 - 116
Terphenyl-d14	66		10 - 121

Client Sample ID: **MW-113-091510**

Lab Sample ID:	680-61277-5	Date Sampled: 09/15/2010 1220
Client Matrix:	Water	Date Received: 09/16/2010 0920

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-180565	Instrument ID:	MSN
Preparation:	3520C	Prep Batch: 680-180267	Lab File ID:	n9365a.d
Dilution:	1.0		Initial Weight/Volume:	1060 mL
Date Analyzed:	09/21/2010 1942		Final Weight/Volume:	1 mL
Date Prepared:	09/18/2010 1253		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
1,2,3-Trichlorobenzene	9.4	U	9.4
1,2,4-Trichlorobenzene	9.4	U	9.4

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	63		50 - 113
2-Fluorophenol	67		36 - 110
Nitrobenzene-d5	66		45 - 112
Phenol-d5	60		38 - 116
Terphenyl-d14	62		10 - 121
2,4,6-Tribromophenol	80		40 - 139

Analytical Data

Client: MACTEC Engineering and Consulting Inc   Job Number: 680-61277-1

Client Sample ID: **MW-107D-091510**

Lab Sample ID:	680-61277-6	Date Sampled: 09/15/2010 1600
Client Matrix:	Water	Date Received: 09/16/2010 0920

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-180565	Instrument ID:	MSN
Preparation:	3520C	Prep Batch: 680-180267	Lab File ID:	n9366.d
Dilution:	1.0		Initial Weight/Volume:	1050 mL
Date Analyzed:	09/21/2010 1759		Final Weight/Volume:	1 mL
Date Prepared:	09/18/2010 1253		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
1,2,3-Trichlorobenzene	9.5	U	9.5
1,2,4-Trichlorobenzene	9.5	U	9.5

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	59		50 - 113
2-Fluorophenol	64		36 - 110
Nitrobenzene-d5	67		45 - 112
Phenol-d5	60		38 - 116
Terphenyl-d14	71		10 - 121
2,4,6-Tribromophenol	77		40 - 139

Client Sample ID: **MW-105-091510**

Lab Sample ID:	680-61277-7	Date Sampled: 09/15/2010 1517
Client Matrix:	Water	Date Received: 09/16/2010 0920

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-180565	Instrument ID:	MSN
Preparation:	3520C	Prep Batch: 680-180267	Lab File ID:	n9367.d
Dilution:	1.0		Initial Weight/Volume:	1060 mL
Date Analyzed:	09/21/2010 1825		Final Weight/Volume:	1 mL
Date Prepared:	09/18/2010 1253		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
1,2,3-Trichlorobenzene	9.4	U	9.4
1,2,4-Trichlorobenzene	9.4	U	9.4

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	66		50 - 113
2-Fluorophenol	70		36 - 110
Nitrobenzene-d5	70		45 - 112
Phenol-d5	63		38 - 116
Terphenyl-d14	71		10 - 121
2,4,6-Tribromophenol	85		40 - 139

Client Sample ID: **MW-104D-091510**

Lab Sample ID:	680-61277-8	Date Sampled:	09/15/2010 1655
Client Matrix:	Water	Date Received:	09/16/2010 0920

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-180791	Instrument ID:	MSN
Preparation:	3520C	Prep Batch: 680-180267	Lab File ID:	n9404.d
Dilution:	100		Initial Weight/Volume:	500 mL
Date Analyzed:	09/22/2010 1853		Final Weight/Volume:	0.5 mL
Date Prepared:	09/18/2010 1253		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
1,2,4-Trichlorobenzene	1000	U	1000
1,2-Dichlorobenzene	1000	U	1000
1,2-Diphenylhydrazine	1000	U	1000
1,3-Dichlorobenzene	1000	U	1000
1,4-Dichlorobenzene	1000	U	1000
1,4-Dioxane	11000		1000
2,4,5-Trichlorophenol	1000	U	1000
2,4,6-Trichlorophenol	1000	U	1000
2,4-Dichlorophenol	1000	U	1000
2,4-Dimethylphenol	1000	U	1000
2,4-Dinitrophenol	5000	U	5000
2,4-Dinitrotoluene	1000	U	1000
2,6-Dinitrotoluene	1000	U	1000
2-Chloronaphthalene	1000	U	1000
2-Chlorophenol	1000	U	1000
2-Methylphenol	1000	U	1000
2-Nitrophenol	1000	U	1000
3 & 4 Methylphenol	1000	U	1000
3,3'-Dichlorobenzidine	6000	U	6000
4,6-Dinitro-2-methylphenol	5000	U	5000
4-Bromophenyl phenyl ether	1000	U	1000
4-Chloro-3-methylphenol	1000	U	1000
4-Chloroaniline	2000	U	2000
4-Chlorophenyl phenyl ether	1000	U	1000
4-Nitroaniline	5000	U	5000
4-Nitrophenol	5000	U	5000
Acenaphthene	1000	U	1000
Acenaphthylene	1000	U	1000
Anthracene	1000	U	1000
Benzo[a]anthracene	1000	U	1000
Benzo[a]pyrene	1000	U	1000
Benzo[b]fluoranthene	1000	U	1000
Benzo[g,h,i]perylene	1000	U	1000
Benzo[k]fluoranthene	1000	U	1000
Benzoic acid	5000	U	5000
Bis(2-chloroethoxy)methane	1000	U	1000
Bis(2-chloroethyl)ether	1000	U	1000
Bis(2-ethylhexyl) phthalate	1000	U	1000
bis(chloroisopropyl) ether	1000	U	1000
Butyl benzyl phthalate	1000	U	1000
Chrysene	1000	U	1000
Dibenz(a,h)anthracene	1000	U	1000
Diethyl phthalate	1000	U	1000
Dimethyl phthalate	1000	U	1000
Di-n-octyl phthalate	1000	U	1000
Fluoranthene	1000	U	1000

Client Sample ID: **MW-104D-091510**

Lab Sample ID:	680-61277-8	Date Sampled:	09/15/2010 1655
Client Matrix:	Water	Date Received:	09/16/2010 0920

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-180791	Instrument ID:	MSN
Preparation:	3520C	Prep Batch: 680-180267	Lab File ID:	n9404.d
Dilution:	100		Initial Weight/Volume:	500 mL
Date Analyzed:	09/22/2010 1853		Final Weight/Volume:	0.5 mL
Date Prepared:	09/18/2010 1253		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
Fluorene	1000	U	1000
Hexachloro-1,3-butadiene	1000	U	1000
Hexachlorobenzene	1000	U	1000
Hexachlorocyclopentadiene	1000	U	1000
Hexachloroethane	1000	U	1000
Indeno[1,2,3-cd]pyrene	1000	U	1000
Isophorone	1000	U	1000
Naphthalene	1000	U	1000
Nitrobenzene	1000	U	1000
Pentachlorophenol	5000	U	5000
Phenanthrene	1000	U	1000
Phenol	1000	U	1000
Pyrene	1000	U	1000
1,2,3-Trichlorobenzene	1000	U	1000

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	0	D	50 - 113
2-Fluorophenol	0	D	36 - 110
Nitrobenzene-d5	0	D	45 - 112
Phenol-d5	0	D	38 - 116
Terphenyl-d14	0	D	10 - 121

Client Sample ID: **MW-106D-091510**

Lab Sample ID:	680-61277-9	Date Sampled: 09/15/2010 1700
Client Matrix:	Water	Date Received: 09/16/2010 0920

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-180651	Instrument ID:	MSN
Preparation:	3520C	Prep Batch: 680-180267	Lab File ID:	n9394.d
Dilution:	1.0		Initial Weight/Volume:	500 mL
Date Analyzed:	09/22/2010 0802		Final Weight/Volume:	0.5 mL
Date Prepared:	09/18/2010 1253		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	RL
1,2,3-Trichlorobenzene	10	U	10
1,2,4-Trichlorobenzene	10	U	10

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	63		50 - 113
2-Fluorophenol	68		36 - 110
Nitrobenzene-d5	69		45 - 112
Phenol-d5	64		38 - 116
Terphenyl-d14	83		10 - 121
2,4,6-Tribromophenol	91		40 - 139

Client Sample ID: **MW-25-091410**

Lab Sample ID:	680-61277-1	Date Sampled:	09/14/2010 1745
Client Matrix:	Water	Date Received:	09/16/2010 0920

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180528	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-180283	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/20/2010 1519		Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	0.19		0.048
4,4'-DDE	0.095	U	0.095
4,4'-DDT	0.095	U	0.095
4,4'-DDD	0.095	U	0.095
delta-BHC	0.13		0.048
Dieldrin	0.095	U	0.095
beta-BHC	1.2	E	0.048
Chlordane (technical)	0.48	U	0.48
gamma-BHC (Lindane)	0.12		0.048
Heptachlor	0.048	U	0.048
Methoxychlor	0.095	U	0.095
Toxaphene	4.8	U	4.8

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	30	p	14 - 115
Tetrachloro-m-xylene	76		35 - 120

Client Sample ID: **MW-25-091410**

Lab Sample ID:	680-61277-1	Date Sampled: 09/14/2010 1745
Client Matrix:	Water	Date Received: 09/16/2010 0920

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180528	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-180283	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/20/2010 1519		Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	51		14 - 115
Tetrachloro-m-xylene	69		35 - 120

Client Sample ID: **MW-25-091410**

Lab Sample ID: 680-61277-1 Date Sampled: 09/14/2010 1745

Client Matrix: Water Date Received: 09/16/2010 0920

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180554		Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-180283		Initial Weight/Volume:	1050 mL
Dilution:	4.0			Final Weight/Volume:	10 mL
Date Analyzed:	09/21/2010 0937	Run Type:	DL	Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	0.19	U D	0.19
4,4'-DDE	0.38	U	0.38
4,4'-DDT	0.38	U	0.38
4,4'-DDD	0.38	U	0.38
delta-BHC	0.19	U D	0.19
Dieldrin	0.38	U	0.38
beta-BHC	0.95	D	0.19
Chlordane (technical)	1.9	U	1.9
gamma-BHC (Lindane)	0.19	U D	0.19
Heptachlor	0.19	U	0.19
Methoxychlor	0.38	U	0.38
Toxaphene	19	U	19

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	70		14 - 115
DCB Decachlorobiphenyl	47		14 - 115
Tetrachloro-m-xylene	47		35 - 120
Tetrachloro-m-xylene	52		35 - 120

Client Sample ID: **Equipment Rinse Blank**

Lab Sample ID:	680-61277-3RB	Date Sampled: 09/15/2010 1000
Client Matrix:	Water	Date Received: 09/16/2010 0920

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180528	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-180283	Initial Weight/Volume:	1030 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/20/2010 1539		Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	0.049	U	0.049
4,4'-DDE	0.097	U	0.097
4,4'-DDT	0.097	U	0.097
4,4'-DDD	0.097	U	0.097
delta-BHC	0.049	U	0.049
Dieldrin	0.097	U	0.097
beta-BHC	0.049	U	0.049
Chlordane (technical)	0.49	U	0.49
gamma-BHC (Lindane)	0.049	U	0.049
Heptachlor	0.049	U	0.049
Methoxychlor	0.097	U	0.097
Toxaphene	4.9	U	4.9

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	39	p	14 - 115
Tetrachloro-m-xylene	85		35 - 120

Client Sample ID: **Equipment Rinse Blank**

Lab Sample ID: 680-61277-3RB
Client Matrix: Water

Date Sampled: 09/15/2010 1000
Date Received: 09/16/2010 0920

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method: 8081A_8082
Preparation: 3520C
Dilution: 1.0
Date Analyzed: 09/20/2010 1539
Date Prepared: 09/18/2010 1253

Analysis Batch: 680-180528
Prep Batch: 680-180283

Instrument ID: SGM
Initial Weight/Volume: 1030 mL
Final Weight/Volume: 10 mL
Injection Volume: 2 uL
Result Type: SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	88		14 - 115
Tetrachloro-m-xylene	69		35 - 120

Client Sample ID: **MW-104A-091510**

Lab Sample ID:	680-61277-4	Date Sampled: 09/15/2010 1140
Client Matrix:	Water	Date Received: 09/16/2010 0920

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180528	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-180283	Initial Weight/Volume:	1060 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/20/2010 1558		Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	0.047	U	0.047
4,4'-DDE	0.094	U	0.094
4,4'-DDT	0.094	U	0.094
4,4'-DDD	0.094	U	0.094
delta-BHC	0.047	U	0.047
Dieldrin	0.094	U	0.094
beta-BHC	0.047	U	0.047
Chlordane (technical)	0.47	U	0.47
gamma-BHC (Lindane)	0.047	U	0.047
Heptachlor	0.047	U	0.047
Methoxychlor	0.094	U	0.094
Toxaphene	4.7	U	4.7

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	40		14 - 115
Tetrachloro-m-xylene	85		35 - 120

Client Sample ID: **MW-104A-091510**

Lab Sample ID:	680-61277-4	Date Sampled:	09/15/2010 1140
Client Matrix:	Water	Date Received:	09/16/2010 0920

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180528	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-180283	Initial Weight/Volume:	1060 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/20/2010 1558		Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	34		14 - 115
Tetrachloro-m-xylene	76		35 - 120

Client Sample ID: **MW-113-091510**

Lab Sample ID: 680-61277-5 Date Sampled: 09/15/2010 1220
Client Matrix: Water Date Received: 09/16/2010 0920

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180528	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-180283	Initial Weight/Volume:	1060 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/20/2010 1618		Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	1.8	E	0.047
4,4'-DDE	0.094	U	0.094
4,4'-DDT	0.094	U	0.094
4,4'-DDD	0.094	U	0.094
delta-BHC	2.2	E	0.047
Dieldrin	0.094	U	0.094
beta-BHC	2.1	E	0.047
Chlordane (technical)	0.47	U	0.47
gamma-BHC (Lindane)	1.6	E	0.047
Heptachlor	0.047	U	0.047
Methoxychlor	0.094	U	0.094
Toxaphene	4.7	U	4.7

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	58		14 - 115
Tetrachloro-m-xylene	74		35 - 120

Client Sample ID: **MW-113-091510**

Lab Sample ID: 680-61277-5 Date Sampled: 09/15/2010 1220
Client Matrix: Water Date Received: 09/16/2010 0920

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180528	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-180283	Initial Weight/Volume:	1060 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/20/2010 1618		Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	57		14 - 115
Tetrachloro-m-xylene	51		35 - 120

Client Sample ID: **MW-113-091510**

Lab Sample ID:	680-61277-5	Date Sampled: 09/15/2010 1220
Client Matrix:	Water	Date Received: 09/16/2010 0920

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180554	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-180283	Initial Weight/Volume:	1060 mL
Dilution:	5.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/21/2010 1000	Run Type: DL	Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253		Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	1.4	D	0.24
4,4'-DDE	0.47	U	0.47
4,4'-DDT	0.47	U	0.47
4,4'-DDD	0.47	U	0.47
delta-BHC	1.6	D	0.24
Dieldrin	0.47	U	0.47
beta-BHC	1.8	D	0.24
Chlordane (technical)	2.4	U	2.4
gamma-BHC (Lindane)	1.2	D	0.24
Heptachlor	0.24	U	0.24
Methoxychlor	0.47	U	0.47
Toxaphene	24	U	24

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	67		14 - 115
DCB Decachlorobiphenyl	56		14 - 115
Tetrachloro-m-xylene	48		35 - 120
Tetrachloro-m-xylene	48		35 - 120

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61277-1

Client Sample ID: **MW-107D-091510**

Lab Sample ID: 680-61277-6

Client Matrix: Water

Date Sampled: 09/15/2010 1600

Date Received: 09/16/2010 0920

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180528	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-180283	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/20/2010 1638		Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	0.048	U	0.048
4,4'-DDE	0.095	U	0.095
4,4'-DDT	0.095	U	0.095
4,4'-DDD	0.095	U	0.095
delta-BHC	0.048	U	0.048
Dieldrin	0.095	U	0.095
beta-BHC	0.048	U	0.048
Chlordane (technical)	0.48	U	0.48
gamma-BHC (Lindane)	0.048	U	0.048
Heptachlor	0.048	U	0.048
Methoxychlor	0.095	U	0.095
Toxaphene	4.8	U	4.8

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	85		14 - 115
Tetrachloro-m-xylene	85		35 - 120

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61277-1

Client Sample ID: **MW-107D-091510**

Lab Sample ID: 680-61277-6

Client Matrix: Water

Date Sampled: 09/15/2010 1600

Date Received: 09/16/2010 0920

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method: 8081A_8082

Preparation: 3520C

Dilution: 1.0

Date Analyzed: 09/20/2010 1638

Date Prepared: 09/18/2010 1253

Analysis Batch: 680-180528

Prep Batch: 680-180283

Instrument ID: SGM

Initial Weight/Volume: 1050 mL

Final Weight/Volume: 10 mL

Injection Volume: 2 uL

Result Type: SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	79		14 - 115
Tetrachloro-m-xylene	69		35 - 120

Analytical Data

Client: MACTEC Engineering and Consulting Inc Job Number: 680-61277-1

Client Sample ID: **MW-105-091510**

Lab Sample ID:	680-61277-7	Date Sampled: 09/15/2010 1517
Client Matrix:	Water	Date Received: 09/16/2010 0920

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180528	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-180283	Initial Weight/Volume:	1060 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/20/2010 1658		Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	0.047	U	0.047
4,4'-DDE	0.094	U	0.094
4,4'-DDT	0.094	U	0.094
4,4'-DDD	0.094	U	0.094
delta-BHC	0.047	U	0.047
Dieldrin	0.094	U	0.094
beta-BHC	0.047	U	0.047
Chlordane (technical)	0.47	U	0.47
gamma-BHC (Lindane)	0.047	U	0.047
Heptachlor	0.047	U	0.047
Methoxychlor	0.094	U	0.094
Toxaphene	4.7	U	4.7

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	64		14 - 115
Tetrachloro-m-xylene	78		35 - 120

Client Sample ID: **MW-105-091510**

Lab Sample ID:	680-61277-7	Date Sampled: 09/15/2010 1517
Client Matrix:	Water	Date Received: 09/16/2010 0920

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180528	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-180283	Initial Weight/Volume:	1060 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/20/2010 1658		Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	54		14 - 115
Tetrachloro-m-xylene	71		35 - 120

Client Sample ID: **MW-104D-091510**

Lab Sample ID:	680-61277-8	Date Sampled: 09/15/2010 1655
Client Matrix:	Water	Date Received: 09/16/2010 0920

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180528	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-180283	Initial Weight/Volume:	1060 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/20/2010 1717		Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	0.047	U	0.047
4,4'-DDE	0.094	U	0.094
4,4'-DDT	0.094	U	0.094
4,4'-DDD	0.094	U	0.094
delta-BHC	0.047	U	0.047
Dieldrin	0.094	U	0.094
beta-BHC	0.047	U	0.047
Chlordane (technical)	0.47	U	0.47
gamma-BHC (Lindane)	0.047	U	0.047
Heptachlor	0.047	U	0.047
Methoxychlor	0.094	U	0.094
Toxaphene	4.7	U	4.7

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	20		14 - 115
Tetrachloro-m-xylene	88		35 - 120

Client Sample ID: **MW-104D-091510**

Lab Sample ID:	680-61277-8	Date Sampled:	09/15/2010 1655
Client Matrix:	Water	Date Received:	09/16/2010 0920

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180528	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-180283	Initial Weight/Volume:	1060 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/20/2010 1717		Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	19		14 - 115
Tetrachloro-m-xylene	73		35 - 120

Client Sample ID: **MW-106D-091510**

Lab Sample ID:	680-61277-9	Date Sampled: 09/15/2010 1700
Client Matrix:	Water	Date Received: 09/16/2010 0920

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180528	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-180283	Initial Weight/Volume:	1060 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/20/2010 1737		Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	7.1	E	0.047
4,4'-DDE	0.094	U	0.094
4,4'-DDT	0.094	U	0.094
4,4'-DDD	0.094	U	0.094
delta-BHC	12	E	0.047
Dieldrin	0.094	U	0.094
beta-BHC	2.0	E	0.047
Chlordane (technical)	0.47	U	0.47
gamma-BHC (Lindane)	5.3	E	0.047
Heptachlor	0.047	U	0.047
Methoxychlor	0.094	U	0.094
Toxaphene	4.7	U	4.7

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	41		14 - 115
Tetrachloro-m-xylene	43	p	35 - 120

Client Sample ID: **MW-106D-091510**

Lab Sample ID:	680-61277-9	Date Sampled: 09/15/2010 1700
Client Matrix:	Water	Date Received: 09/16/2010 0920

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180528	Instrument ID:	SGM
Preparation:	3520C	Prep Batch: 680-180283	Initial Weight/Volume:	1060 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/20/2010 1737		Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	41		14 - 115
Tetrachloro-m-xylene	69		35 - 120

Client Sample ID: **MW-106D-091510**

Lab Sample ID:	680-61277-9	Date Sampled:	09/15/2010 1700
Client Matrix:	Water	Date Received:	09/16/2010 0920

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-180554		Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-180283		Initial Weight/Volume:	1060 mL
Dilution:	20			Final Weight/Volume:	10 mL
Date Analyzed:	09/21/2010 1023	Run Type:	DL	Injection Volume:	2 uL
Date Prepared:	09/18/2010 1253			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	RL
alpha-BHC	8.2	D	0.94
4,4'-DDE	1.9	U	1.9
4,4'-DDT	1.9	U	1.9
4,4'-DDD	1.9	U	1.9
delta-BHC	10	D	0.94
Dieldrin	1.9	U	1.9
beta-BHC	1.9	D	0.94
Chlordane (technical)	9.4	U	9.4
gamma-BHC (Lindane)	5.1	D	0.94
Heptachlor	0.94	U	0.94
Methoxychlor	1.9	U	1.9
Toxaphene	94	U	94

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	0	D	14 - 115
DCB Decachlorobiphenyl	0	D	14 - 115
Tetrachloro-m-xylene	0	D	35 - 120
Tetrachloro-m-xylene	0	D	35 - 120

Client Sample ID: **MW-25-091410**

Lab Sample ID: 680-61277-1
Client Matrix: Water

Date Sampled: 09/14/2010 1745
Date Received: 09/16/2010 0920

6020 Metals (ICP/MS)

Method: 6020
Preparation: 3010A
Dilution: 1.0
Date Analyzed: 09/18/2010 1324
Date Prepared: 09/16/2010 1739

Analysis Batch: 680-180514
Prep Batch: 680-180183

Instrument ID: ICPMSA
Lab File ID: 180183.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (ug/L)	Qualifier	RL
Arsenic	2.7		2.5
Copper	320		5.0
Lead	20		1.5
Zinc	2900		20

Client Sample ID: **Equipment Rinse Blank**

Lab Sample ID: 680-61277-3RB
Client Matrix: Water
Date Sampled: 09/15/2010 1000
Date Received: 09/16/2010 0920

6020 Metals (ICP/MS)

Method: 6020
Preparation: 3010A
Dilution: 1.0
Date Analyzed: 09/18/2010 1332
Date Prepared: 09/16/2010 1739
Analysis Batch: 680-180514
Prep Batch: 680-180183
Instrument ID: ICPMSA
Lab File ID: 180183.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (ug/L)	Qualifier	RL
Arsenic	2.5	U	2.5
Copper	5.0	U	5.0
Lead	1.5	U	1.5
Zinc	20	U	20

Client Sample ID: **MW-104A-091510**

Lab Sample ID: 680-61277-4
Client Matrix: Water

Date Sampled: 09/15/2010 1140
Date Received: 09/16/2010 0920

6020 Metals (ICP/MS)

Method: 6020
Preparation: 3010A
Dilution: 1.0
Date Analyzed: 09/18/2010 1339
Date Prepared: 09/16/2010 1739

Analysis Batch: 680-180514
Prep Batch: 680-180183

Instrument ID: ICPMSA
Lab File ID: 180183.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (ug/L)	Qualifier	RL
Arsenic	2.5	U	2.5
Copper	5.0	U	5.0
Lead	1.5	U	1.5
Zinc	20	U	20

Client Sample ID: **MW-113-091510**

Lab Sample ID: 680-61277-5
Client Matrix: Water

Date Sampled: 09/15/2010 1220
Date Received: 09/16/2010 0920

6020 Metals (ICP/MS)

Method: 6020
Preparation: 3010A
Dilution: 1.0
Date Analyzed: 09/18/2010 1346
Date Prepared: 09/16/2010 1739

Analysis Batch: 680-180514
Prep Batch: 680-180183

Instrument ID: ICPMSA
Lab File ID: 180183.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (ug/L)	Qualifier	RL
Arsenic	23		2.5
Lead	1.9		1.5

Method: 6020
Preparation: 3010A
Dilution: 40
Date Analyzed: 09/24/2010 1049
Date Prepared: 09/16/2010 1739

Analysis Batch: 680-180514
Prep Batch: 680-180183

Instrument ID: ICPMSA
Lab File ID: 180183.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (ug/L)	Qualifier	RL
Copper	15000		200

Method: 6020
Preparation: 3010A
Dilution: 400
Date Analyzed: 09/24/2010 1334
Date Prepared: 09/16/2010 1739

Analysis Batch: 680-180514
Prep Batch: 680-180183

Instrument ID: ICPMSA
Lab File ID: 180183.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (ug/L)	Qualifier	RL
Zinc	95000		8000

Client Sample ID: **MW-107D-091510**

Lab Sample ID: 680-61277-6 Date Sampled: 09/15/2010 1600
Client Matrix: Water Date Received: 09/16/2010 0920

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-180514		Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-180183		Lab File ID:	180183.chr
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	09/18/2010 1353			Final Weight/Volume:	250 mL
Date Prepared:	09/16/2010 1739				

Analyte	Result (ug/L)	Qualifier	RL
Arsenic	2.5	U	2.5
Copper	5.0	U	5.0
Lead	1.5	U	1.5
Zinc	20	U	20

Client Sample ID: **MW-105-091510**

Lab Sample ID: 680-61277-7
Client Matrix: Water
Date Sampled: 09/15/2010 1517
Date Received: 09/16/2010 0920

6020 Metals (ICP/MS)

Method: 6020
Preparation: 3010A
Dilution: 1.0
Date Analyzed: 09/18/2010 1400
Date Prepared: 09/16/2010 1739

Analysis Batch: 680-180514
Prep Batch: 680-180183

Instrument ID: ICPMSA
Lab File ID: 180183.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (ug/L)	Qualifier	RL
Arsenic	2.5	U	2.5
Copper	5.7		5.0
Lead	1.5	U	1.5
Zinc	24		20

Client Sample ID: **MW-104D-091510**

Lab Sample ID:	680-61277-8	Date Sampled: 09/15/2010 1655
Client Matrix:	Water	Date Received: 09/16/2010 0920

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-180514	Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-180183	Lab File ID:	180183.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/18/2010 1408		Final Weight/Volume:	250 mL
Date Prepared:	09/16/2010 1739			

Analyte	Result (ug/L)	Qualifier	RL
Arsenic	4.2		2.5
Copper	5.0	U	5.0
Lead	1.5	U	1.5
Zinc	20	U	20

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61277-1

Client Sample ID: **MW-106D-091510**

Lab Sample ID:	680-61277-9	Date Sampled:	09/15/2010 1700
Client Matrix:	Water	Date Received:	09/16/2010 0920

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-180514	Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-180183	Lab File ID:	180183.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/18/2010 1415		Final Weight/Volume:	250 mL
Date Prepared:	09/16/2010 1739			

Analyte	Result (ug/L)	Qualifier	RL
Arsenic	2.5	U	2.5
Copper	5.0	U	5.0
Lead	1.5	U	1.5
Zinc	110		20

General Chemistry

Client Sample ID: **MW-25-091410**

Lab Sample ID: 680-61277-1 Date Sampled: 09/14/2010 1745
Client Matrix: Water Date Received: 09/16/2010 0920

Analyte	Result	Qual	Units	RL	Dil	Method
Nitrate as N	4.7		mg/L	0.25	5.0	353.2
Analysis Batch: 680-180680	Date Analyzed: 09/16/2010 1448					
Sulfate	200		mg/L	5.0	5.0	9056
Analysis Batch: 680-180459	Date Analyzed: 09/19/2010 1342					

General Chemistry

Client Sample ID: **Equipment Rinse Blank**

Lab Sample ID: 680-61277-3RB

Client Matrix: Water

Date Sampled: 09/15/2010 1000

Date Received: 09/16/2010 0920

Analyte	Result	Qual	Units	RL	Dil	Method
Nitrate as N	0.25	U	mg/L	0.25	5.0	9056
Analysis Batch: 680-180236	Date Analyzed: 09/16/2010 1830					
Sulfate	5.0	U	mg/L	5.0	5.0	9056
Analysis Batch: 680-180459	Date Analyzed: 09/19/2010 1355					

General Chemistry

Client Sample ID: **MW-104A-091510**

Lab Sample ID: 680-61277-4
Client Matrix: Water

Date Sampled: 09/15/2010 1140
Date Received: 09/16/2010 0920

Analyte	Result	Qual	Units	RL	Dil	Method
Nitrate as N	0.25	U	mg/L	0.25	5.0	9056
	Analysis Batch: 680-180236	Date Analyzed: 09/16/2010 1855				
Sulfate	93		mg/L	5.0	5.0	9056
	Analysis Batch: 680-180459	Date Analyzed: 09/19/2010 1407				

General Chemistry

Client Sample ID: **MW-113-091510**

Lab Sample ID: 680-61277-5

Client Matrix: Water

Date Sampled: 09/15/2010 1220

Date Received: 09/16/2010 0920

Analyte	Result	Qual	Units	RL	Dil	Method
Nitrate as N	1.6		mg/L	0.25	5.0	9056
	Analysis Batch: 680-180236	Date Analyzed: 09/16/2010 1907				
Sulfate	2100		mg/L	100	100	9056
	Analysis Batch: 680-180459	Date Analyzed: 09/19/2010 1419				

General Chemistry

Client Sample ID: **MW-107D-091510**

Lab Sample ID: 680-61277-6

Client Matrix: Water

Date Sampled: 09/15/2010 1600

Date Received: 09/16/2010 0920

Analyte	Result	Qual	Units	RL	Dil	Method
Nitrate as N	4.7		mg/L	0.25	5.0	9056
	Analysis Batch: 680-180236	Date Analyzed: 09/16/2010 1944				
Sulfate	190		mg/L	10	10	9056
	Analysis Batch: 680-180459	Date Analyzed: 09/19/2010 1444				

General Chemistry

Client Sample ID: **MW-105-091510**

Lab Sample ID: 680-61277-7
Client Matrix: Water
Date Sampled: 09/15/2010 1517
Date Received: 09/16/2010 0920

Analyte	Result	Qual	Units	RL	Dil	Method
Nitrate as N	0.25	U	mg/L	0.25	5.0	9056
Analysis Batch: 680-180236	Date Analyzed: 09/16/2010 1932					
Sulfate	97		mg/L	5.0	5.0	9056
Analysis Batch: 680-180457	Date Analyzed: 09/20/2010 1220					

General Chemistry

Client Sample ID: **MW-104D-091510**

Lab Sample ID: 680-61277-8 Date Sampled: 09/15/2010 1655
Client Matrix: Water Date Received: 09/16/2010 0920

Analyte	Result	Qual	Units	RL	Dil	Method
Nitrate as N	0.25	U	mg/L	0.25	5.0	9056
	Analysis Batch: 680-180236	Date Analyzed: 09/16/2010 2046				
Sulfate	5.0	U	mg/L	5.0	5.0	9056
	Analysis Batch: 680-180457	Date Analyzed: 09/20/2010 1232				

General Chemistry

Client Sample ID: **MW-106D-091510**

Lab Sample ID: 680-61277-9

Client Matrix: Water

Date Sampled: 09/15/2010 1700

Date Received: 09/16/2010 0920

Analyte	Result	Qual	Units	RL	Dil	Method
Nitrate as N	1.4		mg/L	0.25	5.0	9056
Analysis Batch: 680-180236			Date Analyzed: 09/16/2010 2059			
Sulfate	430		mg/L	25	25	9056
Analysis Batch: 680-180457			Date Analyzed: 09/20/2010 1245			

DATA REPORTING QUALIFIERS

Client: MACTEC Engineering and Consulting Inc Job Number: 680-61277-1

Lab Section	Qualifier	Description
GC/MS VOA		
	U	Indicates the analyte was analyzed for but not detected.
	*	LCS or LCSD exceeds the control limits
	E	Result exceeded calibration range.
	D	Surrogate or matrix spike recoveries were not obtained because the extract was diluted for analysis; also compounds analyzed at a dilution may be flagged with a D.
GC/MS Semi VOA		
	U	Indicates the analyte was analyzed for but not detected.
	F	MS or MSD exceeds the control limits
	D	Surrogate or matrix spike recoveries were not obtained because the extract was diluted for analysis; also compounds analyzed at a dilution may be flagged with a D.
GC Semi VOA		
	U	Indicates the analyte was analyzed for but not detected.
	F	MS or MSD exceeds the control limits
	4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.
	E	Result exceeded calibration range.
	D	Sample results are obtained from a dilution; the surrogate or matrix spike recoveries reported are calculated from diluted samples.
	D	Surrogate or matrix spike recoveries were not obtained because the extract was diluted for analysis; also compounds analyzed at a dilution may be flagged with a D.
	p	The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.

DATA REPORTING QUALIFIERS

Client: MACTEC Engineering and Consulting Inc Job Number: 680-61277-1

Lab Section	Qualifier	Description
Metals		
	U	Indicates the analyte was analyzed for but not detected.
General Chemistry		
	U	Indicates the analyte was analyzed for but not detected.

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61277-1

Method Blank - Batch: 680-180841

Method: 8260B
Preparation: 5030B

Lab Sample ID: MB 680-180841/12
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/22/2010 1517
Date Prepared: 09/22/2010 1517

Analysis Batch: 680-180841
Prep Batch: N/A
Units: ug/L

Instrument ID: MSO
Lab File ID: oq713.d
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	RL
1,1,1,2-Tetrachloroethane	1.0	U	1.0
1,1,1-Trichloroethane	1.0	U	1.0
1,1,2,2-Tetrachloroethane	1.0	U	1.0
1,1,2-Trichloroethane	1.0	U	1.0
1,1-Dichloroethane	1.0	U	1.0
1,1-Dichloroethene	1.0	U	1.0
1,1-Dichloropropene	1.0	U	1.0
1,2,3-Trichloropropane	1.0	U	1.0
1,2,4-Trichlorobenzene	1.0	U	1.0
1,2-Dibromoethane	1.0	U	1.0
1,2-Dichlorobenzene	1.0	U	1.0
1,2-Dichloroethane	1.0	U	1.0
1,2-Dichloropropane	1.0	U	1.0
1,3-Dichlorobenzene	1.0	U	1.0
1,3-Dichloropropane	1.0	U	1.0
1,4-Dichlorobenzene	1.0	U	1.0
2-Butanone	10	U	10
4-Methyl-2-pentanone	10	U	10
Acetone	25	U	25
Benzene	1.0	U	1.0
Carbon tetrachloride	1.0	U	1.0
Chlorobenzene	1.0	U	1.0
Chloroethane	1.0	U	1.0
Chloroform	1.0	U	1.0
Chloromethane	1.0	U	1.0
cis-1,2-Dichloroethene	1.0	U	1.0
Cyclohexane	1.0	U	1.0
Dibromochloromethane	1.0	U	1.0
Dibromomethane	1.0	U	1.0
Dichlorodifluoromethane	1.0	U	1.0
Ethylbenzene	1.0	U	1.0
Hexachloro-1,3-butadiene	1.0	U	1.0
Isopropylbenzene	1.0	U	1.0
Methylene Chloride	5.0	U	5.0
Naphthalene	5.0	U	5.0
Styrene	1.0	U	1.0
Tetrachloroethene	1.0	U	1.0
Tetrahydrofuran	10	U	10
Toluene	1.0	U	1.0
trans-1,2-Dichloroethene	1.0	U	1.0
Trichloroethene	1.0	U	1.0
Trichlorofluoromethane	1.0	U	1.0
Vinyl chloride	1.0	U	1.0

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61277-1

Method Blank - Batch: 680-180841

Method: 8260B
Preparation: 5030B

Lab Sample ID: MB 680-180841/12
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/22/2010 1517
Date Prepared: 09/22/2010 1517

Analysis Batch: 680-180841
Prep Batch: N/A
Units: ug/L

Instrument ID: MSO
Lab File ID: oq713.d
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	RL
Xylenes, Total	2.0	U	2.0

Surrogate	% Rec	Acceptance Limits
Toluene-d8 (Surr)	98	75 - 120

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 680-180841

Method: 8260B
Preparation: 5030B

LCS Lab Sample ID:	LCS 680-180841/9	Analysis Batch:	680-180841	Instrument ID:	MSO
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	oq705.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	5 mL
Date Analyzed:	09/22/2010 1311			Final Weight/Volume:	5 mL
Date Prepared:	09/22/2010 1311				

LCSD Lab Sample ID:	LCSD 680-180841/10	Analysis Batch:	680-180841	Instrument ID:	MSO
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	oq707.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	5 mL
Date Analyzed:	09/22/2010 1351			Final Weight/Volume:	5 mL
Date Prepared:	09/22/2010 1351				

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
1,1,1,2-Tetrachloroethane	101	102	81 - 128	1	30		
1,1,1-Trichloroethane	98	96	76 - 127	3	30		
1,1,2,2-Tetrachloroethane	103	104	69 - 129	0	30		
1,1,2-Trichloroethane	96	97	75 - 121	1	30		
1,1-Dichloroethane	102	106	74 - 127	4	30		
1,1-Dichloroethene	103	107	62 - 141	3	30		
1,1-Dichloropropene	97	96	77 - 122	2	30		
1,2,3-Trichloropropane	101	103	70 - 130	2	30		
1,2,4-Trichlorobenzene	97	97	60 - 135	0	30		
1,2-Dibromoethane	103	103	80 - 121	0	30		
1,2-Dichlorobenzene	101	102	79 - 124	1	30		
1,2-Dichloroethane	89	87	66 - 132	2	30		
1,2-Dichloropropane	95	91	73 - 124	4	30		
1,3-Dichlorobenzene	92	95	78 - 125	4	30		
1,3-Dichloropropane	99	97	75 - 120	2	30		
1,4-Dichlorobenzene	101	101	81 - 122	1	30		
2-Butanone	108	117	33 - 157	9	30		
4-Methyl-2-pentanone	94	93	40 - 151	1	30		
Acetone	111	122	17 - 175	10	50		
Benzene	97	96	77 - 119	1	30		
Carbon tetrachloride	98	95	71 - 135	3	30		
Chlorobenzene	102	101	85 - 116	1	30		
Chloroethane	52	69	40 - 165	27	50		
Chloroform	107	109	82 - 120	2	30		
Chloromethane	78	76	48 - 142	2	50		
cis-1,2-Dichloroethene	108	111	69 - 134	2	30		
Cyclohexane	83	83	54 - 138	0	30		
Dibromochloromethane	115	113	75 - 133	1	30		
Dibromomethane	95	94	78 - 119	1	30		
Dichlorodifluoromethane	104	108	34 - 154	4	30		
Ethylbenzene	93	94	86 - 116	2	30		
Hexachloro-1,3-butadiene	86	87	62 - 142	1	30		
Isopropylbenzene	90	92	82 - 121	2	30		

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61277-1

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 680-180841

Method: 8260B
Preparation: 5030B

LCS Lab Sample ID:	LCS 680-180841/9	Analysis Batch:	680-180841	Instrument ID:	MSO
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	oq705.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	5 mL
Date Analyzed:	09/22/2010 1311			Final Weight/Volume:	5 mL
Date Prepared:	09/22/2010 1311				

LCSD Lab Sample ID:	LCSD 680-180841/10	Analysis Batch:	680-180841	Instrument ID:	MSO
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	oq707.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	5 mL
Date Analyzed:	09/22/2010 1351			Final Weight/Volume:	5 mL
Date Prepared:	09/22/2010 1351				

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Methylene Chloride	97	104	70 - 125	7	30		
Naphthalene	100	99	48 - 135	2	30		
Styrene	94	92	82 - 122	2	30		
Tetrachloroethene	101	101	76 - 126	0	30		
Tetrahydrofuran	0	0	70 - 130	NC	30	U *	U *
Toluene	82	81	81 - 117	1	30		
trans-1,2-Dichloroethene	98	106	72 - 131	8	30		
Trichloroethene	101	100	84 - 115	1	30		
Trichlorofluoromethane	89	100	58 - 149	11	50		
Vinyl chloride	83	86	59 - 144	4	50		
Xylenes, Total	93	92	84 - 118	1	30		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
Toluene-d8 (Surr)	95	94	75 - 120

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61277-1

Method Blank - Batch: 680-180857

Method: 8260B
Preparation: 5030B

Lab Sample ID: MB 680-180857/7
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/23/2010 1236
Date Prepared: 09/23/2010 1236

Analysis Batch: 680-180857
Prep Batch: N/A
Units: ug/L

Instrument ID: MSP2
Lab File ID: pq202.d
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	RL
1,1,1,2-Tetrachloroethane	1.0	U	1.0
1,1,1-Trichloroethane	1.0	U	1.0
1,1,2,2-Tetrachloroethane	1.0	U	1.0
1,1,2-Trichloroethane	1.0	U	1.0
1,1-Dichloroethane	1.0	U	1.0
1,1-Dichloroethene	1.0	U	1.0
1,1-Dichloropropene	1.0	U	1.0
1,2,3-Trichloropropane	1.0	U	1.0
1,2,4-Trichlorobenzene	1.0	U	1.0
1,2-Dibromoethane	1.0	U	1.0
1,2-Dichlorobenzene	1.0	U	1.0
1,2-Dichloroethane	1.0	U	1.0
1,2-Dichloropropane	1.0	U	1.0
1,3-Dichlorobenzene	1.0	U	1.0
1,3-Dichloropropane	1.0	U	1.0
1,4-Dichlorobenzene	1.0	U	1.0
2-Butanone	10	U	10
4-Methyl-2-pentanone	10	U	10
Acetone	25	U	25
Benzene	1.0	U	1.0
Carbon tetrachloride	1.0	U	1.0
Chlorobenzene	1.0	U	1.0
Chloroethane	1.0	U	1.0
Chloroform	1.0	U	1.0
Chloromethane	1.0	U	1.0
cis-1,2-Dichloroethene	1.0	U	1.0
Cyclohexane	1.0	U	1.0
Dibromochloromethane	1.0	U	1.0
Dibromomethane	1.0	U	1.0
Dichlorodifluoromethane	1.0	U	1.0
Ethylbenzene	1.0	U	1.0
Hexachloro-1,3-butadiene	1.0	U	1.0
Isopropylbenzene	1.0	U	1.0
Methylene Chloride	5.0	U	5.0
Naphthalene	5.0	U	5.0
Styrene	1.0	U	1.0
Tetrachloroethene	1.0	U	1.0
Tetrahydrofuran	10	U	10
Toluene	1.0	U	1.0
trans-1,2-Dichloroethene	1.0	U	1.0
Trichloroethene	1.0	U	1.0
Trichlorofluoromethane	1.0	U	1.0
Vinyl chloride	1.0	U	1.0

Method Blank - Batch: 680-180857

Method: 8260B
Preparation: 5030B

Lab Sample ID: MB 680-180857/7
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/23/2010 1236
Date Prepared: 09/23/2010 1236

Analysis Batch: 680-180857
Prep Batch: N/A
Units: ug/L

Instrument ID: MSP2
Lab File ID: pq202.d
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	RL
Xylenes, Total	2.0	U	2.0

Surrogate	% Rec	Acceptance Limits
Toluene-d8 (Surr)	100	75 - 120

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 680-180857

Method: 8260B
Preparation: 5030B

LCS Lab Sample ID:	LCS 680-180857/4	Analysis Batch:	680-180857	Instrument ID:	MSP2
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	pq194.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	5 mL
Date Analyzed:	09/23/2010 1034			Final Weight/Volume:	5 mL
Date Prepared:	09/23/2010 1034				

LCSD Lab Sample ID:	LCSD 680-180857/5	Analysis Batch:	680-180857	Instrument ID:	MSP2
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	pq196.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	5 mL
Date Analyzed:	09/23/2010 1103			Final Weight/Volume:	5 mL
Date Prepared:	09/23/2010 1103				

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
1,1,1,2-Tetrachloroethane	105	103	81 - 128	2	30		
1,1,1-Trichloroethane	104	104	76 - 127	0	30		
1,1,2,2-Tetrachloroethane	106	103	69 - 129	3	30		
1,1,2-Trichloroethane	97	98	75 - 121	1	30		
1,1-Dichloroethane	100	99	74 - 127	1	30		
1,1-Dichloroethene	101	100	62 - 141	0	30		
1,1-Dichloropropene	103	105	77 - 122	2	30		
1,2,3-Trichloropropane	102	98	70 - 130	3	30		
1,2,4-Trichlorobenzene	102	105	60 - 135	3	30		
1,2-Dibromoethane	100	101	80 - 121	2	30		
1,2-Dichlorobenzene	100	102	79 - 124	2	30		
1,2-Dichloroethane	93	92	66 - 132	1	30		
1,2-Dichloropropane	99	99	73 - 124	0	30		
1,3-Dichlorobenzene	97	99	78 - 125	2	30		
1,3-Dichloropropane	94	96	75 - 120	2	30		
1,4-Dichlorobenzene	97	99	81 - 122	2	30		
2-Butanone	96	96	33 - 157	0	30		
4-Methyl-2-pentanone	95	95	40 - 151	0	30		
Acetone	97	98	17 - 175	1	50		
Benzene	98	100	77 - 119	2	30		
Carbon tetrachloride	100	98	71 - 135	2	30		
Chlorobenzene	103	101	85 - 116	2	30		
Chloroethane	88	91	40 - 165	3	50		
Chloroform	102	103	82 - 120	0	30		
Chloromethane	94	100	48 - 142	6	50		
cis-1,2-Dichloroethene	102	103	69 - 134	1	30		
Cyclohexane	102	103	54 - 138	1	30		
Dibromochloromethane	98	98	75 - 133	1	30		
Dibromomethane	97	96	78 - 119	1	30		
Dichlorodifluoromethane	107	107	34 - 154	0	30		
Ethylbenzene	98	100	86 - 116	1	30		
Hexachloro-1,3-butadiene	109	111	62 - 142	1	30		
Isopropylbenzene	100	101	82 - 121	1	30		

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 680-180857

Method: 8260B
Preparation: 5030B

LCS Lab Sample ID: LCS 680-180857/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/23/2010 1034
Date Prepared: 09/23/2010 1034

Analysis Batch: 680-180857
Prep Batch: N/A
Units: ug/L

Instrument ID: MSP2
Lab File ID: pq194.d
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

LCSD Lab Sample ID: LCSD 680-180857/5
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/23/2010 1103
Date Prepared: 09/23/2010 1103

Analysis Batch: 680-180857
Prep Batch: N/A
Units: ug/L

Instrument ID: MSP2
Lab File ID: pq196.d
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Methylene Chloride	94	101	70 - 125	7	30		
Naphthalene	105	104	48 - 135	0	30		
Styrene	99	100	82 - 122	2	30		
Tetrachloroethene	110	108	76 - 126	2	30		
Toluene	94	97	81 - 117	3	30		
trans-1,2-Dichloroethene	105	104	72 - 131	1	30		
Trichloroethene	102	104	84 - 115	2	30		
Trichlorofluoromethane	105	106	58 - 149	0	50		
Vinyl chloride	108	113	59 - 144	5	50		
Xylenes, Total	99	100	84 - 118	1	30		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
Toluene-d8 (Surr)	94	98	75 - 120

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61277-1

Method Blank - Batch: 680-180267

Method: 8270C
Preparation: 3520C

Lab Sample ID:	MB 680-180267/19-A	Analysis Batch:	680-180419	Instrument ID:	MSN
Client Matrix:	Water	Prep Batch:	680-180267	Lab File ID:	n9327.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	1000 mL
Date Analyzed:	09/20/2010 1424			Final Weight/Volume:	1 mL
Date Prepared:	09/18/2010 1253			Injection Volume:	1 uL

Analyte	Result	Qual	RL
1,2,4-Trichlorobenzene	10	U	10
1,2,3-Trichlorobenzene	10	U	10

Surrogate	% Rec	Acceptance Limits
2,4,6-Tribromophenol	63	40 - 139
2-Fluorobiphenyl	62	50 - 113
2-Fluorophenol	66	36 - 110
Nitrobenzene-d5	65	45 - 112
Phenol-d5	62	38 - 116
Terphenyl-d14	90	10 - 121

Lab Control Sample - Batch: 680-180267

Method: 8270C
Preparation: 3520C

Lab Sample ID:	LCS 680-180267/20-A	Analysis Batch:	680-180419	Instrument ID:	MSN	
Client Matrix:	Water	Prep Batch:	680-180267	Lab File ID:	n9328.d	
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	1000	mL
Date Analyzed:	09/20/2010 1450			Final Weight/Volume:	1	mL
Date Prepared:	09/18/2010 1253			Injection Volume:	1	uL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
1,2,4-Trichlorobenzene	100	64.4	64	41 - 110	

Surrogate	% Rec	Acceptance Limits
2,4,6-Tribromophenol	94	40 - 139
2-Fluorobiphenyl	81	50 - 113
2-Fluorophenol	80	36 - 110
Nitrobenzene-d5	83	45 - 112
Phenol-d5	83	38 - 116
Terphenyl-d14	90	10 - 121

Lab Control Sample - Batch: 680-180267

Method: 8270C
Preparation: 3520C

Lab Sample ID:	LCS 680-180267/23-A	Analysis Batch:	680-180419	Instrument ID:	MSN	
Client Matrix:	Water	Prep Batch:	680-180267	Lab File ID:	n9329.d	
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	1000	mL
Date Analyzed:	09/20/2010 1515			Final Weight/Volume:	1	mL
Date Prepared:	09/18/2010 1253			Injection Volume:	1	uL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
1,2,3-Trichlorobenzene	100	56.6	57	14 - 130	

Surrogate	% Rec	Acceptance Limits
2,4,6-Tribromophenol	84	40 - 139
2-Fluorobiphenyl	71	50 - 113
2-Fluorophenol	75	36 - 110
Nitrobenzene-d5	73	45 - 112
Phenol-d5	75	38 - 116
Terphenyl-d14	76	10 - 121

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61277-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-180267

Method: 8270C
Preparation: 3520C

MS Lab Sample ID:	680-61277-9	Analysis Batch: 680-180565		Instrument ID:	MSN
Client Matrix:	Water	Prep Batch: 680-180267		Lab File ID:	n9370.d
Dilution:	1.0			Initial Weight/Volume:	500 mL
Date Analyzed:	09/21/2010 2007			Final Weight/Volume:	0.5 mL
Date Prepared:	09/18/2010 1253			Injection Volume:	1 uL

MSD Lab Sample ID:	680-61277-9	Analysis Batch: 680-180565		Instrument ID:	MSN
Client Matrix:	Water	Prep Batch: 680-180267		Lab File ID:	n9371.d
Dilution:	1.0			Initial Weight/Volume:	500 mL
Date Analyzed:	09/21/2010 2033			Final Weight/Volume:	0.5 mL
Date Prepared:	09/18/2010 1253			Injection Volume:	1 uL

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
1,2-Dichlorobenzene	39	46	39 - 110	16	40		
1,2,4-Trichlorobenzene	46	53	41 - 110	13	40		
1,2-Diphenylhydrazine	73	78	49 - 114	6	40		
1,3-Dichlorobenzene	37	43	36 - 110	16	40		
1,4-Dichlorobenzene	39	44	38 - 110	13	40		
1,4-Dioxane	53	55	11 - 110	4	40		
2,4,5-Trichlorophenol	83	82	47 - 122	0	40		
2,4,6-Trichlorophenol	78	83	46 - 120	6	40		
2,4-Dichlorophenol	76	75	46 - 115	1	40		
2,4-Dimethylphenol	70	66	36 - 110	5	40		
2,4-Dinitrophenol	112	97	10 - 189	14	40		
2,4-Dinitrotoluene	83	79	49 - 128	6	40		
2,6-Dinitrotoluene	81	77	45 - 131	5	40		
2-Chloronaphthalene	64	71	47 - 110	11	40		
2-Chlorophenol	66	67	47 - 110	2	40		
2-Methylphenol	73	69	46 - 110	6	40		
2-Nitrophenol	70	73	42 - 120	3	40		
3 & 4 Methylphenol	79	73	43 - 110	8	40		
3,3'-Dichlorobenzidine	0	0	10 - 113	NC	40	U F	U F
4,6-Dinitro-2-methylphenol	107	101	29 - 167	6	40		
4-Bromophenyl phenyl ether	88	92	42 - 110	5	40		
4-Chloro-3-methylphenol	86	77	46 - 118	12	40		
4-Chloroaniline	19	28	10 - 110	37	40	U	
4-Chlorophenyl phenyl ether	82	80	46 - 114	3	40		
4-Nitroaniline	57	64	36 - 125	12	40		
4-Nitrophenol	76	67	30 - 122	13	40		
Acenaphthene	72	75	45 - 117	4	40		
Acenaphthylene	74	77	51 - 112	5	40		
Anthracene	78	79	52 - 116	1	40		
Benzo[a]anthracene	82	80	49 - 124	2	40		

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61277-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-180267

Method: 8270C
Preparation: 3520C

MS Lab Sample ID: 680-61277-9
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/21/2010 2007
Date Prepared: 09/18/2010 1253

Analysis Batch: 680-180565
Prep Batch: 680-180267

Instrument ID: MSN
Lab File ID: n9370.d
Initial Weight/Volume: 500 mL
Final Weight/Volume: 0.5 mL
Injection Volume: 1 uL

MSD Lab Sample ID: 680-61277-9
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/21/2010 2033
Date Prepared: 09/18/2010 1253

Analysis Batch: 680-180565
Prep Batch: 680-180267

Instrument ID: MSN
Lab File ID: n9371.d
Initial Weight/Volume: 500 mL
Final Weight/Volume: 0.5 mL
Injection Volume: 1 uL

Analyte	% Rec. MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Benzo[a]pyrene	91	90	48 - 120	0	40		
Benzo[b]fluoranthene	84	78	46 - 126	8	40		
Benzo[g,h,i]perylene	90	85	51 - 117	6	40		
Benzo[k]fluoranthene	81	81	47 - 126	0	40		
Benzoic acid	111	95	10 - 138	15	40		
Bis(2-chloroethoxy)methane	75	82	50 - 112	8	40		
Bis(2-chloroethyl)ether	67	72	43 - 110	7	40		
Bis(2-ethylhexyl) phthalate	90	86	47 - 134	4	40		
bis(chloroisopropyl) ether	69	75	42 - 110	9	40		
Butyl benzyl phthalate	94	91	52 - 135	3	40		
Chrysene	82	80	51 - 123	3	40		
Dibenz(a,h)anthracene	82	80	46 - 124	3	40		
Diethyl phthalate	89	87	51 - 119	3	40		
Dimethyl phthalate	87	86	50 - 116	0	40		
Di-n-octyl phthalate	93	93	44 - 134	1	40		
Fluoranthene	79	78	50 - 120	2	40		
Fluorene	78	77	50 - 115	1	40		
Hexachloro-1,3-butadiene	43	50	40 - 110	16	40		
Hexachlorobenzene	81	82	48 - 119	1	40		
Hexachlorocyclopentadiene	20	25	10 - 110	23	40		
Hexachloroethane	34	43	33 - 110	22	40		
Indeno[1,2,3-cd]pyrene	81	84	40 - 126	3	40		
Isophorone	71	72	50 - 111	2	40		
Naphthalene	54	58	41 - 110	7	40		
Nitrobenzene	65	70	46 - 110	7	40		
Pentachlorophenol	99	99	37 - 132	0	40		
Phenanthrene	79	80	52 - 117	2	40		
Phenol	63	60	39 - 110	5	40		
Pyrene	84	80	52 - 125	5	40		

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
2,4,6-Tribromophenol	100	91	40 - 139
2-Fluorobiphenyl	69	76	50 - 113
2-Fluorophenol	65	68	36 - 110
Nitrobenzene-d5	71	76	45 - 112
Phenol-d5	69	68	38 - 116
Terphenyl-d14	82	79	10 - 121

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61277-1

Method Blank - Batch: 680-180283

Method: 8081A_8082
Preparation: 3520C

Lab Sample ID: MB 680-180283/16-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/20/2010 1122
Date Prepared: 09/18/2010 1253

Analysis Batch: 680-180528
Prep Batch: 680-180283
Units: ug/L

Instrument ID: SGM
Lab File ID: mi20009.d
Initial Weight/Volume: 1000 mL
Final Weight/Volume: 10 mL
Injection Volume: 2 uL
Column ID: PRIMARY

Analyte	Result	Qual	RL
alpha-BHC	0.050	U	0.050
4,4'-DDE	0.10	U	0.10
4,4'-DDT	0.10	U	0.10
4,4'-DDD	0.10	U	0.10
delta-BHC	0.050	U	0.050
Dieldrin	0.10	U	0.10
beta-BHC	0.050	U	0.050
Chlordane (technical)	0.50	U	0.50
gamma-BHC (Lindane)	0.050	U	0.050
Heptachlor	0.050	U	0.050
Methoxychlor	0.10	U	0.10
Toxaphene	5.0	U	5.0

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	77	14 - 115
Tetrachloro-m-xylene	72	35 - 120

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	76	14 - 115
Tetrachloro-m-xylene	62	35 - 120

Lab Control Sample - Batch: 680-180283

Method: 8081A_8082
Preparation: 3520C

Lab Sample ID:	LCS 680-180283/17-A	Analysis Batch:	680-180528	Instrument ID:	SGM
Client Matrix:	Water	Prep Batch:	680-180283	Lab File ID:	mi20010.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	1000 mL
Date Analyzed:	09/20/2010 1142			Final Weight/Volume:	10 mL
Date Prepared:	09/18/2010 1253			Injection Volume:	2 uL
				Column ID:	PRIMARY

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
alpha-BHC	0.100	0.107	107	29 - 112	
4,4'-DDE	0.200	0.151	76	33 - 142	
4,4'-DDT	0.200	0.242	121	27 - 141	
4,4'-DDD	0.200	0.217	108	37 - 179	
delta-BHC	0.100	0.106	106	25 - 123	
Dieldrin	0.200	0.222	111	45 - 137	
beta-BHC	0.100	0.168	168	15 - 204	
gamma-BHC (Lindane)	0.100	0.112	112	31 - 118	
Heptachlor	0.100	0.0860	86	30 - 133	
Methoxychlor	0.200	0.243	122	10 - 243	

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	80	14 - 115
Tetrachloro-m-xylene	88	35 - 120

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	77	14 - 115
Tetrachloro-m-xylene	72	35 - 120

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	89	14 - 115
Tetrachloro-m-xylene	88	35 - 120

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	87	14 - 115
Tetrachloro-m-xylene	76	35 - 120

Lab Control Sample - Batch: 680-180283

Method: 8081A_8082
Preparation: 3520C

Lab Sample ID:	LCS 680-180283/25-A	Analysis Batch:	680-180528	Instrument ID:	SGM
Client Matrix:	Water	Prep Batch:	680-180283	Lab File ID:	mi20012.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	1000 mL
Date Analyzed:	09/20/2010 1222			Final Weight/Volume:	10 mL
Date Prepared:	09/18/2010 1253			Injection Volume:	2 uL
				Column ID:	PRIMARY

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Chlordane (technical)	5.00	4.81	96	70 - 130	

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61277-1

Lab Control Sample - Batch: 680-180283

Method: 8081A_8082
Preparation: 3520C

Lab Sample ID:	LCS 680-180283/25-A	Analysis Batch: 680-180528		Instrument ID:	SGM
Client Matrix:	Water	Prep Batch: 680-180283		Lab File ID:	mi20012.d
Dilution:	1.0	Units: ug/L		Initial Weight/Volume:	1000 mL
Date Analyzed:	09/20/2010 1222			Final Weight/Volume:	10 mL
Date Prepared:	09/18/2010 1253			Injection Volume:	2 uL
				Column ID:	PRIMARY

Analyte	Spike Amount	Result	% Rec.	Limit	Qual

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	69	14 - 115
Tetrachloro-m-xylene	90	35 - 120

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	66	14 - 115
Tetrachloro-m-xylene	77	35 - 120

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61277-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-180283

Method: 8081A_8082
Preparation: 3520C

MS Lab Sample ID:	680-61217-B-4-A MS	Analysis Batch: 680-180528	Instrument ID: SGM
Client Matrix:	Water	Prep Batch: 680-180283	Lab File ID: mi20029.d
Dilution:	1.0		Initial Weight/Volume: 500 mL
Date Analyzed:	09/20/2010 1757		Final Weight/Volume: 5 mL
Date Prepared:	09/18/2010 1253		Injection Volume: 2 uL
			Column ID: PRIMARY

MSD Lab Sample ID:	680-61217-B-4-B MSD	Analysis Batch: 680-180528	Instrument ID: SGM
Client Matrix:	Water	Prep Batch: 680-180283	Lab File ID: mi20030.d
Dilution:	1.0		Initial Weight/Volume: 500 mL
Date Analyzed:	09/20/2010 1817		Final Weight/Volume: 5 mL
Date Prepared:	09/18/2010 1253		Injection Volume: 2 uL
			Column ID: PRIMARY

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
alpha-BHC	-4794	-929	29 - 112	27	40	E 4	E 4
4,4'-DDE	113	107	33 - 142	5	40		
4,4'-DDT	169	186	27 - 141	10	40	F	F
4,4'-DDD	148	160	37 - 179	8	40		
delta-BHC	-5570	-1620	25 - 123	13	40	E 4	E 4
Dieldrin	87	104	45 - 137	10	40		
beta-BHC	-612	-99	15 - 204	12	40	E 4	E 4
gamma-BHC (Lindane)	-1805	-511	31 - 118	17	40	E 4	E 4
Heptachlor	32240	36467	30 - 133	12	40	E F	E F
Methoxychlor	159	173	10 - 243	9	40		

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
DCB Decachlorobiphenyl	49	52	14 - 115
Tetrachloro-m-xylene	91	90	35 - 120

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
DCB Decachlorobiphenyl	36	38	14 - 115
Tetrachloro-m-xylene	73	86	35 - 120

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61277-1

Method Blank - Batch: 680-180183

Method: 6020
Preparation: 3010A

Lab Sample ID: MB 680-180183/14-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/18/2010 1310
Date Prepared: 09/16/2010 1739

Analysis Batch: 680-180514
Prep Batch: 680-180183
Units: ug/L

Instrument ID: ICPMSA
Lab File ID: 180183.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result	Qual	RL
Arsenic	2.5	U	2.5
Copper	5.0	U	5.0
Lead	1.5	U	1.5
Zinc	20	U	20

Lab Control Sample - Batch: 680-180183

Method: 6020
Preparation: 3010A

Lab Sample ID: LCS 680-180183/15-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/18/2010 1317
Date Prepared: 09/16/2010 1739

Analysis Batch: 680-180514
Prep Batch: 680-180183
Units: ug/L

Instrument ID: ICPMSA
Lab File ID: 180183.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Arsenic	100	95.3	95	75 - 125	
Copper	100	97.7	98	75 - 125	
Lead	50.0	47.6	95	75 - 125	
Zinc	100	91.6	92	75 - 125	

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-180183

Method: 6020
Preparation: 3010A

MS Lab Sample ID: 680-61267-C-1-B MS
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/18/2010 1459
Date Prepared: 09/16/2010 1739

Analysis Batch: 680-180514
Prep Batch: 680-180183

Instrument ID: ICPMSA
Lab File ID: 180183.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

MSD Lab Sample ID: 680-61267-C-1-C MSD
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/18/2010 1506
Date Prepared: 09/16/2010 1739

Analysis Batch: 680-180514
Prep Batch: 680-180183

Instrument ID: ICPMSA
Lab File ID: 180183.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Arsenic	98	95	75 - 125	3	20		
Copper	96	96	75 - 125	0	20		
Lead	94	95	75 - 125	1	20		
Zinc	88	86	75 - 125	2	20		

Method Blank - Batch: 680-180680

Method: 353.2
Preparation: N/A

Lab Sample ID: MB 680-180680/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/16/2010 1438
Date Prepared: N/A

Analysis Batch: 680-180680
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 2 mL
Final Weight/Volume: 2 mL

Analyte	Result	Qual	RL
Nitrate as N	0.050	U	0.050

Lab Control Sample - Batch: 680-180680

Method: 353.2
Preparation: N/A

Lab Sample ID: LCS 680-180680/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/16/2010 1437
Date Prepared: N/A

Analysis Batch: 680-180680
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 2 mL
Final Weight/Volume: 2 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Nitrate as N	0.500	0.468	94		

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-180680

Method: 353.2
Preparation: N/A

MS Lab Sample ID: 680-61248-E-2 MS
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/16/2010 1455
Date Prepared: N/A

Analysis Batch: 680-180680
Prep Batch: N/A

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 10 mL
Final Weight/Volume: 10 mL

MSD Lab Sample ID: 680-61248-E-2 MSD
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/16/2010 1457
Date Prepared: N/A

Analysis Batch: 680-180680
Prep Batch: N/A

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 10 mL
Final Weight/Volume: 10 mL

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Nitrate as N	92	98		2			

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61277-1

Duplicate - Batch: 680-180680

Method: 353.2
Preparation: N/A

Lab Sample ID: 680-61293-A-3 DU
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/16/2010 1511
Date Prepared: N/A

Analysis Batch: 680-180680
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 2 mL
Final Weight/Volume: 2 mL

Analyte	Sample Result/Qual		Result	RPD	Limit	Qual
Nitrate as N	0.050	U	0.050	NC		U

Method Blank - Batch: 680-180236

Method: 9056
Preparation: N/A

Lab Sample ID:	MB 680-180236/2	Analysis Batch: 680-180236		Instrument ID:	ICG
Client Matrix:	Water	Prep Batch: N/A		Lab File ID:	0036.d
Dilution:	5.0	Units:	mg/L	Initial Weight/Volume:	1 mL
Date Analyzed:	09/16/2010 1740			Final Weight/Volume:	5 mL
Date Prepared:	N/A				

Analyte	Result	Qual	RL
Nitrate as N	0.25	U	0.25

Lab Control Sample - Batch: 680-180236

Method: 9056
Preparation: N/A

Lab Sample ID:	LCS 680-180236/3	Analysis Batch: 680-180236		Instrument ID:	ICG
Client Matrix:	Water	Prep Batch: N/A		Lab File ID:	0037.d
Dilution:	5.0	Units:	mg/L	Initial Weight/Volume:	1 mL
Date Analyzed:	09/16/2010 1752			Final Weight/Volume:	5 mL
Date Prepared:	N/A				

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Nitrate as N	2.50	2.41	96	90 - 110	

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-180236

Method: 9056
Preparation: N/A

MS Lab Sample ID:	680-61277-6	Analysis Batch: 680-180236		Instrument ID:	ICG
Client Matrix:	Water	Prep Batch: N/A		Lab File ID:	0047.d
Dilution:	5.0			Initial Weight/Volume:	1 mL
Date Analyzed:	09/16/2010 1957			Final Weight/Volume:	5 mL
Date Prepared:	N/A				1 uL

MSD Lab Sample ID:	680-61277-6	Analysis Batch: 680-180236		Instrument ID:	ICG
Client Matrix:	Water	Prep Batch: N/A		Lab File ID:	0048.d
Dilution:	5.0			Initial Weight/Volume:	1 mL
Date Analyzed:	09/16/2010 2009			Final Weight/Volume:	5 mL
Date Prepared:	N/A				1 uL

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Nitrate as N	95	96	90 - 110	1	30		

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-180236

Method: 9056
Preparation: N/A

MS Lab Sample ID:	680-61277-9	Analysis Batch: 680-180236		Instrument ID:	ICG
Client Matrix:	Water	Prep Batch: N/A		Lab File ID:	0053.d
Dilution:	5.0			Initial Weight/Volume:	1 mL
Date Analyzed:	09/16/2010 2111			Final Weight/Volume:	5 mL
Date Prepared:	N/A				1 uL

MSD Lab Sample ID:	680-61277-9	Analysis Batch: 680-180236		Instrument ID:	ICG
Client Matrix:	Water	Prep Batch: N/A		Lab File ID:	0054.d
Dilution:	5.0			Initial Weight/Volume:	1 mL
Date Analyzed:	09/16/2010 2123			Final Weight/Volume:	5 mL
Date Prepared:	N/A				1 uL

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Nitrate as N	101	101	90 - 110	0	30		

Method Blank - Batch: 680-180457

Method: 9056
Preparation: N/A

Lab Sample ID: MB 680-180457/2
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/20/2010 0914
Date Prepared: N/A

Analysis Batch: 680-180457
Prep Batch: N/A
Units: mg/L

Instrument ID: ICG
Lab File ID: 0005.d
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	RL
Sulfate	5.0	U	5.0

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 680-180457

Method: 9056
Preparation: N/A

LCS Lab Sample ID: LCS 680-180457/3
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/20/2010 0926
Date Prepared: N/A

Analysis Batch: 680-180457
Prep Batch: N/A
Units: mg/L

Instrument ID: ICG
Lab File ID: 0006.d
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 5 mL
1 uL

LCSD Lab Sample ID: LCSD 680-180457/4
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/20/2010 0939
Date Prepared: N/A

Analysis Batch: 680-180457
Prep Batch: N/A
Units: mg/L

Instrument ID: ICG
Lab File ID: 0007.d
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 5 mL
1 uL

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Sulfate	109	108	90 - 110	1	30		

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-180457

Method: 9056
Preparation: N/A

MS Lab Sample ID: 680-61277-9
Client Matrix: Water
Dilution: 25
Date Analyzed: 09/20/2010 1257
Date Prepared: N/A

Analysis Batch: 680-180457
Prep Batch: N/A

Instrument ID: ICG
Lab File ID: 0023.d
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 5 mL
1 uL

MSD Lab Sample ID: 680-61277-9
Client Matrix: Water
Dilution: 25
Date Analyzed: 09/20/2010 1309
Date Prepared: N/A

Analysis Batch: 680-180457
Prep Batch: N/A

Instrument ID: ICG
Lab File ID: 0024.d
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 5 mL
1 uL

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Sulfate	107	102	90 - 110	2	30		

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61277-1

Method Blank - Batch: 680-180459

Method: 9056
Preparation: N/A

Lab Sample ID: MB 680-180459/2
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/19/2010 1215
Date Prepared: N/A

Analysis Batch: 680-180459
Prep Batch: N/A
Units: mg/L

Instrument ID: ICG
Lab File ID: 0004.d
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	RL
Sulfate	5.0	U	5.0

Lab Control Sample - Batch: 680-180459

Method: 9056
Preparation: N/A

Lab Sample ID: LCS 680-180459/3
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/19/2010 1228
Date Prepared: N/A

Analysis Batch: 680-180459
Prep Batch: N/A
Units: mg/L

Instrument ID: ICG
Lab File ID: 0005.d
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 5 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	50.0	54.4	109	90 - 110	

Matrix Spike - Batch: 680-180459

Method: 9056
Preparation: N/A

Lab Sample ID: 680-61277-5
Client Matrix: Water
Dilution: 100
Date Analyzed: 09/19/2010 1432
Date Prepared: N/A

Analysis Batch: 680-180459
Prep Batch: N/A
Units: mg/L

Instrument ID: ICG
Lab File ID: 0015.d
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 5 mL
1 uL

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	2100	1000	3100	95	90 - 110	

Serial Number 009616

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

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○ Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE BFEL Atlanta	PROJECT NO. 6122080154	PROJECT LOCATION (STATE) GA
TAL (LAB) PROJECT MANAGER Kathy Smith	P.O. NUMBER	CONTRACT NO.
CLIENT (SITE) PM Rhonda Quinn	CLIENT PHONE 770-421-3400	CLIENT FAX 770-421-3486
CLIENT NAME Mactec	CLIENT E-MAIL	

CLIENT ADDRESS 3200 Town Point Dr, Ste 100, Kennesaw, GA 30144
COMPANY CONTRACTING THIS WORK (if applicable)

PAGE 1 OF 1
STANDARD REPORT DELIVERY ○
DATE DUE
EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE
NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	6020 Cu+Zn (HNO3)	6020 As,Pb,Cu,Zn (HNO3)	9056 NO3+SO4	8270C 1,2,3-TCB, 124-TCB	8260 VOC List	8270C SVOC List 123-TCB, 124-TCB	8081A Pest				REMARKS
9/14/10	1745	MW-25-091410 *	G	X					1	1	2			2				*Short holding time
9/15/10	0930	TB-091510	G	X								2						For NO_3 for Sample
	1000	Equipment Rinse Blank	G	X					1	1		3	2	2				MW-25-091410
	1140	MW-104A-091510	G	X					1	1		3	2	2				Samples are
	1220	MW-113-091510	G	X					1	1	2			2				in 4 coolers
	1600	MW-107D-091510	G	X					1	1	2			2				
	1517	MW-105-091510	G	X					1	1	2			2				
	1455 ~~1435~~	MW-104D-091510	G	X					1	1	2^{OH}	3	2	2				
	1700	MW-106D-091510	G	X					1	1	2			2				

PRESERVATIVE
NUMBER OF CONTAINERS SUBMITTED

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
Daniel Howard	9/15/10	1930						
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SAVANNAH LOG NO.	LABORATORY REMARKS
	9/16/10	0920	YES ● NO ○		680-61277	Temps: (°C): 0.2, 1.6, 1.2, 2.8

TAL8240-680 (1207)

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 680-61548-1

Job Description: BFEL Atlanta

For:
MACTEC Engineering and Consulting Inc
3200 Town Point Drive Northwest
Suite 100
Kennesaw, GA 30144

Attention: Ms. Rhonda Quinn

Kathryn Smith

Approved for release.
Kathryn Smith
Project Manager I
10/5/2010 10:02 AM

Kathryn Smith
Project Manager I
kathye.smith@testamericainc.com
10/05/2010

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

Savannah Certifications and ID #s: A2LA: 0399.01; AL: 41450; ARDEQ: 88-0692; ARDOH; CA: 03217CA; CO; CT: PH0161; DE; FL: E87052; GA: 803; Guam; HI; IL: 200022; IN; IA: 353; KS: E-10322; KY EPPC: 90084; KY UST; LA DEQ: 30690; LA DHH: LA080008; ME: 2008022; MD: 250; MA: M-GA006; MI: 9925; MS; NFESC: 249; NV: GA00006; NJ: GA769; NM; NY: 10842; NC DWQ: 269; NC DHHS: 13701; PA: 68-00474; PR: GA00006; RI: LAO00244; SC: 98001001; TN: TN0296; TX: T104704185; USEPA: GA00006; VT: VT-87052; VA: 00302; WA; WV DEP: 094; WV DHHR: 9950 C; WI DNR: 999819810; WY/EPAR8: 8TMS-Q

TestAmerica Laboratories, Inc.
TestAmerica Savannah   5102 LaRoche Avenue, Savannah, GA 31404
Tel (912) 354-7858 Fax (912) 352-0165 www.testamericainc.com

ACCREDITED IN ACCORDANCE WITH nelac

Job Narrative
680-61548-1

Comments
No additional comments.

Receipt
All samples were received in good condition within temperature requirements.

GC/MS Semi VOA
No analytical or quality issues were noted.

GC Semi VOA
Method(s) 8081A_8082: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for batch 680-181114 were outside control limits. The associated laboratory control sample (LCS) recovery met acceptance criteria.

No other analytical or quality issues were noted.

Metals
No analytical or quality issues were noted.

General Chemistry
No analytical or quality issues were noted.

Organic Prep
No analytical or quality issues were noted.

METHOD / ANALYST SUMMARY

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61548-1

Method	Analyst	Analyst ID
SW846 8270C	Palefsky, Whitney H	WHP
SW846 8081A_8082	Meincke, Griffin	GM
SW846 6020	Bland, Brian	BCB
SW846 6020	Robertson, Bryn	BR
SW846 9056	Brazell, Connie	CB
SM SM 2340C	Nelson, Christopher	CN

SAMPLE SUMMARY

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61548-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
680-61548-1	SW2010-4	Water	09/23/2010 1352	09/24/2010 0915
680-61548-2	SW2010-9	Water	09/23/2010 1420	09/24/2010 0915
680-61548-3	SW2010-10	Water	09/23/2010 1434	09/24/2010 0915
680-61548-4	SW2010-17	Water	09/23/2010 1044	09/24/2010 0915
680-61548-5	SW2010-18	Water	09/23/2010 1125	09/24/2010 0915
680-61548-6	SW2010-14	Water	09/23/2010 1228	09/24/2010 0915
680-61548-7	SW2010-13	Water	09/23/2010 1245	09/24/2010 0915
680-61548-8	SW2010-1-Dup	Water	09/23/2010 1254	09/24/2010 0915
680-61548-9	SW2010-15-Dup	Water	09/23/2010 1254	09/24/2010 0915
680-61548-10	SW2010-7	Water	09/23/2010 1500	09/24/2010 0915
680-61548-11	SW2010-6	Water	09/23/2010 1434	09/24/2010 0915
680-61548-12	SW2010-3	Water	09/23/2010 1332	09/24/2010 0915
680-61548-13	SW2010-15	Water	09/23/2010 1126	09/24/2010 0915
680-61548-14	SW2010-16	Water	09/23/2010 1055	09/24/2010 0915
680-61548-15	SW2010-11	Water	09/23/2010 1358	09/24/2010 0915
680-61548-16	SW2010-12	Water	09/23/2010 1330	09/24/2010 0915
680-61548-17	SW2010-8	Water	09/23/2010 1520	09/24/2010 0915
680-61548-18	SW2010-1	Water	09/23/2010 1254	09/24/2010 0915
680-61548-19	SW2010-5	Water	09/23/2010 1413	09/24/2010 0915
680-61548-20	SW2010-2	Water	09/23/2010 1308	09/24/2010 0915

Client Sample ID: **SW2010-18**

Lab Sample ID:	680-61548-5	Date Sampled:	09/23/2010 1125
Client Matrix:	Water	Date Received:	09/24/2010 0915

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-181820	Instrument ID:	MST
Preparation:	3520C	Prep Batch: 680-181385	Lab File ID:	t2329.d
Dilution:	1.0		Initial Weight/Volume:	1060 mL
Date Analyzed:	10/01/2010 1927		Final Weight/Volume:	1 mL
Date Prepared:	09/29/2010 1451		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,2,3-Trichlorobenzene	0.94	U	0.94	9.4
1,2,4-Trichlorobenzene	0.53	U	0.53	9.4

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	74		50 - 113
2-Fluorophenol	62		36 - 110
Nitrobenzene-d5	69		45 - 112
Phenol-d5	63		38 - 116
Terphenyl-d14	33		10 - 121
2,4,6-Tribromophenol	79		40 - 139

Analytical Data

Client: MACTEC Engineering and Consulting Inc
Job Number: 680-61548-1

Client Sample ID: **SW2010-13**

Lab Sample ID:	680-61548-7	Date Sampled:	09/23/2010 1245
Client Matrix:	Water	Date Received:	09/24/2010 0915

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-181811	Instrument ID:	MST
Preparation:	3520C	Prep Batch: 680-181385	Lab File ID:	t2334.d
Dilution:	1.0		Initial Weight/Volume:	1060 mL
Date Analyzed:	10/03/2010 1434		Final Weight/Volume:	1 mL
Date Prepared:	09/29/2010 1451		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,2,3-Trichlorobenzene	0.94	U	0.94	9.4
1,2,4-Trichlorobenzene	0.53	U	0.53	9.4

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	79		50 - 113
2-Fluorophenol	62		36 - 110
Nitrobenzene-d5	75		45 - 112
Phenol-d5	57		38 - 116
Terphenyl-d14	28		10 - 121
2,4,6-Tribromophenol	79		40 - 139

Client Sample ID:	**SW2010-1-Dup**		
Lab Sample ID:	680-61548-8	Date Sampled:	09/23/2010 1254
Client Matrix:	Water	Date Received:	09/24/2010 0915

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-181820	Instrument ID:	MST
Preparation:	3520C	Prep Batch: 680-181385	Lab File ID:	t2330.d
Dilution:	1.0		Initial Weight/Volume:	1060 mL
Date Analyzed:	10/01/2010 1953		Final Weight/Volume:	1 mL
Date Prepared:	09/29/2010 1451		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,2,3-Trichlorobenzene	0.94	U	0.94	9.4
1,2,4-Trichlorobenzene	0.53	U	0.53	9.4

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	78		50 - 113
2-Fluorophenol	68		36 - 110
Nitrobenzene-d5	75		45 - 112
Phenol-d5	67		38 - 116
Terphenyl-d14	26		10 - 121
2,4,6-Tribromophenol	73		40 - 139

Client Sample ID: **SW2010-15-Dup**

Lab Sample ID:	680-61548-9	Date Sampled: 09/23/2010 1254
Client Matrix:	Water	Date Received: 09/24/2010 0915

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-181811	Instrument ID:	MST
Preparation:	3520C	Prep Batch: 680-181385	Lab File ID:	t2335a.d
Dilution:	1.0		Initial Weight/Volume:	1060 mL
Date Analyzed:	10/03/2010 1500		Final Weight/Volume:	1 mL
Date Prepared:	09/29/2010 1451		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,2,3-Trichlorobenzene	0.94	U	0.94	9.4
1,2,4-Trichlorobenzene	0.53	U	0.53	9.4

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	81		50 - 113
2-Fluorophenol	67		36 - 110
Nitrobenzene-d5	80		45 - 112
Phenol-d5	63		38 - 116
Terphenyl-d14	39		10 - 121
2,4,6-Tribromophenol	82		40 - 139

Client Sample ID: **SW2010-15**

Lab Sample ID:	680-61548-13	Date Sampled:	09/23/2010 1126
Client Matrix:	Water	Date Received:	09/24/2010 0915

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-181820	Instrument ID:	MST
Preparation:	3520C	Prep Batch: 680-181385	Lab File ID:	t2331.d
Dilution:	1.0		Initial Weight/Volume:	1050 mL
Date Analyzed:	10/01/2010 2019		Final Weight/Volume:	1 mL
Date Prepared:	09/29/2010 1451		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,2,3-Trichlorobenzene	0.95	U	0.95	9.5
1,2,4-Trichlorobenzene	0.53	U	0.53	9.5

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	87		50 - 113
2-Fluorophenol	79		36 - 110
Nitrobenzene-d5	82		45 - 112
Phenol-d5	79		38 - 116
Terphenyl-d14	48		10 - 121
2,4,6-Tribromophenol	88		40 - 139

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61548-1

Client Sample ID: **SW2010-11**

Lab Sample ID:	680-61548-15	Date Sampled:	09/23/2010 1358
Client Matrix:	Water	Date Received:	09/24/2010 0915

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-181811	Instrument ID:	MST
Preparation:	3520C	Prep Batch: 680-181385	Lab File ID:	t2336.d
Dilution:	1.0		Initial Weight/Volume:	500 mL
Date Analyzed:	10/03/2010 1526		Final Weight/Volume:	0.5 mL
Date Prepared:	09/29/2010 1451		Injection Volume:	1 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,2,3-Trichlorobenzene	1.0	U	1.0	10
1,2,4-Trichlorobenzene	0.56	U	0.56	10

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	83		50 - 113
2-Fluorophenol	67		36 - 110
Nitrobenzene-d5	81		45 - 112
Phenol-d5	61		38 - 116
Terphenyl-d14	57		10 - 121
2,4,6-Tribromophenol	83		40 - 139

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61548-1

Client Sample ID: **SW2010-1**

Lab Sample ID: 680-61548-18

Client Matrix: Water

Date Sampled: 09/23/2010 1254

Date Received: 09/24/2010 0915

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C

Preparation: 3520C

Dilution: 1.0

Date Analyzed: 10/03/2010 1552

Date Prepared: 09/29/2010 1451

Analysis Batch: 680-181811

Prep Batch: 680-181385

Instrument ID: MST

Lab File ID: t2337.d

Initial Weight/Volume: 500 mL

Final Weight/Volume: 0.5 mL

Injection Volume: 1 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,2,3-Trichlorobenzene	1.0	U	1.0	10
1,2,4-Trichlorobenzene	0.56	U	0.56	10

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	63		50 - 113
2-Fluorophenol	51		36 - 110
Nitrobenzene-d5	62		45 - 112
Phenol-d5	46		38 - 116
Terphenyl-d14	44		10 - 121
2,4,6-Tribromophenol	57		40 - 139

Client Sample ID: **SW2010-5**

Lab Sample ID:	680-61548-19	Date Sampled:	09/23/2010 1413
Client Matrix:	Water	Date Received:	09/24/2010 0915

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method:	8270C	Analysis Batch: 680-181811	Instrument ID: MST
Preparation:	3520C	Prep Batch: 680-181385	Lab File ID: t2338.d
Dilution:	1.0		Initial Weight/Volume: 1030 mL
Date Analyzed:	10/03/2010 1618		Final Weight/Volume: 1 mL
Date Prepared:	09/29/2010 1451		Injection Volume: 1 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,2,3-Trichlorobenzene	0.97	U	0.97	9.7
1,2,4-Trichlorobenzene	0.54	U	0.54	9.7

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	78		50 - 113
2-Fluorophenol	68		36 - 110
Nitrobenzene-d5	76		45 - 112
Phenol-d5	65		38 - 116
Terphenyl-d14	33		10 - 121
2,4,6-Tribromophenol	86		40 - 139

Client Sample ID:	**SW2010-4**		
Lab Sample ID:	680-61548-1	Date Sampled:	09/23/2010 1352
Client Matrix:	Water	Date Received:	09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	1060 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 1503		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
alpha-BHC	0.039	J	0.0054	0.047
4,4'-DDE	0.0073	U	0.0073	0.094
4,4'-DDT	0.0092	U	0.0092	0.094
4,4'-DDD	0.0061	U	0.0061	0.094
delta-BHC	0.11	p	0.0045	0.047
Dieldrin	0.0086	U	0.0086	0.094
beta-BHC	0.14		0.0063	0.047
Chlordane (technical)	0.094	U	0.094	0.47
gamma-BHC (Lindane)	0.028	J p	0.0056	0.047
Heptachlor	0.0066	U	0.0066	0.047
Methoxychlor	0.012	U	0.012	0.094
Toxaphene	0.47	U	0.47	4.7

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	26		14 - 115
Tetrachloro-m-xylene	66		35 - 120

Client: MACTEC Engineering and Consulting Inc
Job Number: 680-61548-1

Client Sample ID: **SW2010-4**

Lab Sample ID: 680-61548-1
Client Matrix: Water
Date Sampled: 09/23/2010 1352
Date Received: 09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method: 8081A_8082
Preparation: 3520C
Dilution: 1.0
Date Analyzed: 09/29/2010 1503
Date Prepared: 09/27/2010 1433

Analysis Batch: 680-181597
Prep Batch: 680-181114

Instrument ID: SGJ
Initial Weight/Volume: 1060 mL
Final Weight/Volume: 10 mL
Injection Volume: 2 uL
Result Type: SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	23		14 - 115
Tetrachloro-m-xylene	58		35 - 120

Client Sample ID: **SW2010-9**

Lab Sample ID:	680-61548-2	Date Sampled: 09/23/2010 1420
Client Matrix:	Water	Date Received: 09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 1526		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
alpha-BHC	0.16		0.0054	0.048
4,4'-DDE	0.0073	U	0.0073	0.095
4,4'-DDT	0.0092	U	0.0092	0.095
4,4'-DDD	0.0062	U	0.0062	0.095
delta-BHC	0.20		0.0046	0.048
Dieldrin	0.0087	U	0.0087	0.095
beta-BHC	0.14	p	0.0064	0.048
Chlordane (technical)	0.095	U	0.095	0.48
gamma-BHC (Lindane)	0.10		0.0056	0.048
Heptachlor	0.0067	U	0.0067	0.048
Methoxychlor	0.012	U	0.012	0.095
Toxaphene	0.48	U	0.48	4.8

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	31		14 - 115
Tetrachloro-m-xylene	73		35 - 120

Client Sample ID: **SW2010-9**

Lab Sample ID: 680-61548-2 Date Sampled: 09/23/2010 1420
Client Matrix: Water Date Received: 09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 1526		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	26		14 - 115
Tetrachloro-m-xylene	63		35 - 120

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61548-1

Client Sample ID: **SW2010-10**

Lab Sample ID: 680-61548-3

Client Matrix: Water

Date Sampled: 09/23/2010 1434

Date Received: 09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	1060 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 1549		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
alpha-BHC	0.13		0.0054	0.047
4,4'-DDE	0.0073	U	0.0073	0.094
4,4'-DDT	0.0092	U	0.0092	0.094
4,4'-DDD	0.0061	U	0.0061	0.094
delta-BHC	0.11	p	0.0045	0.047
Dieldrin	0.011	J	0.0086	0.094
beta-BHC	0.18		0.0063	0.047
Chlordane (technical)	0.094	U	0.094	0.47
gamma-BHC (Lindane)	0.084		0.0056	0.047
Heptachlor	0.0066	U	0.0066	0.047
Methoxychlor	0.012	U	0.012	0.094
Toxaphene	0.47	U	0.47	4.7

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	34		14 - 115
Tetrachloro-m-xylene	63		35 - 120

Client Sample ID: **SW2010-10**

Lab Sample ID: 680-61548-3
Client Matrix: Water

Date Sampled: 09/23/2010 1434
Date Received: 09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	1060 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 1549		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	33		14 - 115
Tetrachloro-m-xylene	54		35 - 120

Client Sample ID: **SW2010-17**

Lab Sample ID:	680-61548-4	Date Sampled: 09/23/2010 1044
Client Matrix:	Water	Date Received: 09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	1060 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 1612		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
alpha-BHC	0.31		0.0054	0.047
4,4'-DDE	0.0073	U	0.0073	0.094
4,4'-DDT	0.0092	U	0.0092	0.094
4,4'-DDD	0.0061	U	0.0061	0.094
delta-BHC	0.21	p	0.0045	0.047
Dieldrin	0.0086	U	0.0086	0.094
beta-BHC	0.48		0.0063	0.047
Chlordane (technical)	0.094	U	0.094	0.47
gamma-BHC (Lindane)	0.11		0.0056	0.047
Heptachlor	0.0066	U	0.0066	0.047
Methoxychlor	0.012	U	0.012	0.094
Toxaphene	0.47	U	0.47	4.7

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	56		14 - 115
Tetrachloro-m-xylene	53		35 - 120

Client: MACTEC Engineering and Consulting Inc
Job Number: 680-61548-1

Client Sample ID: **SW2010-17**

Lab Sample ID: 680-61548-4
Client Matrix: Water
Date Sampled: 09/23/2010 1044
Date Received: 09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	1060 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 1612		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	46		14 - 115
Tetrachloro-m-xylene	50		35 - 120

Client Sample ID: **SW2010-18**

Lab Sample ID:	680-61548-5	Date Sampled: 09/23/2010 1125
Client Matrix:	Water	Date Received: 09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 1635		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
alpha-BHC	0.45		0.0054	0.048
4,4'-DDE	0.0073	U	0.0073	0.095
4,4'-DDT	0.0092	U	0.0092	0.095
4,4'-DDD	0.0062	U	0.0062	0.095
delta-BHC	0.30	p	0.0046	0.048
Dieldrin	0.0087	U	0.0087	0.095
beta-BHC	0.64		0.0064	0.048
Chlordane (technical)	0.095	U	0.095	0.48
gamma-BHC (Lindane)	0.17		0.0056	0.048
Heptachlor	0.0067	U	0.0067	0.048
Methoxychlor	0.012	U	0.012	0.095
Toxaphene	0.48	U	0.48	4.8

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	52		14 - 115
Tetrachloro-m-xylene	78	p	35 - 120

Client Sample ID: **SW2010-18**

Lab Sample ID:	680-61548-5	Date Sampled:	09/23/2010 1125
Client Matrix:	Water	Date Received:	09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 1635		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	44		14 - 115
Tetrachloro-m-xylene	207	X	35 - 120

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61548-1

Client Sample ID: **SW2010-14**

Lab Sample ID:	680-61548-6	Date Sampled: 09/23/2010 1228
Client Matrix:	Water	Date Received: 09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 1658		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
alpha-BHC	0.62		0.0054	0.048
4,4'-DDE	0.0073	U	0.0073	0.095
4,4'-DDT	0.0092	U	0.0092	0.095
4,4'-DDD	0.0062	U	0.0062	0.095
delta-BHC	0.48	p	0.0046	0.048
Dieldrin	0.015	J	0.0087	0.095
beta-BHC	0.73		0.0064	0.048
Chlordane (technical)	0.095	U	0.095	0.48
gamma-BHC (Lindane)	0.22		0.0056	0.048
Heptachlor	0.0067	U	0.0067	0.048
Methoxychlor	0.012	U	0.012	0.095
Toxaphene	0.48	U	0.48	4.8

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	40		14 - 115
Tetrachloro-m-xylene	70		35 - 120

Client Sample ID:	**SW2010-14**		
Lab Sample ID:	680-61548-6	Date Sampled:	09/23/2010 1228
Client Matrix:	Water	Date Received:	09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 1658		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	35		14 - 115
Tetrachloro-m-xylene	62		35 - 120

Client Sample ID: **SW2010-13**

Lab Sample ID:	680-61548-7	Date Sampled: 09/23/2010 1245
Client Matrix:	Water	Date Received: 09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 1721		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
alpha-BHC	0.50		0.0054	0.048
4,4'-DDE	0.0073	U	0.0073	0.095
4,4'-DDT	0.0092	U	0.0092	0.095
4,4'-DDD	0.0062	U	0.0062	0.095
delta-BHC	0.32	p	0.0046	0.048
Dieldrin	0.015	J	0.0087	0.095
beta-BHC	0.63		0.0064	0.048
Chlordane (technical)	0.095	U	0.095	0.48
gamma-BHC (Lindane)	0.20		0.0056	0.048
Heptachlor	0.0067	U	0.0067	0.048
Methoxychlor	0.012	U	0.012	0.095
Toxaphene	0.48	U	0.48	4.8

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	48		14 - 115
Tetrachloro-m-xylene	80		35 - 120

Client Sample ID: **SW2010-13**

Lab Sample ID:	680-61548-7	Date Sampled: 09/23/2010 1245
Client Matrix:	Water	Date Received: 09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 1721		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	43		14 - 115
Tetrachloro-m-xylene	79		35 - 120

Analytical Data

Client: MACTEC Engineering and Consulting Inc | Job Number: 680-61548-1

Client Sample ID:	**SW2010-1-Dup**		
Lab Sample ID:	680-61548-8	Date Sampled:	09/23/2010 1254
Client Matrix:	Water	Date Received:	09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 1744		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
alpha-BHC	0.0054	U	0.0054	0.048
4,4'-DDE	0.0073	U	0.0073	0.095
4,4'-DDT	0.0092	U	0.0092	0.095
4,4'-DDD	0.0062	U	0.0062	0.095
delta-BHC	0.0046	U	0.0046	0.048
Dieldrin	0.0087	U	0.0087	0.095
beta-BHC	0.068	p	0.0064	0.048
Chlordane (technical)	0.095	U	0.095	0.48
gamma-BHC (Lindane)	0.0056	U	0.0056	0.048
Heptachlor	0.0067	U	0.0067	0.048
Methoxychlor	0.012	U	0.012	0.095
Toxaphene	0.48	U	0.48	4.8

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	41		14 - 115
Tetrachloro-m-xylene	78		35 - 120

Client Sample ID:	**SW2010-1-Dup**	
Lab Sample ID:	680-61548-8	Date Sampled: 09/23/2010 1254
Client Matrix:	Water	Date Received: 09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 1744		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	39		14 - 115
Tetrachloro-m-xylene	60		35 - 120

Client Sample ID: **SW2010-15-Dup**

Lab Sample ID:	680-61548-9	Date Sampled: 09/23/2010 1254
Client Matrix:	Water	Date Received: 09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	1060 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 1808		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
alpha-BHC	0.44		0.0054	0.047
4,4'-DDE	0.0073	U	0.0073	0.094
4,4'-DDT	0.0092	U	0.0092	0.094
4,4'-DDD	0.0061	U	0.0061	0.094
delta-BHC	0.35	p	0.0045	0.047
Dieldrin	0.0086	U	0.0086	0.094
beta-BHC	0.61		0.0063	0.047
Chlordane (technical)	0.094	U	0.094	0.47
gamma-BHC (Lindane)	0.16		0.0056	0.047
Heptachlor	0.0066	U	0.0066	0.047
Methoxychlor	0.012	U	0.012	0.094
Toxaphene	0.47	U	0.47	4.7

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	31		14 - 115
Tetrachloro-m-xylene	56		35 - 120

Client Sample ID: **SW2010-15-Dup**

Lab Sample ID:	680-61548-9	Date Sampled:	09/23/2010 1254
Client Matrix:	Water	Date Received:	09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	1060 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 1808		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	28		14 - 115
Tetrachloro-m-xylene	51		35 - 120

Client Sample ID: **SW2010-7**

Lab Sample ID:	680-61548-10	Date Sampled:	09/23/2010 1500
Client Matrix:	Water	Date Received:	09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	1060 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 1831		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
alpha-BHC	0.090		0.0054	0.047
4,4'-DDE	0.0073	U	0.0073	0.094
4,4'-DDT	0.0092	U	0.0092	0.094
4,4'-DDD	0.014	J	0.0061	0.094
delta-BHC	0.091	p	0.0045	0.047
Dieldrin	0.0086	U	0.0086	0.094
beta-BHC	0.16		0.0063	0.047
Chlordane (technical)	0.094	U	0.094	0.47
gamma-BHC (Lindane)	0.029	J p	0.0056	0.047
Heptachlor	0.0066	U	0.0066	0.047
Methoxychlor	0.012	U	0.012	0.094
Toxaphene	0.47	U	0.47	4.7

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	32		14 - 115
Tetrachloro-m-xylene	75		35 - 120

Client Sample ID: **SW2010-7**

Lab Sample ID: 680-61548-10
Client Matrix: Water

Date Sampled: 09/23/2010 1500
Date Received: 09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method: 8081A_8082
Preparation: 3520C
Dilution: 1.0
Date Analyzed: 09/29/2010 1831
Date Prepared: 09/27/2010 1433

Analysis Batch: 680-181597
Prep Batch: 680-181114

Instrument ID: SGJ
Initial Weight/Volume: 1060 mL
Final Weight/Volume: 10 mL
Injection Volume: 2 uL
Result Type: SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	29		14 - 115
Tetrachloro-m-xylene	74		35 - 120

Client Sample ID: **SW2010-6**

Lab Sample ID:	680-61548-11	Date Sampled:	09/23/2010 1434
Client Matrix:	Water	Date Received:	09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch:	680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch:	680-181114	Initial Weight/Volume:	1060 mL
Dilution:	1.0			Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 1854			Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
alpha-BHC	0.094		0.0054	0.047
4,4'-DDE	0.0073	U	0.0073	0.094
4,4'-DDT	0.0092	U	0.0092	0.094
4,4'-DDD	0.0061	U	0.0061	0.094
delta-BHC	0.14		0.0045	0.047
Dieldrin	0.0086	U	0.0086	0.094
beta-BHC	0.15		0.0063	0.047
Chlordane (technical)	0.094	U	0.094	0.47
gamma-BHC (Lindane)	0.043	J	0.0056	0.047
Heptachlor	0.0066	U	0.0066	0.047
Methoxychlor	0.012	U	0.012	0.094
Toxaphene	0.47	U	0.47	4.7

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	22		14 - 115
Tetrachloro-m-xylene	71		35 - 120

Client Sample ID: **SW2010-6**

Lab Sample ID: 680-61548-11 Date Sampled: 09/23/2010 1434
Client Matrix: Water Date Received: 09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	1060 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 1854		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	20		14 - 115
Tetrachloro-m-xylene	60		35 - 120

Client Sample ID:	**SW2010-3**		
Lab Sample ID:	680-61548-12	Date Sampled:	09/23/2010 1332
Client Matrix:	Water	Date Received:	09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	1060 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 1917		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
alpha-BHC	0.057		0.0054	0.047
4,4'-DDE	0.0073	U	0.0073	0.094
4,4'-DDT	0.0092	U	0.0092	0.094
4,4'-DDD	0.0061	U	0.0061	0.094
delta-BHC	0.13	p	0.0045	0.047
Dieldrin	0.0086	U	0.0086	0.094
beta-BHC	0.15		0.0063	0.047
Chlordane (technical)	0.094	U	0.094	0.47
gamma-BHC (Lindane)	0.060		0.0056	0.047
Heptachlor	0.0066	U	0.0066	0.047
Methoxychlor	0.012	U	0.012	0.094
Toxaphene	0.47	U	0.47	4.7

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	23		14 - 115
Tetrachloro-m-xylene	85		35 - 120

Client Sample ID: **SW2010-3**

Lab Sample ID:	680-61548-12	Date Sampled:	09/23/2010 1332
Client Matrix:	Water	Date Received:	09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	1060 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 1917		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	23		14 - 115
Tetrachloro-m-xylene	78		35 - 120

Client Sample ID:	**SW2010-15**
Lab Sample ID:	680-61548-13
Client Matrix:	Water

Date Sampled: 09/23/2010 1126
Date Received: 09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 1940		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
alpha-BHC	0.62		0.0054	0.048
4,4'-DDE	0.0073	U	0.0073	0.095
4,4'-DDT	0.0092	U	0.0092	0.095
4,4'-DDD	0.0062	U	0.0062	0.095
delta-BHC	0.44	p	0.0046	0.048
Dieldrin	0.017	J	0.0087	0.095
beta-BHC	0.75		0.0064	0.048
Chlordane (technical)	0.095	U	0.095	0.48
gamma-BHC (Lindane)	0.22		0.0056	0.048
Heptachlor	0.0067	U	0.0067	0.048
Methoxychlor	0.012	U	0.012	0.095
Toxaphene	0.48	U	0.48	4.8

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	38		14 - 115
Tetrachloro-m-xylene	81		35 - 120

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61548-1

Client Sample ID: **SW2010-15**

Lab Sample ID: 680-61548-13

Client Matrix: Water

Date Sampled: 09/23/2010 1126

Date Received: 09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	1050 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 1940		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	34		14 - 115
Tetrachloro-m-xylene	80		35 - 120

Client Sample ID: **SW2010-16**

Lab Sample ID:	680-61548-14	Date Sampled: 09/23/2010 1055
Client Matrix:	Water	Date Received: 09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	1060 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 2003		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
alpha-BHC	0.37		0.0054	0.047
4,4'-DDE	0.0073	U	0.0073	0.094
4,4'-DDT	0.0092	U	0.0092	0.094
4,4'-DDD	0.0061	U	0.0061	0.094
delta-BHC	0.33	p	0.0045	0.047
Dieldrin	0.012	J	0.0086	0.094
beta-BHC	0.60		0.0063	0.047
Chlordane (technical)	0.094	U	0.094	0.47
gamma-BHC (Lindane)	0.15		0.0056	0.047
Heptachlor	0.0066	U	0.0066	0.047
Methoxychlor	0.012	U	0.012	0.094
Toxaphene	0.47	U	0.47	4.7

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	29		14 - 115
Tetrachloro-m-xylene	50		35 - 120

Client Sample ID: **SW2010-16**

Lab Sample ID:	680-61548-14	Date Sampled: 09/23/2010 1055
Client Matrix:	Water	Date Received: 09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	1060 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 2003		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	26		14 - 115
Tetrachloro-m-xylene	47		35 - 120

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61548-1

Client Sample ID: **SW2010-11**

Lab Sample ID:	680-61548-15	Date Sampled:	09/23/2010 1358
Client Matrix:	Water	Date Received:	09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID: SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume: 1060 mL
Dilution:	1.0		Final Weight/Volume: 10 mL
Date Analyzed:	09/29/2010 2026		Injection Volume: 2 uL
Date Prepared:	09/27/2010 1433		Result Type: PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
alpha-BHC	0.19		0.0054	0.047
4,4'-DDE	0.0073	U	0.0073	0.094
4,4'-DDT	0.0092	U	0.0092	0.094
4,4'-DDD	0.0061	U	0.0061	0.094
delta-BHC	0.13	p	0.0045	0.047
Dieldrin	0.012	J	0.0086	0.094
beta-BHC	0.45		0.0063	0.047
Chlordane (technical)	0.094	U	0.094	0.47
gamma-BHC (Lindane)	0.11		0.0056	0.047
Heptachlor	0.0066	U	0.0066	0.047
Methoxychlor	0.012	U	0.012	0.094
Toxaphene	0.47	U	0.47	4.7

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	27		14 - 115
Tetrachloro-m-xylene	46		35 - 120

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61548-1

Client Sample ID: **SW2010-11**

Lab Sample ID: 680-61548-15

Client Matrix: Water

Date Sampled: 09/23/2010 1358

Date Received: 09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	1060 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 2026		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	24		14 - 115
Tetrachloro-m-xylene	44		35 - 120

Client Sample ID: **SW2010-12**

Lab Sample ID:	680-61548-16	Date Sampled:	09/23/2010 1330
Client Matrix:	Water	Date Received:	09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	1060 mL
Dilution:	1.0		Final Weight/Volume:	10 mL
Date Analyzed:	09/29/2010 2049		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
alpha-BHC	0.25		0.0054	0.047
4,4'-DDE	0.0073	U	0.0073	0.094
4,4'-DDT	0.0092	U	0.0092	0.094
4,4'-DDD	0.0061	U	0.0061	0.094
delta-BHC	0.15	p	0.0045	0.047
Dieldrin	0.012	J	0.0086	0.094
beta-BHC	0.46		0.0063	0.047
Chlordane (technical)	0.094	U	0.094	0.47
gamma-BHC (Lindane)	0.13		0.0056	0.047
Heptachlor	0.0066	U	0.0066	0.047
Methoxychlor	0.012	U	0.012	0.094
Toxaphene	0.47	U	0.47	4.7

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	19		14 - 115
Tetrachloro-m-xylene	49		35 - 120

Client: MACTEC Engineering and Consulting Inc Job Number: 680-61548-1

Client Sample ID: **SW2010-12**

Lab Sample ID: 680-61548-16 Date Sampled: 09/23/2010 1330
Client Matrix: Water Date Received: 09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method: 8081A_8082 Analysis Batch: 680-181597 Instrument ID: SGJ
Preparation: 3520C Prep Batch: 680-181114 Initial Weight/Volume: 1060 mL
Dilution: 1.0 Final Weight/Volume: 10 mL
Date Analyzed: 09/29/2010 2049 Injection Volume: 2 uL
Date Prepared: 09/27/2010 1433 Result Type: SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	17		14 - 115
Tetrachloro-m-xylene	48		35 - 120

Analytical Data

Client: MACTEC Engineering and Consulting Inc Job Number: 680-61548-1

Client Sample ID: **SW2010-8**

Lab Sample ID:	680-61548-17	Date Sampled: 09/23/2010 1520
Client Matrix:	Water	Date Received: 09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	500 mL
Dilution:	1.0		Final Weight/Volume:	5 mL
Date Analyzed:	09/29/2010 2112		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
alpha-BHC	0.18		0.0057	0.050
4,4'-DDE	0.0077	U	0.0077	0.10
4,4'-DDT	0.0097	U	0.0097	0.10
4,4'-DDD	0.0065	U	0.0065	0.10
delta-BHC	0.19	p	0.0048	0.050
Dieldrin	0.014	J	0.0091	0.10
beta-BHC	0.19	p	0.0067	0.050
Chlordane (technical)	0.10	U	0.10	0.50
gamma-BHC (Lindane)	0.12		0.0059	0.050
Heptachlor	0.0070	U	0.0070	0.050
Methoxychlor	0.013	U	0.013	0.10
Toxaphene	0.50	U	0.50	5.0

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	56		14 - 115
Tetrachloro-m-xylene	66		35 - 120

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61548-1

Client Sample ID: **SW2010-8**

Lab Sample ID: 680-61548-17

Client Matrix: Water

Date Sampled: 09/23/2010 1520

Date Received: 09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	500 mL
Dilution:	1.0		Final Weight/Volume:	5 mL
Date Analyzed:	09/29/2010 2112		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	51		14 - 115
Tetrachloro-m-xylene	63		35 - 120

Client Sample ID: **SW2010-1**

Lab Sample ID:	680-61548-18	Date Sampled:	09/23/2010 1254
Client Matrix:	Water	Date Received:	09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	500 mL
Dilution:	1.0		Final Weight/Volume:	5 mL
Date Analyzed:	09/29/2010 2135		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
alpha-BHC	0.0057	U	0.0057	0.050
4,4'-DDE	0.0077	U	0.0077	0.10
4,4'-DDT	0.0097	U	0.0097	0.10
4,4'-DDD	0.0065	U	0.0065	0.10
delta-BHC	0.0048	U	0.0048	0.050
Dieldrin	0.0091	U	0.0091	0.10
beta-BHC	0.0067	U	0.0067	0.050
Chlordane (technical)	0.10	U	0.10	0.50
gamma-BHC (Lindane)	0.0059	U	0.0059	0.050
Heptachlor	0.0070	U	0.0070	0.050
Methoxychlor	0.013	U	0.013	0.10
Toxaphene	0.50	U	0.50	5.0

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	50		14 - 115
Tetrachloro-m-xylene	73		35 - 120

Client Sample ID: **SW2010-1**

Lab Sample ID:	680-61548-18	Date Sampled:	09/23/2010 1254
Client Matrix:	Water	Date Received:	09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	500 mL
Dilution:	1.0		Final Weight/Volume:	5 mL
Date Analyzed:	09/29/2010 2135		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	48		14 - 115
Tetrachloro-m-xylene	64		35 - 120

Client Sample ID: **SW2010-5**

Lab Sample ID:	680-61548-19	Date Sampled:	09/23/2010 1413
Client Matrix:	Water	Date Received:	09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	500 mL
Dilution:	1.0		Final Weight/Volume:	5 mL
Date Analyzed:	09/29/2010 2158		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
alpha-BHC	0.13		0.0057	0.050
4,4'-DDE	0.0077	U	0.0077	0.10
4,4'-DDT	0.0097	U	0.0097	0.10
4,4'-DDD	0.0065	U	0.0065	0.10
delta-BHC	0.20		0.0048	0.050
Dieldrin	0.0091	U	0.0091	0.10
beta-BHC	0.23		0.0067	0.050
Chlordane (technical)	0.10	U	0.10	0.50
gamma-BHC (Lindane)	0.037	J p	0.0059	0.050
Heptachlor	0.0070	U	0.0070	0.050
Methoxychlor	0.013	U	0.013	0.10
Toxaphene	0.50	U	0.50	5.0

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	47		14 - 115
Tetrachloro-m-xylene	80		35 - 120

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61548-1

Client Sample ID: **SW2010-5**

Lab Sample ID:	680-61548-19	Date Sampled: 09/23/2010 1413
Client Matrix:	Water	Date Received: 09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	500 mL
Dilution:	1.0		Final Weight/Volume:	5 mL
Date Analyzed:	09/29/2010 2158		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	39		14 - 115
Tetrachloro-m-xylene	72		35 - 120

Client Sample ID: **SW2010-2**

Lab Sample ID:	680-61548-20	Date Sampled:	09/23/2010 1308
Client Matrix:	Water	Date Received:	09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	500 mL
Dilution:	1.0		Final Weight/Volume:	5 mL
Date Analyzed:	09/29/2010 2221		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
alpha-BHC	0.13		0.0057	0.050
4,4'-DDE	0.0077	U	0.0077	0.10
4,4'-DDT	0.0097	U	0.0097	0.10
4,4'-DDD	0.0065	U	0.0065	0.10
delta-BHC	0.22	p	0.0048	0.050
Dieldrin	0.0091	U	0.0091	0.10
beta-BHC	0.16	p	0.0067	0.050
Chlordane (technical)	0.10	U	0.10	0.50
gamma-BHC (Lindane)	0.058	p	0.0059	0.050
Heptachlor	0.0070	U	0.0070	0.050
Methoxychlor	0.013	U	0.013	0.10
Toxaphene	0.50	U	0.50	5.0

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	39		14 - 115
Tetrachloro-m-xylene	75		35 - 120

Client Sample ID: **SW2010-2**

Lab Sample ID:	680-61548-20	Date Sampled: 09/23/2010 1308
Client Matrix:	Water	Date Received: 09/24/2010 0915

8081A_8082 Organochlorine Pesticides & PCBs (GC)

Method:	8081A_8082	Analysis Batch: 680-181597	Instrument ID:	SGJ
Preparation:	3520C	Prep Batch: 680-181114	Initial Weight/Volume:	500 mL
Dilution:	1.0		Final Weight/Volume:	5 mL
Date Analyzed:	09/29/2010 2221		Injection Volume:	2 uL
Date Prepared:	09/27/2010 1433		Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
DCB Decachlorobiphenyl	33		14 - 115
Tetrachloro-m-xylene	72		35 - 120

Client Sample ID: **SW2010-4**

Lab Sample ID: 680-61548-1 Date Sampled: 09/23/2010 1352
Client Matrix: Water Date Received: 09/24/2010 0915

6020 Metals (ICP/MS)

Method: 6020
Preparation: 3010A
Dilution: 1.0
Date Analyzed: 09/30/2010 2200
Date Prepared: 09/29/2010 1440

Analysis Batch: 680-181744
Prep Batch: 680-181445

Instrument ID: ICPMSA
Lab File ID: 181445.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	16		1.3	2.5
Copper	16		1.1	5.0
Lead	4.6		0.50	1.5
Zinc	540		8.4	20

6020 Metals (ICP/MS)-Dissolved

Method: 6020
Preparation: 3005A
Dilution: 1.0
Date Analyzed: 09/30/2010 1004
Date Prepared: 09/29/2010 1157

Analysis Batch: 680-181582
Prep Batch: 680-181421

Instrument ID: ICPMSB
Lab File ID: 181421.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	1.3	U	1.3	2.5
Copper	7.3		1.1	5.0
Lead	0.20	U	0.20	1.5
Zinc	560		8.3	20

Client Sample ID: **SW2010-9**

Lab Sample ID:	680-61548-2	Date Sampled: 09/23/2010 1420
Client Matrix:	Water	Date Received: 09/24/2010 0915

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-181744	Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-181445	Lab File ID:	181445.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/30/2010 2235		Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1440			

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	4.9		1.3	2.5
Copper	11		1.1	5.0
Lead	0.64	J	0.50	1.5
Zinc	620		8.4	20

6020 Metals (ICP/MS)-Dissolved

Method:	6020	Analysis Batch: 680-181582	Instrument ID:	ICPMSB
Preparation:	3005A	Prep Batch: 680-181421	Lab File ID:	181421.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/30/2010 1040		Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1157			

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	2.3	J	1.3	2.5
Copper	5.9		1.1	5.0
Lead	0.20	U	0.20	1.5
Zinc	540		8.3	20

Client Sample ID: **SW2010-10**

Lab Sample ID: 680-61548-3 Date Sampled: 09/23/2010 1434
Client Matrix: Water Date Received: 09/24/2010 0915

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-181744	Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-181445	Lab File ID:	181445.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/30/2010 2243		Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1440			

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	4.1		1.3	2.5
Copper	10		1.1	5.0
Lead	0.50	U	0.50	1.5
Zinc	500		8.4	20

6020 Metals (ICP/MS)-Dissolved

Method:	6020	Analysis Batch: 680-181582	Instrument ID:	ICPMSB
Preparation:	3005A	Prep Batch: 680-181421	Lab File ID:	181421.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/30/2010 1047		Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1157			

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	2.3	J	1.3	2.5
Copper	5.4		1.1	5.0
Lead	0.20	U	0.20	1.5
Zinc	440		8.3	20

Client Sample ID: **SW2010-17**

Lab Sample ID:	680-61548-4	Date Sampled: 09/23/2010 1044
Client Matrix:	Water	Date Received: 09/24/2010 0915

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-181744	Instrument ID: ICPMSA
Preparation:	3010A	Prep Batch: 680-181445	Lab File ID: 181445.chr
Dilution:	1.0		Initial Weight/Volume: 50 mL
Date Analyzed:	09/30/2010 2250		Final Weight/Volume: 250 mL
Date Prepared:	09/29/2010 1440		

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	2.9		1.3	2.5
Copper	54		1.1	5.0
Lead	0.50	U	0.50	1.5
Zinc	1900		8.4	20

6020 Metals (ICP/MS)-Dissolved

Method:	6020	Analysis Batch: 680-181582	Instrument ID: ICPMSB
Preparation:	3005A	Prep Batch: 680-181421	Lab File ID: 181421.chr
Dilution:	1.0		Initial Weight/Volume: 50 mL
Date Analyzed:	09/30/2010 1054		Final Weight/Volume: 250 mL
Date Prepared:	09/29/2010 1157		

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	1.3	J	1.3	2.5
Copper	24		1.1	5.0
Lead	0.20	U	0.20	1.5
Zinc	1600		8.3	20

Client Sample ID:	**SW2010-18**	
Lab Sample ID:	680-61548-5	Date Sampled: 09/23/2010 1125
Client Matrix:	Water	Date Received: 09/24/2010 0915

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-181744	Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-181445	Lab File ID:	181445.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/30/2010 2311		Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1440			

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	3.2		1.3	2.5
Copper	52		1.1	5.0
Lead	0.50	U	0.50	1.5
Zinc	2000		8.4	20

6020 Metals (ICP/MS)-Dissolved

Method:	6020	Analysis Batch: 680-181582	Instrument ID:	ICPMSB
Preparation:	3005A	Prep Batch: 680-181421	Lab File ID:	181421.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/30/2010 1116		Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1157			

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	1.4	J	1.3	2.5
Copper	20		1.1	5.0
Lead	0.20	U	0.20	1.5
Zinc	1700		8.3	20

Client Sample ID: **SW2010-14**

Lab Sample ID:	680-61548-6	Date Sampled: 09/23/2010 1228
Client Matrix:	Water	Date Received: 09/24/2010 0915

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-181744	Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-181445	Lab File ID:	181445.chr
Dilution:	5.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/30/2010 2318		Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1440			

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	28		6.5	12
Copper	780		5.5	25
Lead	14		2.5	7.5
Zinc	15000		42	100

6020 Metals (ICP/MS)-Dissolved

Method:	6020	Analysis Batch: 680-181582	Instrument ID:	ICPMSB
Preparation:	3005A	Prep Batch: 680-181421	Lab File ID:	181421.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/30/2010 1123		Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1157			

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	1.3	U	1.3	2.5
Copper	48		1.1	5.0
Lead	0.20	U	0.20	1.5
Zinc	2500		8.3	20

Client Sample ID: **SW2010-13**

Lab Sample ID: 680-61548-7		Date Sampled: 09/23/2010 1245
Client Matrix: Water		Date Received: 09/24/2010 0915

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-181744	Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-181445	Lab File ID:	181445.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/30/2010 2326		Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1440			

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	2.9		1.3	2.5
Copper	110		1.1	5.0
Lead	0.50	U	0.50	1.5
Zinc	2300		8.4	20

6020 Metals (ICP/MS)-Dissolved

Method:	6020	Analysis Batch: 680-181582	Instrument ID:	ICPMSB
Preparation:	3005A	Prep Batch: 680-181421	Lab File ID:	181421.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/30/2010 1130		Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1157			

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	1.3	J	1.3	2.5
Copper	53		1.1	5.0
Lead	0.20	U	0.20	1.5
Zinc	2100		8.3	20

Client Sample ID: **SW2010-1-Dup**

Lab Sample ID: 680-61548-8
Client Matrix: Water

Date Sampled: 09/23/2010 1254
Date Received: 09/24/2010 0915

6020 Metals (ICP/MS)

Method: 6020
Preparation: 3010A
Dilution: 1.0
Date Analyzed: 09/30/2010 2333
Date Prepared: 09/29/2010 1440

Analysis Batch: 680-181744
Prep Batch: 680-181445

Instrument ID: ICPMSA
Lab File ID: 181445.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	88		1.3	2.5
Copper	2.0	J	1.1	5.0
Lead	1.3	J	0.50	1.5
Zinc	12	J	8.4	20

6020 Metals (ICP/MS)-Dissolved

Method: 6020
Preparation: 3005A
Dilution: 1.0
Date Analyzed: 09/30/2010 1137
Date Prepared: 09/29/2010 1157

Analysis Batch: 680-181582
Prep Batch: 680-181421

Instrument ID: ICPMSB
Lab File ID: 181421.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	33		1.3	2.5
Copper	1.1	U	1.1	5.0
Lead	0.20	U	0.20	1.5
Zinc	8.3	U	8.3	20

Client Sample ID: **SW2010-15-Dup**

Lab Sample ID:	680-61548-9	Date Sampled: 09/23/2010 1254
Client Matrix:	Water	Date Received: 09/24/2010 0915

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-181744	Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-181445	Lab File ID:	181445.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/30/2010 2340		Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1440			

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	3.2		1.3	2.5
Copper	85		1.1	5.0
Lead	0.94	J	0.50	1.5
Zinc	2300		8.4	20

6020 Metals (ICP/MS)-Dissolved

Method:	6020	Analysis Batch: 680-181582	Instrument ID:	ICPMSB
Preparation:	3005A	Prep Batch: 680-181421	Lab File ID:	181421.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/30/2010 1144		Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1157			

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	1.3	U	1.3	2.5
Copper	33		1.1	5.0
Lead	0.20	U	0.20	1.5
Zinc	2000		8.3	20

Client Sample ID: **SW2010-7**

Lab Sample ID:	680-61548-10	Date Sampled: 09/23/2010 1500
Client Matrix:	Water	Date Received: 09/24/2010 0915

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-181744	Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-181445	Lab File ID:	181445.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/30/2010 2347		Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1440			

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	8.2		1.3	2.5
Copper	15		1.1	5.0
Lead	3.2		0.50	1.5
Zinc	810		8.4	20

6020 Metals (ICP/MS)-Dissolved

Method:	6020	Analysis Batch: 680-181582	Instrument ID:	ICPMSB
Preparation:	3005A	Prep Batch: 680-181421	Lab File ID:	181421.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/30/2010 1151		Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1157			

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	1.9	J	1.3	2.5
Copper	6.0		1.1	5.0
Lead	0.20	U	0.20	1.5
Zinc	760		8.3	20

Client Sample ID: **SW2010-6**

Lab Sample ID: 680-61548-11
Client Matrix: Water

Date Sampled: 09/23/2010 1434
Date Received: 09/24/2010 0915

6020 Metals (ICP/MS)

Method: 6020
Preparation: 3010A
Dilution: 1.0
Date Analyzed: 09/30/2010 2354
Date Prepared: 09/29/2010 1440

Analysis Batch: 680-181744
Prep Batch: 680-181445

Instrument ID: ICPMSA
Lab File ID: 181445.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	5.9		1.3	2.5
Copper	12		1.1	5.0
Lead	0.55	J	0.50	1.5
Zinc	870		8.4	20

6020 Metals (ICP/MS)-Dissolved

Method: 6020
Preparation: 3005A
Dilution: 1.0
Date Analyzed: 09/30/2010 1158
Date Prepared: 09/29/2010 1157

Analysis Batch: 680-181582
Prep Batch: 680-181421

Instrument ID: ICPMSB
Lab File ID: 181421.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	1.8	J	1.3	2.5
Copper	5.6		1.1	5.0
Lead	0.20	U	0.20	1.5
Zinc	720		8.3	20

Client Sample ID: **SW2010-3**

Lab Sample ID: 680-61548-12 Date Sampled: 09/23/2010 1332
Client Matrix: Water Date Received: 09/24/2010 0915

6020 Metals (ICP/MS)

Method: 6020 Analysis Batch: 680-181744 Instrument ID: ICPMSA
Preparation: 3010A Prep Batch: 680-181445 Lab File ID: 181445.chr
Dilution: 1.0 Initial Weight/Volume: 50 mL
Date Analyzed: 10/01/2010 0001 Final Weight/Volume: 250 mL
Date Prepared: 09/29/2010 1440

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	25		1.3	2.5
Copper	7.1		1.1	5.0
Lead	0.96	J	0.50	1.5
Zinc	84		8.4	20

6020 Metals (ICP/MS)-Dissolved

Method: 6020 Analysis Batch: 680-181582 Instrument ID: ICPMSB
Preparation: 3005A Prep Batch: 680-181421 Lab File ID: 181421.chr
Dilution: 1.0 Initial Weight/Volume: 50 mL
Date Analyzed: 09/30/2010 1205 Final Weight/Volume: 250 mL
Date Prepared: 09/29/2010 1157

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	1.4	J	1.3	2.5
Copper	3.1	J	1.1	5.0
Lead	0.20	U	0.20	1.5
Zinc	38		8.3	20

Client Sample ID: **SW2010-15**

Lab Sample ID: 680-61548-13 Date Sampled: 09/23/2010 1126
Client Matrix: Water Date Received: 09/24/2010 0915

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-181744	Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-181445	Lab File ID:	181445.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	10/01/2010 0008		Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1440			

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	2.5		1.3	2.5
Copper	84		1.1	5.0
Lead	0.50	U	0.50	1.5
Zinc	2400		8.4	20

6020 Metals (ICP/MS)-Dissolved

Method:	6020	Analysis Batch: 680-181582	Instrument ID:	ICPMSB
Preparation:	3005A	Prep Batch: 680-181421	Lab File ID:	181421.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/30/2010 1213		Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1157			

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	1.3	U	1.3	2.5
Copper	38		1.1	5.0
Lead	0.20	U	0.20	1.5
Zinc	2200		8.3	20

Client Sample ID: **SW2010-16**

Lab Sample ID: 680-61548-14 Date Sampled: 09/23/2010 1055

Client Matrix: Water Date Received: 09/24/2010 0915

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-181744	Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-181445	Lab File ID:	181445.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	10/01/2010 0016		Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1440			

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	5.5		1.3	2.5
Copper	120		1.1	5.0
Lead	4.7		0.50	1.5
Zinc	2800		8.4	20

6020 Metals (ICP/MS)-Dissolved

Method:	6020	Analysis Batch: 680-181582	Instrument ID:	ICPMSB
Preparation:	3005A	Prep Batch: 680-181421	Lab File ID:	181421.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/30/2010 1220		Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1157			

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	1.3	U	1.3	2.5
Copper	30		1.1	5.0
Lead	0.20	U	0.20	1.5
Zinc	2300		8.3	20

Client Sample ID: **SW2010-11**

Lab Sample ID: 680-61548-15
Client Matrix: Water

Date Sampled: 09/23/2010 1358
Date Received: 09/24/2010 0915

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-181744		Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-181445		Lab File ID:	181445.chr
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	10/01/2010 0037			Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1440				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	5.9		1.3	2.5
Copper	220		1.1	5.0
Lead	12		0.50	1.5
Zinc	3000		8.4	20

6020 Metals (ICP/MS)-Dissolved

Method:	6020	Analysis Batch: 680-181582		Instrument ID:	ICPMSB
Preparation:	3005A	Prep Batch: 680-181421		Lab File ID:	181421.chr
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	09/30/2010 1241			Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1157				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	1.6	J	1.3	2.5
Copper	97		1.1	5.0
Lead	0.20	U	0.20	1.5
Zinc	2700		8.3	20

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61548-1

Client Sample ID: **SW2010-12**

Lab Sample ID:	680-61548-16	Date Sampled:	09/23/2010 1330
Client Matrix:	Water	Date Received:	09/24/2010 0915

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-181744	Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-181445	Lab File ID:	181445.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	10/01/2010 0044		Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1440			

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	6.7		1.3	2.5
Copper	310		1.1	5.0
Lead	1.9		0.50	1.5
Zinc	3200		8.4	20

6020 Metals (ICP/MS)-Dissolved

Method:	6020	Analysis Batch: 680-181582	Instrument ID:	ICPMSB
Preparation:	3005A	Prep Batch: 680-181421	Lab File ID:	181421.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/30/2010 1248		Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1157			

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	1.6	J	1.3	2.5
Copper	92		1.1	5.0
Lead	0.20	U	0.20	1.5
Zinc	2600		8.3	20

Client Sample ID: **SW2010-8**

Lab Sample ID:	680-61548-17	Date Sampled: 09/23/2010 1520
Client Matrix:	Water	Date Received: 09/24/2010 0915

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-181744	Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-181445	Lab File ID:	181445.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	10/01/2010 0052		Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1440			

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	5.3		1.3	2.5
Copper	13		1.1	5.0
Lead	2.2		0.50	1.5
Zinc	650		8.4	20

6020 Metals (ICP/MS)-Dissolved

Method:	6020	Analysis Batch: 680-181582	Instrument ID:	ICPMSB
Preparation:	3005A	Prep Batch: 680-181421	Lab File ID:	181421.chr
Dilution:	1.0		Initial Weight/Volume:	50 mL
Date Analyzed:	09/30/2010 1255		Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1157			

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	2.0	J	1.3	2.5
Copper	5.5		1.1	5.0
Lead	0.20	U	0.20	1.5
Zinc	500		8.3	20

Client Sample ID: **SW2010-1**

Lab Sample ID: 680-61548-18
Client Matrix: Water

Date Sampled: 09/23/2010 1254
Date Received: 09/24/2010 0915

6020 Metals (ICP/MS)

Method: 6020
Preparation: 3010A
Dilution: 1.0
Date Analyzed: 10/01/2010 0059
Date Prepared: 09/29/2010 1440

Analysis Batch: 680-181744
Prep Batch: 680-181445

Instrument ID: ICPMSA
Lab File ID: 181445.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	90		1.3	2.5
Copper	4.3	J	1.1	5.0
Lead	2.4		0.50	1.5
Zinc	16	J	8.4	20

6020 Metals (ICP/MS)-Dissolved

Method: 6020
Preparation: 3005A
Dilution: 1.0
Date Analyzed: 09/30/2010 1303
Date Prepared: 09/29/2010 1157

Analysis Batch: 680-181582
Prep Batch: 680-181421

Instrument ID: ICPMSB
Lab File ID: 181421.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	25		1.3	2.5
Copper	1.2	J	1.1	5.0
Lead	0.20	U	0.20	1.5
Zinc	8.3	U	8.3	20

Client Sample ID: **SW2010-5**

Lab Sample ID: 680-61548-19
Client Matrix: Water

Date Sampled: 09/23/2010 1413
Date Received: 09/24/2010 0915

6020 Metals (ICP/MS)

Method: 6020
Preparation: 3010A
Dilution: 1.0
Date Analyzed: 10/01/2010 0106
Date Prepared: 09/29/2010 1440

Analysis Batch: 680-181744
Prep Batch: 680-181445

Instrument ID: ICPMSA
Lab File ID: 181445.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	8.0		1.3	2.5
Copper	16		1.1	5.0
Lead	0.67	J	0.50	1.5
Zinc	970		8.4	20

6020 Metals (ICP/MS)-Dissolved

Method: 6020
Preparation: 3005A
Dilution: 1.0
Date Analyzed: 09/30/2010 1310
Date Prepared: 09/29/2010 1157

Analysis Batch: 680-181582
Prep Batch: 680-181421

Instrument ID: ICPMSB
Lab File ID: 181421.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	1.5	J	1.3	2.5
Copper	7.4		1.1	5.0
Lead	0.20	U	0.20	1.5
Zinc	890		8.3	20

Analytical Data

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61548-1

Client Sample ID: **SW2010-2**

Lab Sample ID: 680-61548-20

Client Matrix: Water

Date Sampled: 09/23/2010 1308

Date Received: 09/24/2010 0915

6020 Metals (ICP/MS)

Method:	6020	Analysis Batch: 680-181744		Instrument ID:	ICPMSA
Preparation:	3010A	Prep Batch: 680-181445		Lab File ID:	181445.chr
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	10/01/2010 0113			Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1440				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	43		1.3	2.5
Copper	6.5		1.1	5.0
Lead	1.5		0.50	1.5
Zinc	27		8.4	20

6020 Metals (ICP/MS)-Dissolved

Method:	6020	Analysis Batch: 680-181582		Instrument ID:	ICPMSB
Preparation:	3005A	Prep Batch: 680-181421		Lab File ID:	181421.chr
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	09/30/2010 1317			Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1157				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Arsenic	7.4		1.3	2.5
Copper	3.4	J	1.1	5.0
Lead	0.20	U	0.20	1.5
Zinc	12	J	8.3	20

General Chemistry

Client Sample ID: **SW2010-4**

Lab Sample ID: 680-61548-1

Client Matrix: Water

Date Sampled: 09/23/2010 1352

Date Received: 09/24/2010 0915

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Hardness as calcium carbonate	190		mg/L	10	10	1.0	SM 2340C
Analysis Batch: 680-181195			Date Analyzed: 09/28/2010 0818				

General Chemistry

Client Sample ID: **SW2010-18**

Lab Sample ID: 680-61548-5

Client Matrix: Water

Date Sampled: 09/23/2010 1125

Date Received: 09/24/2010 0915

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Nitrate as N	3.1		mg/L	0.075	0.25	5.0	9056
Analysis Batch: 680-181446	Date Analyzed: 09/24/2010 1629						
Sulfate	190		mg/L	2.6	5.0	5.0	9056
Analysis Batch: 680-181371	Date Analyzed: 09/28/2010 2104						

General Chemistry

Client Sample ID: **SW2010-13**

Lab Sample ID: 680-61548-7 Date Sampled: 09/23/2010 1245

Client Matrix: Water Date Received: 09/24/2010 0915

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Nitrate as N	3.3		mg/L	0.075	0.25	5.0	9056
	Analysis Batch: 680-181446	Date Analyzed: 09/24/2010 1641					
Sulfate	180		mg/L	2.6	5.0	5.0	9056
	Analysis Batch: 680-181371	Date Analyzed: 09/28/2010 2117					

General Chemistry

Client Sample ID: **SW2010-1-Dup**

Lab Sample ID: 680-61548-8 Date Sampled: 09/23/2010 1254
Client Matrix: Water Date Received: 09/24/2010 0915

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Nitrate as N	0.85		mg/L	0.075	0.25	5.0	9056
Analysis Batch: 680-181446	Date Analyzed: 09/24/2010 1654						
Sulfate	62		mg/L	2.6	5.0	5.0	9056
Analysis Batch: 680-181371	Date Analyzed: 09/28/2010 2142						

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Hardness as calcium carbonate	190		mg/L	10	10	1.0	SM 2340C
Analysis Batch: 680-181195	Date Analyzed: 09/28/2010 0818						

General Chemistry

Client Sample ID: **SW2010-15-Dup**

Lab Sample ID: 680-61548-9
Client Matrix: Water

Date Sampled: 09/23/2010 1254
Date Received: 09/24/2010 0915

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Nitrate as N	3.3		mg/L	0.075	0.25	5.0	9056
Analysis Batch: 680-181446	Date Analyzed: 09/24/2010 1731						
Sulfate	200		mg/L	2.6	5.0	5.0	9056
Analysis Batch: 680-181371	Date Analyzed: 09/28/2010 2154						

General Chemistry

Client Sample ID: **SW2010-15**

Lab Sample ID: 680-61548-13 Date Sampled: 09/23/2010 1126

Client Matrix: Water Date Received: 09/24/2010 0915

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Nitrate as N	530		mg/L	7.5	25	500	9056
	Analysis Batch: 680-181461	Date Analyzed: 09/25/2010 1029					
Sulfate	330		mg/L	5.2	10	10	9056
	Analysis Batch: 680-181441	Date Analyzed: 09/29/2010 1007					

General Chemistry

Client Sample ID: **SW2010-11**

Lab Sample ID: 680-61548-15 Date Sampled: 09/23/2010 1358
Client Matrix: Water Date Received: 09/24/2010 0915

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Nitrate as N	4.1		mg/L	0.075	0.25	5.0	9056
Analysis Batch: 680-181446	Date Analyzed: 09/24/2010 1756						
Sulfate	220		mg/L	2.6	5.0	5.0	9056
Analysis Batch: 680-181371	Date Analyzed: 09/28/2010 2244						

General Chemistry

Client Sample ID: **SW2010-1**

Lab Sample ID: 680-61548-18
Client Matrix: Water

Date Sampled: 09/23/2010 1254
Date Received: 09/24/2010 0915

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Nitrate as N	0.65		mg/L	0.075	0.25	5.0	9056
Analysis Batch: 680-181446	Date Analyzed: 09/24/2010 1808						
Sulfate	64		mg/L	2.6	5.0	5.0	9056
Analysis Batch: 680-181371	Date Analyzed: 09/28/2010 2321						

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Hardness as calcium carbonate	200		mg/L	10	10	1.0	SM 2340C
Analysis Batch: 680-181195	Date Analyzed: 09/28/2010 0818						

General Chemistry

Client Sample ID: **SW2010-5**

Lab Sample ID: 680-61548-19
Client Matrix: Water

Date Sampled: 09/23/2010 1413
Date Received: 09/24/2010 0915

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Nitrate as N	0.74		mg/L	0.075	0.25	5.0	9056
Analysis Batch: 680-181446	Date Analyzed: 09/24/2010 1820						
Sulfate	110		mg/L	2.6	5.0	5.0	9056
Analysis Batch: 680-181371	Date Analyzed: 09/28/2010 2333						

DATA REPORTING QUALIFIERS

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61548-1

Lab Section	Qualifier	Description
GC/MS Semi VOA		
	U	Indicates the analyte was analyzed for but not detected.
GC Semi VOA		
	U	Indicates the analyte was analyzed for but not detected.
	F	MS or MSD exceeds the control limits
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
	X	Surrogate is outside control limits
	p	The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.
Metals		
	U	Indicates the analyte was analyzed for but not detected.
	4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
General Chemistry		
	U	Indicates the analyte was analyzed for but not detected.
	4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.
	E	Result exceeded calibration range.

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61548-1

Method Blank - Batch: 680-181385

Method: 8270C
Preparation: 3520C

Lab Sample ID: MB 680-181385/9-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 10/03/2010 1408
Date Prepared: 09/29/2010 1451

Analysis Batch: 680-181811
Prep Batch: 680-181385
Units: ug/L

Instrument ID: MST
Lab File ID: t2335.d
Initial Weight/Volume: 1000 mL
Final Weight/Volume: 1 mL
Injection Volume: 1 uL

Analyte	Result	Qual	MDL	RL
1,2,3-Trichlorobenzene	1.0	U	1.0	10
1,2,4-Trichlorobenzene	0.56	U	0.56	10

Surrogate	% Rec	Acceptance Limits
2-Fluorobiphenyl	76	50 - 113
2-Fluorophenol	71	36 - 110
Nitrobenzene-d5	77	45 - 112
Phenol-d5	73	38 - 116
Terphenyl-d14	87	10 - 121
2,4,6-Tribromophenol	86	40 - 139

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61548-1

Lab Control Sample - Batch: 680-181385

Method: 8270C
Preparation: 3520C

Lab Sample ID: LCS 680-181385/10-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 10/01/2010 2045
Date Prepared: 09/29/2010 1451

Analysis Batch: 680-181820
Prep Batch: 680-181385
Units: ug/L

Instrument ID: MST
Lab File ID: t2332.d
Initial Weight/Volume: 1000 mL
Final Weight/Volume: 1 mL
Injection Volume: 1 uL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
1,2,4-Trichlorobenzene	100	75.8	76	41 - 110	

Surrogate	% Rec	Acceptance Limits
2-Fluorobiphenyl	82	50 - 113
2-Fluorophenol	74	36 - 110
Nitrobenzene-d5	83	45 - 112
Phenol-d5	75	38 - 116
Terphenyl-d14	78	10 - 121
2,4,6-Tribromophenol	95	40 - 139

Lab Control Sample - Batch: 680-181385

Method: 8270C
Preparation: 3520C

Lab Sample ID: LCS 680-181385/13-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 10/01/2010 2111
Date Prepared: 09/29/2010 1451

Analysis Batch: 680-181820
Prep Batch: 680-181385
Units: ug/L

Instrument ID: MST
Lab File ID: t2333.d
Initial Weight/Volume: 1000 mL
Final Weight/Volume: 1 mL
Injection Volume: 1 uL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
1,2,3-Trichlorobenzene	100	76.7	77	14 - 130	

Surrogate	% Rec	Acceptance Limits
2-Fluorobiphenyl	78	50 - 113
2-Fluorophenol	74	36 - 110
Nitrobenzene-d5	76	45 - 112
Phenol-d5	79	38 - 116
Terphenyl-d14	71	10 - 121
2,4,6-Tribromophenol	86	40 - 139

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-181385

Method: 8270C
Preparation: 3520C

MS Lab Sample ID:	680-61548-18	Analysis Batch:	680-181820	Instrument ID:	MST
Client Matrix:	Water	Prep Batch:	680-181385	Lab File ID:	t2334.d
Dilution:	1.0			Initial Weight/Volume:	500 mL
Date Analyzed:	10/01/2010 2137			Final Weight/Volume:	0.5 mL
Date Prepared:	09/29/2010 1451			Injection Volume:	1 uL

MSD Lab Sample ID:	680-61548-18	Analysis Batch:	680-181811	Instrument ID:	MST
Client Matrix:	Water	Prep Batch:	680-181385	Lab File ID:	t2341.d
Dilution:	1.0			Initial Weight/Volume:	500 mL
Date Analyzed:	10/03/2010 1736			Final Weight/Volume:	0.5 mL
Date Prepared:	09/29/2010 1451			Injection Volume:	1 uL

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
1,2,3-Trichlorobenzene	68	57	14 - 130	18	40		

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
2-Fluorobiphenyl	72	69	50 - 113
2-Fluorophenol	62	52	36 - 110
Nitrobenzene-d5	66	62	45 - 112
Phenol-d5	66	50	38 - 116
Terphenyl-d14	68	56	10 - 121
2,4,6-Tribromophenol	80	74	40 - 139

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-181385

Method: 8270C
Preparation: 3520C

MS Lab Sample ID:	680-61548-15	Analysis Batch:	680-181811	Instrument ID:	MST
Client Matrix:	Water	Prep Batch:	680-181385	Lab File ID:	t2339.d
Dilution:	1.0			Initial Weight/Volume:	500 mL
Date Analyzed:	10/03/2010 1644			Final Weight/Volume:	0.5 mL
Date Prepared:	09/29/2010 1451			Injection Volume:	1 uL

MSD Lab Sample ID:	680-61548-15	Analysis Batch:	680-181811	Instrument ID:	MST
Client Matrix:	Water	Prep Batch:	680-181385	Lab File ID:	t2340.d
Dilution:	1.0			Initial Weight/Volume:	500 mL
Date Analyzed:	10/03/2010 1710			Final Weight/Volume:	0.5 mL
Date Prepared:	09/29/2010 1451			Injection Volume:	1 uL

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
1,2,4-Trichlorobenzene	66	61	41 - 110	9	40		

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
2-Fluorobiphenyl	70	68	50 - 113
2-Fluorophenol	58	55	36 - 110
Nitrobenzene-d5	70	68	45 - 112
Phenol-d5	56	55	38 - 116
Terphenyl-d14	56	74	10 - 121
2,4,6-Tribromophenol	80	85	40 - 139

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61548-1

Method Blank - Batch: 680-181114

Method: 8081A_8082
Preparation: 3520C

Lab Sample ID:	MB 680-181114/21-A	Analysis Batch:	680-181597	Instrument ID:	SGJ
Client Matrix:	Water	Prep Batch:	680-181114	Lab File ID:	ji29009.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	1000 mL
Date Analyzed:	09/29/2010 1330			Final Weight/Volume:	10 mL
Date Prepared:	09/27/2010 1433			Injection Volume:	2 uL
				Column ID:	PRIMARY

Analyte	Result	Qual	MDL	RL
alpha-BHC	0.0057	U	0.0057	0.050
4,4'-DDE	0.0077	U	0.0077	0.10
4,4'-DDT	0.0097	U	0.0097	0.10
4,4'-DDD	0.0065	U	0.0065	0.10
delta-BHC	0.0048	U	0.0048	0.050
Dieldrin	0.0091	U	0.0091	0.10
beta-BHC	0.0067	U	0.0067	0.050
Chlordane (technical)	0.10	U	0.10	0.50
gamma-BHC (Lindane)	0.0059	U	0.0059	0.050
Heptachlor	0.0070	U	0.0070	0.050
Methoxychlor	0.013	U	0.013	0.10
Toxaphene	0.50	U	0.50	5.0

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	40	14 - 115
Tetrachloro-m-xylene	80	35 - 120

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	37	14 - 115
Tetrachloro-m-xylene	71	35 - 120

Lab Control Sample - Batch: 680-181114

Method: 8081A_8082
Preparation: 3520C

Lab Sample ID:	LCS 680-181114/22-A	Analysis Batch: 680-181597		Instrument ID:	SGJ
Client Matrix:	Water	Prep Batch: 680-181114		Lab File ID:	ji29010.d
Dilution:	1.0	Units: ug/L		Initial Weight/Volume:	1000 mL
Date Analyzed:	09/29/2010 1354			Final Weight/Volume:	10 mL
Date Prepared:	09/27/2010 1433			Injection Volume:	2 uL
				Column ID:	PRIMARY

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
alpha-BHC	0.100	0.0885	88	29 - 112	
4,4'-DDE	0.200	0.163	81	33 - 142	
4,4'-DDT	0.200	0.229	114	27 - 141	
4,4'-DDD	0.200	0.204	102	37 - 179	
delta-BHC	0.100	0.0994	99	25 - 123	
Dieldrin	0.200	0.194	97	45 - 137	
beta-BHC	0.100	0.186	186	15 - 204	
gamma-BHC (Lindane)	0.100	0.0945	95	31 - 118	
Heptachlor	0.100	0.106	106	30 - 133	
Methoxychlor	0.200	0.191	95	10 - 243	

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	61	14 - 115
Tetrachloro-m-xylene	85	35 - 120

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	57	14 - 115
Tetrachloro-m-xylene	79	35 - 120

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	84	14 - 115
Tetrachloro-m-xylene	84	35 - 120

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	82	14 - 115
Tetrachloro-m-xylene	82	35 - 120

Lab Control Sample - Batch: 680-181114

Method: 8081A_8082
Preparation: 3520C

Lab Sample ID:	LCS 680-181114/28-A	Analysis Batch: 680-181597		Instrument ID:	SGJ
Client Matrix:	Water	Prep Batch: 680-181114		Lab File ID:	ji29012.d
Dilution:	1.0	Units: ug/L		Initial Weight/Volume:	1000 mL
Date Analyzed:	09/29/2010 1440			Final Weight/Volume:	10 mL
Date Prepared:	09/27/2010 1433			Injection Volume:	2 uL
				Column ID:	PRIMARY

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Chlordane (technical)	5.00	4.60	92	70 - 130	

Lab Control Sample - Batch: 680-181114

Method: 8081A_8082
Preparation: 3520C

Lab Sample ID: LCS 680-181114/28-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/29/2010 1440
Date Prepared: 09/27/2010 1433

Analysis Batch: 680-181597
Prep Batch: 680-181114
Units: ug/L

Instrument ID: SGJ
Lab File ID: ji29012.d
Initial Weight/Volume: 1000 mL
Final Weight/Volume: 10 mL
Injection Volume: 2 uL
Column ID: PRIMARY

Analyte	Spike Amount	Result	% Rec.	Limit	Qual

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	51	14 - 115
Tetrachloro-m-xylene	75	35 - 120

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	45	14 - 115
Tetrachloro-m-xylene	67	35 - 120

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61548-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-181114

Method: 8081A_8082
Preparation: 3520C

MS Lab Sample ID: 680-61548-17
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/29/2010 2244
Date Prepared: 09/27/2010 1433

Analysis Batch: 680-181597
Prep Batch: 680-181114

Instrument ID: SGJ
Lab File ID: ji29033.d
Initial Weight/Volume: 500 mL
Final Weight/Volume: 5 mL
Injection Volume: 2 uL
Column ID: PRIMARY

MSD Lab Sample ID: 680-61548-17
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/29/2010 2307
Date Prepared: 09/27/2010 1433

Analysis Batch: 680-181597
Prep Batch: 680-181114

Instrument ID: SGJ
Lab File ID: ji29034.d
Initial Weight/Volume: 500 mL
Final Weight/Volume: 5 mL
Injection Volume: 2 uL
Column ID: PRIMARY

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
alpha-BHC	114	93	29 - 112	7	40	F	
4,4'-DDE	89	76	33 - 142	15	40		
4,4'-DDT	114	104	27 - 141	9	40		
4,4'-DDD	116	105	37 - 179	10	40		
delta-BHC	91	68	25 - 123	9	40	p	p
Dieldrin	95	85	45 - 137	10	40		
beta-BHC	143	90	15 - 204	18	40		
gamma-BHC (Lindane)	96	82	31 - 118	7	40		
Heptachlor	98	91	30 - 133	7	40	p	p
Methoxychlor	95	88	10 - 243	7	40		

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
DCB Decachlorobiphenyl	56	54	14 - 115
Tetrachloro-m-xylene	77	79	35 - 120

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
DCB Decachlorobiphenyl	49	42	14 - 115
Tetrachloro-m-xylene	67	69	35 - 120

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
DCB Decachlorobiphenyl	65	54	14 - 115
Tetrachloro-m-xylene	71	72	35 - 120

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
DCB Decachlorobiphenyl	58	52	14 - 115
Tetrachloro-m-xylene	65	63	35 - 120

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61548-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-181114

Method: 8081A_8082
Preparation: 3520C

MS Lab Sample ID: 680-61548-19
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/30/2010 0016
Date Prepared: 09/27/2010 1433

Analysis Batch: 680-181597
Prep Batch: 680-181114

Instrument ID: SGJ
Lab File ID: ji29037.d
Initial Weight/Volume: 500 mL
Final Weight/Volume: 5 mL
Injection Volume: 2 uL
Column ID: PRIMARY

MSD Lab Sample ID: 680-61548-19
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/30/2010 0039
Date Prepared: 09/27/2010 1433

Analysis Batch: 680-181597
Prep Batch: 680-181114

Instrument ID: SGJ
Lab File ID: ji29038.d
Initial Weight/Volume: 500 mL
Final Weight/Volume: 5 mL
Injection Volume: 2 uL
Column ID: PRIMARY

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Chlordane (technical)	100	131	70 - 130	27	40	p	F

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
DCB Decachlorobiphenyl	71	46	14 - 115
Tetrachloro-m-xylene	74	68	35 - 120

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
DCB Decachlorobiphenyl	62	41	14 - 115
Tetrachloro-m-xylene	72	66	35 - 120

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61548-1

Method Blank - Batch: 680-181421

Method: 6020
Preparation: 3005A
Dissolved

Lab Sample ID: MB 680-181418/21-B
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/30/2010 0950
Date Prepared: 09/29/2010 1157

Analysis Batch: 680-181582
Prep Batch: 680-181421
Units: ug/L

Instrument ID: ICPMSB
Lab File ID: 181421.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result	Qual	MDL	RL
Arsenic	1.3	U	1.3	2.5
Copper	1.1	U	1.1	5.0
Lead	0.20	U	0.20	1.5
Zinc	8.3	U	8.3	20

Lab Control Sample - Batch: 680-181421

Method: 6020
Preparation: 3005A
Dissolved

Lab Sample ID: LCS 680-181418/22-B
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/30/2010 0957
Date Prepared: 09/29/2010 1157

Analysis Batch: 680-181582
Prep Batch: 680-181421
Units: ug/L

Instrument ID: ICPMSB
Lab File ID: 181421.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Arsenic	100	95.2	95	75 - 125	
Copper	100	96.0	96	75 - 125	
Lead	50.0	50.7	101	75 - 125	
Zinc	100	99.6	100	75 - 125	

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-181421

Method: 6020
Preparation: 3005A
Dissolved

MS Lab Sample ID:	680-61548-1	Analysis Batch:	680-181582	Instrument ID:	ICPMSB
Client Matrix:	Water	Prep Batch:	680-181421	Lab File ID:	181421.chr
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	09/30/2010 1026			Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1157				

MSD Lab Sample ID:	680-61548-1	Analysis Batch:	680-181582	Instrument ID:	ICPMSB
Client Matrix:	Water	Prep Batch:	680-181421	Lab File ID:	181421.chr
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	09/30/2010 1033			Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1157				

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Arsenic	94	96	75 - 125	2	20		
Copper	91	93	75 - 125	2	20		
Lead	99	99	75 - 125	0.4	20		
Zinc	84	101	75 - 125	3	20	4	4

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61548-1

Method Blank - Batch: 680-181445

Method: 6020
Preparation: 3010A

Lab Sample ID:	MB 680-181445/21-A	Analysis Batch: 680-181744		Instrument ID:	ICPMSA
Client Matrix:	Water	Prep Batch: 680-181445		Lab File ID:	181445.chr
Dilution:	1.0	Units: ug/L		Initial Weight/Volume:	50 mL
Date Analyzed:	09/30/2010 2145			Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1440				

Analyte	Result	Qual	MDL	RL
Arsenic	1.3	U	1.3	2.5
Copper	1.1	U	1.1	5.0
Lead	0.50	U	0.50	1.5
Zinc	8.4	U	8.4	20

Lab Control Sample - Batch: 680-181445

Method: 6020
Preparation: 3010A

Lab Sample ID:	LCS 680-181445/22-A	Analysis Batch: 680-181744		Instrument ID:	ICPMSA
Client Matrix:	Water	Prep Batch: 680-181445		Lab File ID:	181445.chr
Dilution:	1.0	Units: ug/L		Initial Weight/Volume:	50 mL
Date Analyzed:	09/30/2010 2153			Final Weight/Volume:	250 mL
Date Prepared:	09/29/2010 1440				

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Arsenic	100	95.6	96	75 - 125	
Copper	100	102	102	75 - 125	
Lead	50.0	48.3	97	75 - 125	
Zinc	100	95.0	95	75 - 125	

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-181445

Method: 6020
Preparation: 3010A

MS Lab Sample ID: 680-61548-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/30/2010 2221
Date Prepared: 09/29/2010 1440

Analysis Batch: 680-181744
Prep Batch: 680-181445

Instrument ID: ICPMSA
Lab File ID: 181445.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

MSD Lab Sample ID: 680-61548-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/30/2010 2228
Date Prepared: 09/29/2010 1440

Analysis Batch: 680-181744
Prep Batch: 680-181445

Instrument ID: ICPMSA
Lab File ID: 181445.chr
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Arsenic	100	95	75 - 125	5	20		
Copper	103	98	75 - 125	5	20		
Lead	97	92	75 - 125	5	20		
Zinc	89	68	75 - 125	4	20	4	4

Method Blank - Batch: 680-181371

Method: 9056
Preparation: N/A

Lab Sample ID: MB 680-181371/2
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/28/2010 1925
Date Prepared: N/A

Analysis Batch: 680-181371
Prep Batch: N/A
Units: mg/L

Instrument ID: ICG
Lab File ID: 0028.d
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	MDL	RL
Sulfate	2.6	U	2.6	5.0

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 680-181371

Method: 9056
Preparation: N/A

LCS Lab Sample ID: LCS 680-181371/3
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/28/2010 1937
Date Prepared: N/A

Analysis Batch: 680-181371
Prep Batch: N/A
Units: mg/L

Instrument ID: ICG
Lab File ID: 0029.d
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 5 mL
1 uL

LCSD Lab Sample ID: LCSD 680-181371/4
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/28/2010 1950
Date Prepared: N/A

Analysis Batch: 680-181371
Prep Batch: N/A
Units: mg/L

Instrument ID: ICG
Lab File ID: 0030.d
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 5 mL
1 uL

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Sulfate	106	106	90 - 110	0.3	30		

Matrix Spike - Batch: 680-181371

Method: 9056
Preparation: N/A

Lab Sample ID: 680-61548-7
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/28/2010 2129
Date Prepared: N/A

Analysis Batch: 680-181371
Prep Batch: N/A
Units: mg/L

Instrument ID: ICG
Lab File ID: 0038.d
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 5 mL
1 uL

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	180	50.0	233	101	90 - 110	

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-181371

Method: 9056
Preparation: N/A

MS Lab Sample ID:	680-61548-15	Analysis Batch: 680-181371	Instrument ID:	ICG	
Client Matrix:	Water	Prep Batch: N/A	Lab File ID:	0045.d	
Dilution:	5.0		Initial Weight/Volume:	1.0	mL
Date Analyzed:	09/28/2010 2256		Final Weight/Volume:	5	mL
Date Prepared:	N/A			1	uL

MSD Lab Sample ID:	680-61548-15	Analysis Batch: 680-181371	Instrument ID:	ICG	
Client Matrix:	Water	Prep Batch: N/A	Lab File ID:	0046.d	
Dilution:	5.0		Initial Weight/Volume:	1.0	mL
Date Analyzed:	09/28/2010 2308		Final Weight/Volume:	5	mL
Date Prepared:	N/A			1	uL

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Sulfate	39	37	90 - 110	0.4	30	4	4

Quality Control Results

Client: MACTEC Engineering and Consulting Inc

Job Number: 680-61548-1

Method Blank - Batch: 680-181441

Method: 9056
Preparation: N/A

Lab Sample ID:	MB 680-181441/2	Analysis Batch: 680-181441		Instrument ID:	ICG
Client Matrix:	Water	Prep Batch: N/A		Lab File ID:	0005.d
Dilution:	5.0	Units: mg/L		Initial Weight/Volume:	1.0 mL
Date Analyzed:	09/29/2010 0930			Final Weight/Volume:	5 mL
Date Prepared:	N/A				

Analyte	Result	Qual	MDL	RL
Sulfate	2.6	U	2.6	5.0

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 680-181441

Method: 9056
Preparation: N/A

LCS Lab Sample ID:	LCS 680-181441/3	Analysis Batch: 680-181441		Instrument ID:	ICG
Client Matrix:	Water	Prep Batch: N/A		Lab File ID:	0006.d
Dilution:	5.0	Units: mg/L		Initial Weight/Volume:	1.0 mL
Date Analyzed:	09/29/2010 0942			Final Weight/Volume:	5 mL
Date Prepared:	N/A				1 uL

LCSD Lab Sample ID:	LCSD 680-181441/4	Analysis Batch: 680-181441		Instrument ID:	ICG
Client Matrix:	Water	Prep Batch: N/A		Lab File ID:	0007.d
Dilution:	5.0	Units: mg/L		Initial Weight/Volume:	1.0 mL
Date Analyzed:	09/29/2010 0955			Final Weight/Volume:	5 mL
Date Prepared:	N/A				1 uL

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Sulfate	108	108	90 - 110	0.6	30		

Matrix Spike - Batch: 680-181441

Method: 9056
Preparation: N/A

Lab Sample ID:	680-61422-D-1 MS	Analysis Batch: 680-181441		Instrument ID:	ICG
Client Matrix:	Water	Prep Batch: N/A		Lab File ID:	0015.d
Dilution:	10	Units: mg/L		Initial Weight/Volume:	1.0 mL
Date Analyzed:	09/29/2010 1134			Final Weight/Volume:	5 mL
Date Prepared:	N/A				1 uL

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	300	100	410	110	90 - 110	

Method Blank - Batch: 680-181446

Method: 9056
Preparation: N/A

Lab Sample ID: MB 680-181446/2
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/24/2010 1552
Date Prepared: N/A

Analysis Batch: 680-181446
Prep Batch: N/A
Units: mg/L

Instrument ID: ICG
Lab File ID: 0032.d
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	MDL	RL
Nitrate as N	0.075	U	0.075	0.25

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 680-181446

Method: 9056
Preparation: N/A

LCS Lab Sample ID: LCS 680-181446/3
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/24/2010 1604
Date Prepared: N/A

Analysis Batch: 680-181446
Prep Batch: N/A
Units: mg/L

Instrument ID: ICG
Lab File ID: 0033.d
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 5 mL
1 uL

LCSD Lab Sample ID: LCSD 680-181446/4
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/24/2010 1616
Date Prepared: N/A

Analysis Batch: 680-181446
Prep Batch: N/A
Units: mg/L

Instrument ID: ICG
Lab File ID: 0034.d
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 5 mL
1 uL

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Nitrate as N	96	96	90 - 110	0.5	30		

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-181446

Method: 9056
Preparation: N/A

MS Lab Sample ID: 680-61548-8
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/24/2010 1706
Date Prepared: N/A

Analysis Batch: 680-181446
Prep Batch: N/A

Instrument ID: ICG
Lab File ID: 0038.d
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 5 mL
1 uL

MSD Lab Sample ID: 680-61548-8
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/24/2010 1718
Date Prepared: N/A

Analysis Batch: 680-181446
Prep Batch: N/A

Instrument ID: ICG
Lab File ID: 0039.d
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 5 mL
1 uL

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Nitrate as N	105	104	90 - 110	1	30		

Method Blank - Batch: 680-181461

Method: 9056
Preparation: N/A

Lab Sample ID:	MB 680-181461/2	Analysis Batch:	680-181461	Instrument ID:	ICG
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	0004.d
Dilution:	5.0	Units:	mg/L	Initial Weight/Volume:	1.0 mL
Date Analyzed:	09/25/2010 0951			Final Weight/Volume:	5 mL
Date Prepared:	N/A				

Analyte	Result	Qual	MDL	RL
Nitrate as N	0.075	U	0.075	0.25

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 680-181461

Method: 9056
Preparation: N/A

LCS Lab Sample ID:	LCS 680-181461/3	Analysis Batch:	680-181461	Instrument ID:	ICG
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	0005.d
Dilution:	5.0	Units:	mg/L	Initial Weight/Volume:	1.0 mL
Date Analyzed:	09/25/2010 1004			Final Weight/Volume:	5 mL
Date Prepared:	N/A				1 uL

LCSD Lab Sample ID:	LCSD 680-181461/4	Analysis Batch:	680-181461	Instrument ID:	ICG
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	0006.d
Dilution:	5.0	Units:	mg/L	Initial Weight/Volume:	1.0 mL
Date Analyzed:	09/25/2010 1016			Final Weight/Volume:	5 mL
Date Prepared:	N/A				1 uL

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Nitrate as N	97	96	90 - 110	0.2	30		

Matrix Spike - Batch: 680-181461

Method: 9056
Preparation: N/A

Lab Sample ID:	680-61548-13	Analysis Batch:	680-181461	Instrument ID:	ICG
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	0009.d
Dilution:	500	Units:	mg/L	Initial Weight/Volume:	1.0 mL
Date Analyzed:	09/25/2010 1053			Final Weight/Volume:	5 mL
Date Prepared:	N/A				1 uL

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Nitrate as N	530	499	1010	96	90 - 110	E

Method Blank - Batch: 680-181195

Method: SM 2340C
Preparation: N/A

Lab Sample ID: MB 680-181195/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/28/2010 0818
Date Prepared: N/A

Analysis Batch: 680-181195
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 25 mL
Final Weight/Volume: 25 mL

Analyte	Result	Qual	RL	RL
Hardness as calcium carbonate	10	U	10	10

Duplicate - Batch: 680-181195

Method: SM 2340C
Preparation: N/A

Lab Sample ID: 680-61548-18
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/28/2010 0818
Date Prepared: N/A

Analysis Batch: 680-181195
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 25 mL
Final Weight/Volume: 25 mL

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Hardness as calcium carbonate	200	193	4	30	

Serial Number 034282

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

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5102 LaRoche Avenue
Savannah, GA 31404

Website: www.testamericainc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

○ Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE: Bfd - Atlanta
PROJECT NO.: 6122080154
PROJECT LOCATION (STATE): GA
TAL (LAB) PROJECT MANAGER:
P.O. NUMBER:
CONTRACT NO.:
CLIENT (SITE) PM: Greg Wren
CLIENT PHONE: 770-421-3400
CLIENT FAX: 770-421-3486
CLIENT NAME: MACTEC
CLIENT E-MAIL:
CLIENT ADDRESS: 3400 Town Point Dr. Kennesaw, GA
COMPANY CONTRACTING THIS WORK (if applicable):

PAGE 1 OF 1
STANDARD REPORT DELIVERY ☒
DATE DUE
EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE
NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

REQUIRED ANALYSIS

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	Total Organo chlorine Pesticides (SW8081A)	TCBs (SW 8270D)	Total metals (SW6020) As, Pb, Cu, Zn	Dissolved metals (SW6020) As, Pb, Cu, Zn	Total Nitrate + Total Sulfate (SW9056)	REMARKS
PRESERVATIVE								2	0	HNO3		0	
9/23/10	1352	SW2010-4						X		X	X		
9/23/10	1420	SW2010-9						X		X	X		
9/23/10	1431	SW2010-10						X		X	X		

NUMBER OF CONTAINERS SUBMITTED

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
	9/23/10	1700						
RECEIVED BY: (SIGNATURE)	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SAVANNAH LOG NO.	LABORATORY REMARKS
Jess Howard	9/24/10	0715	YES ○ NO ○		680-61548	Temp 6.0°C

TAL8240-680 (1207)

Serial Number 034281

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica

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Savannah, GA 31404

Website: www.testamericainc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

○ Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE: Bfel-Atlanta
PROJECT NO.: 6220808154
PROJECT LOCATION (STATE): GA
TAL (LAB) PROJECT MANAGER:
P.O. NUMBER:
CONTRACT NO.:
CLIENT (SITE) PM: Greg Wren
CLIENT PHONE: 770-421-3400
CLIENT FAX:
CLIENT NAME: MACTEC
CLIENT E-MAIL:
CLIENT ADDRESS: 3400 ~~De~~ Town Point Dr. Kennesaw, GA
COMPANY CONTRACTING THIS WORK (if applicable):

PAGE 1 OF 1

STANDARD REPORT DELIVERY ☒
DATE DUE ____
EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE ____
NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	Total Organo Chlorine Pesticides (SW8081A)	TCBs (SW8270D)	Total metals (SW6020) As, Pb, Cu, Zn	Dissolved metals (SW6020) As, Pb, Cu, Zn	Total Nitrate Total sulfate (SW9056)	REMARKS
9/23/10	1044	SW2010-17	X	X				X		X	X		
9/23/10	1125	SW2010-18	X	X				X	X	X	X	X	

PRESERVATIVE

NUMBER OF CONTAINERS SUBMITTED

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
	9/23/10	1700						

RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SAVANNAH LOG NO.	LABORATORY REMARKS
	9/24/10	0915	YES ○ NO ○		680-61548	Temp 3.0°C

TAL8240-680 (1207)

Serial Number 034290

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

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5102 LaRoche Avenue
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Website: www.testamericainc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

○ Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE BEEL - Atlanta	PROJECT NO. 6122080154	PROJECT LOCATION (STATE) GA
TAL (LAB) PROJECT MANAGER	P.O. NUMBER	CONTRACT NO.
CLIENT (SITE) PM Greg Wren	CLIENT PHONE 770-421-3400	CLIENT FAX 770-421-3486
CLIENT NAME MACTEC	CLIENT E-MAIL	
CLIENT ADDRESS 3400 Town Point Dr. Kennesaw, GA		
COMPANY CONTRACTING THIS WORK (if applicable)		

PAGE ___ OF ___

STANDARD REPORT DELIVERY ○ DATE DUE ______

EXPEDITED REPORT DELIVERY (SURCHARGE) ○ DATE DUE ______

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	Total Organo Chlorine Pesticides (SW8081A)	TCBs (SW8270D)	Total metals (SW 6020) As, Pb, Cu, Zn	Dissolved metals (SW6020) As, Pb, Cu, Zn	Total Nitrate + Total Sulfate (SW9056)						REMARKS
		PRESERVATIVE						None		HNO3	None							
		NUMBER OF CONTAINERS SUBMITTED						2	2	1	1	1						
9/23/10	1228	SW2010-14	X	X				X		X	X							
9/23/10	1245	SW2010-13	X	X				X	X	X	X	X						

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
	9/23/10	1700						
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SAVANNAH LOG NO.	LABORATORY REMARKS
	9/24/10	0915	YES ○ NO ○		680-61548	Temp 5.3°C

TAL8240-680 (1207)

Serial Number 034277

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

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Savannah, GA 31404

Website: www.testamericainc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

○ Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE: Bfel - Atlanta
PROJECT NO.: 6122080154
PROJECT LOCATION (STATE): GA
TAL (LAB) PROJECT MANAGER:
P.O. NUMBER:
CONTRACT NO.:
CLIENT (SITE) PM:
CLIENT PHONE: 770-421-3400
CLIENT FAX:
CLIENT NAME: MACTEC
CLIENT E-MAIL:
CLIENT ADDRESS: 3400 Town Point Drive Kennesaw GA
COMPANY CONTRACTING THIS WORK (if applicable):

PAGE 1 OF 1

STANDARD REPORT DELIVERY ☒
DATE DUE

EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	Total Organo Chlorine Pesticides (SW8081A)	PCBs (SW8270D)	Total metals (SW6020) As, Pb, Cu, Zn	Dissolved metals (SW6020) As, Pb, Cu, Zn	Total Nitrate + Total Sulfate (SW9056)	REMARKS
								PRESERVATIVE					
								NUMBER OF CONTAINERS SUBMITTED					
9/23/10	1254	SW-2010-1-DUP	X	X				X	X	X	X	X	
9/23/10	1241	SW-2010-15-DUP	X	X				X	X	X	X	X	

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
	9/23/10	1700						
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SAVANNAH LOG NO.	LABORATORY REMARKS
	9/24/10	0915	YES ○ NO ○		680-61548	Temp 6.0°C

TAL8240-680 (1207)

Serial Number 034293

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

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5102 LaRoche Avenue
Savannah, GA 31404

Website: www.testamericainc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

○ Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE BRL - Atlanta
PROJECT NO. 6122080134
PROJECT LOCATION (STATE) GA
TAL (LAB) PROJECT MANAGER
P.O. NUMBER
CONTRACT NO.
CLIENT (SITE) PM Greg Wilen
CLIENT PHONE 770-421-3400
CLIENT FAX 770-421-3486
CLIENT NAME MACTEC
CLIENT E-MAIL
CLIENT ADDRESS
COMPANY CONTRACTING THIS WORK (if applicable) 3200 Town Point Dr. Kennesaw, GA

PAGE 1 OF 1
STANDARD REPORT DELIVERY ☒
DATE DUE
EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE
NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

MATRIX TYPE / REQUIRED ANALYSIS

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	Total Organo (SW8081A) Chlorinepesticides	PCBs (SW8082)	Total metals (SW6020) As, Pb, Cu, Zn	Dissolved metals (SW6020) As, Pb, Cu, Zn	Total nitrate, Total sulfate (SW9056)	REMARKS
PRESERVATIVE								None		HNO3			
NUMBER OF CONTAINERS SUBMITTED								2	2				
9/23/10	1500	SW2010-7	X	X				X		X	X		
9/23/10	1434	SW2010-6	X	X				X		X	X		
9/23/10	1332	SW2010-3	X	X				X		X	X		
			X	X						~~X~~			

RELINQUISHED BY: (SIGNATURE) DATE 9/23/10 TIME 1700
RECEIVED BY: (SIGNATURE) DATE TIME
RELINQUISHED BY: (SIGNATURE) DATE TIME
RECEIVED BY: (SIGNATURE) DATE TIME
RELINQUISHED BY: (SIGNATURE) DATE TIME
RECEIVED BY: (SIGNATURE) DATE TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE) DATE 9/24/10 TIME 0915
CUSTODY INTACT YES ○ NO ○
CUSTODY SEAL NO.
SAVANNAH LOG NO. 680-61548
LABORATORY REMARKS Temp 3.1°C

TAL8240-680 (1207)

Serial Number 034289

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

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Savannah, GA 31404

Website: www.testamericainc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

○ Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE: Bfel-Atlanta
PROJECT NO.: 6122080154
PROJECT LOCATION (STATE): GA
TAL (LAB) PROJECT MANAGER:
P.O. NUMBER:
CONTRACT NO.:
CLIENT (SITE) PM: Greg Wren
CLIENT PHONE: 770-421-3400
CLIENT FAX:
CLIENT NAME: MACTEC
CLIENT E-MAIL:
CLIENT ADDRESS: 3200 Town Point Dr. Kennesaw, GA
COMPANY CONTRACTING THIS WORK (if applicable):

PAGE 1 OF 1
STANDARD REPORT DELIVERY ☒
DATE DUE
EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE
NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

REQUIRED ANALYSIS — PRESERVATIVE — NUMBER OF CONTAINERS SUBMITTED

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	Total Organo Chlorine Pesticides (SW ~~8085~~ 8081A)	TCBs (SW8270D)	Total metals (SW 6010) As, Pb, Cu, Zn	Dissolved metals (SW 6010) As, Pb, Cu, Zn	Total Nitrate + Total Sulfate (SW9056)					REMARKS
9/23/10	1124	SW2010-15	X	X				X	X	X	X	X					
9/23/10	1055	SW2010-16	X	X				X		X	X						

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
	9/23/10	1700						

RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SAVANNAH LOG NO.	LABORATORY REMARKS
	9/24/10	0915	YES ○ NO ○		680-61548	Temp 4.6°C

TAL8240-680 (1207)

Serial Number 034278

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

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○ **TestAmerica Savannah**
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.testamericainc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

○ Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE Bfel - Atlanta
PROJECT NO. 6122080154
PROJECT LOCATION (STATE) GA
TAL (LAB) PROJECT MANAGER
P.O. NUMBER
CONTRACT NO.
CLIENT (SITE) PM Greg Wren
CLIENT PHONE 770-421-3400
CLIENT FAX
CLIENT NAME MACTEC
CLIENT E-MAIL
CLIENT ADDRESS 3400 Town Point Dr. Kennesaw, GA
COMPANY CONTRACTING THIS WORK (if applicable)

PAGE 1 OF 1

STANDARD REPORT DELIVERY ☒
DATE DUE ____
EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE ____
NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	Total Organochlorine Pesticides (SW8081A)	TCBs (SW8270D)	Total metals (SW6020) As, Pb, Cu, Zn	Dissolved metals (SW6020) As, Pb, Cu, Zn	Total Nitrate + Total Sulfate (SW9056)						REMARKS
								PRESERVATIVE										
								NUMBER OF CONTAINERS SUBMITTED										
9/23/10	1358	SW2010-11	X	X				X	X	X	X	X						
9/23/10	~~1358~~ 1330	SW2010-12	X	X				X		X	X							

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
	9/23/10	1700						
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SAVANNAH LOG NO.	LABORATORY REMARKS
	9/24/10	0915	YES ○ NO ○		680-61548	Temp 5.6° C

TAL8240-680 (1207)

Serial Number 034292

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

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5102 LaRoche Avenue
Savannah, GA 31404

Website: www.testamericainc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

○ Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE: BFeL-Atlanta
PROJECT NO.: 6122080154
PROJECT LOCATION (STATE): GA
TAL (LAB) PROJECT MANAGER:
P.O. NUMBER:
CONTRACT NO.:
CLIENT (SITE) PM: Greg Wren
CLIENT PHONE: 770-421-3400
CLIENT FAX: 770-421-3486
CLIENT NAME: MACTEC
CLIENT E-MAIL:
CLIENT ADDRESS: 3200 Town Point Dr Kennesaw, GA
COMPANY CONTRACTING THIS WORK (if applicable):

PAGE ___ OF ___

STANDARD REPORT DELIVERY ☒
DATE DUE ______
EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE ______
NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	Total Organo Chlorine Pesticides (SW8081A)	PCBs (SW8082)	Total metals (SW6020) As, Pb, Cu, Zn	Dissolved metals As, Pb, Cu, Zn	Total Nitrate Total Sulfate (SW9056)						REMARKS
								PRESERVATIVE										
								NUMBER OF CONTAINERS SUBMITTED										
9/23/10	1520	SW2010-8	X					X		X	X							
9/23/10	1254	SW2010-1	X					X	X	X	X	X						

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
	9/23/10	01700						

RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SAVANNAH LOG NO.	LABORATORY REMARKS
Lisa Harvey	9/24/10	0915	YES ○ NO ○		680-61548	Temp 3.0°C

TAL8240-680 (1207)

Serial Number 034291

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

○ **TestAmerica Savannah**
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.testamericainc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

○ Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE BFel - Atlanta	PROJECT NO. 6122080154	PROJECT LOCATION (STATE) GA
TAL (LAB) PROJECT MANAGER	P.O. NUMBER	CONTRACT NO.
CLIENT (SITE) PM Grey Wrenn	CLIENT PHONE 770-421-3400	CLIENT FAX
CLIENT NAME Mactec	CLIENT E-MAIL	
CLIENT ADDRESS 3400 Town Point Dr. Kennesaw, GA		
COMPANY CONTRACTING THIS WORK (if applicable)		

PAGE 1 OF 1

STANDARD REPORT DELIVERY ☒
DATE DUE ______

EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE ______

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	Total Organo Chlorine Pesticides (SW8081A)	TCBs (SW8270D)	Total Metals As,Pb,Cu,Zn (SW6020)	As,Pb,Cu,Zn Dissolved Metals (SW6020)	Total Nitrate & Total Sulfate (SW9056)					REMARKS
										PRESERVATIVE							
9/23/10	1413	SW2010-5	X	X				X	X	X	X	X					
9/23/10	1305	SW2010-2	X	X				X		X	X						

MATRIX TYPE — REQUIRED ANALYSIS — NUMBER OF CONTAINERS SUBMITTED

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
	9/23/10	1700						
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	SAVANNAH LOG NO.	LABORATORY REMARKS
680-61548	9/24/10	0915	YES ○ NO ○		680-61548	Temp 3.1°C

TAL8240-680 (1207)

FIELD SAMPLING REPORTS

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-1B

DEPTH TO PRODUCT: NE

DATE: 7-29-10

PURGE METHOD: Low Flow/Low Stress :Pump

TIME: 1115

SAMPLE METHOD: Pump per SESDPROC 301-R1

GRAB (x) COMPOSITE ( )

DUP./REP. OF: ___________

DEPTH TO WATER: 23.60

TOTAL DEPTH: 32.20

DEPTH TO PASSIVE DIFFUSION BAG (btoc) NA

Arrived at: 1030

PURGE VOLUME: 4.38

8.6x0.17=1.46x3=4.38

Initial PID = ___________

Bailing PID = ___________

WELL DIAMETER (inches): 2-inch

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 1035	0.5	5.76	20.6	0.36	51.0	500 ( )	23.91
1043	1.5	5.83	20.3	~~0.34~~ 0.37	34.4	500	23.91
1051	2.5	5.90	20.1	0.36	15.4	500	23.91
1059	3.5	5.92	20.2	0.36	9.83	500	23.91
1107	4.5	5.92	20.2	0.36	6.40	500	23.91
1115	collect Sample						

COMMENTS:

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL	1	Nitric acid	6020	Metals: Total Arsenic and Lead
1 L	2	none	8081A	Total organochlorine Pesticides

GENERAL INFORMATION	
WEATHER:	HOT-HUMID
SHIPPED VIA:	FedEX
SHIPPED TO:	Test Americal Labs -Savannah, GA
SAMPLER:	EVER GUILLEN
OBSERVER:	

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.367 x water column height (ft) x 3 (well volumes) for 3" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]
[1.02 x water column height (ft) x 3 (well volumes) for 5" wells]
[1.47 x water column height (ft) x 3 (well volumes) for 6" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-1B

DEPTH TO PRODUCT: NE

DATE: 9/13/10

PURGE METHOD: Low Flow/Low Stress :Pump

TIME: 1430

SAMPLE METHOD: Pump per SESDPROC 301-R1

GRAB (x) COMPOSITE ( )

DUP./REP. OF: ________

DEPTH TO WATER: 25,31

DEPTH TO PASSIVE DIFFUSION BAG (btoc) N/A

TOTAL DEPTH: 32,2

6,89x0,17=1,17x3=3,51

Arrived at: 1340

PURGE VOLUME: 3,51

WELL DIAMETER (inches): 2-inch

Initial PID = ________

Bailing PID = ________

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 1355	0,5	6,16	20,1	0,32	108,4	400 ( )	25,67
1400	1,0	6.16	19,6	0.34	82,2	400	25,67
1405	1,5	6,16	19,4	0,35	22,7	400	25,71
1410	2,0	6.17	19,4	0,35	10,41	400	25,70
1415	2,5	6,17	19,4	0,35	4,32	400	25,71
1420	3,0	6,17	19,4	0,35	3,40	400	25,72
1425	3,5	6,17	19,4	0,35	2,76	400	25,72
1430	Collect	Sample					

COMMENTS:

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL PL	1	Nitric acid	6020	Metals: Total ~~Arsenic Lead~~ Copper Zinc
1 L GL Amber	2	none	8081A	~~Total organochlorine Pesticides~~
125 ML PL	1	none	9056	Nitrate and Sulfate
1 L GL Amber	2	none	~~8081A~~ 8270C	123 Trichlorobenzene 124 Trichlorobenzene

GENERAL INFORMATION		
WEATHER:	Hot - Humid - Clear	
SHIPPED VIA:	FedEX	
SHIPPED TO:	Test Americal Labs -Savannah, GA	
SAMPLER: Ever Guillen		OBSERVER:

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]

Did not sample

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-21

DEPTH TO PRODUCT: ____

DATE: ____

PURGE METHOD: Low Flow/Low Stress :Pump

TIME: ____

SAMPLE METHOD: Pump per SESDPROC 301-R1

GRAB (x) COMPOSITE ( )

DUP./REP. OF: ____

DEPTH TO WATER: 24.57

DEPTH TO PASSIVE DIFFUSION BAG (btoc) ____

TOTAL DEPTH: 25.49

Arrived at: 1450

PURGE VOLUME: 0.92×0.163 = 0.15×3
0.45 gal

WELL DIAMETER (inches): 2-inch

Initial PID = ____

Bailing PID = ____

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial:	▨					( )	▨
	7/28/10						

COMMENTS: Well has 0.92 ft of water. Bailed well dry. removed 1 ft of water from well.
7/29/10 Checked well < one ft of water in well, Will not sample

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL	1	Nitric acid	6020	Metals: Total Arsenic and Lead
1 L	2	none	8081A	Total organochlorine Pesticides

GENERAL INFORMATION	
WEATHER:	
SHIPPED VIA:	FedEX
SHIPPED TO:	Test Americal Labs -Savannah, GA
SAMPLER:	OBSERVER:

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.367 x water column height (ft) x 3 (well volumes) for 3" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]
[1.02 x water column height (ft) x 3 (well volumes) for 5" wells]
[1.47 x water column height (ft) x 3 (well volumes) for 6" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-22

DEPTH TO PRODUCT: NA

DATE: 7/28/10

PURGE METHOD: Low Flow/Low Stress :Pump

TIME: 1710

SAMPLE METHOD: Pump per SESDPROC 301-R1

GRAB (x) COMPOSITE ( )

DUP./REP. OF: __________

DEPTH TO WATER: 18.16

DEPTH TO PASSIVE DIFFUSION BAG (btoc) __________

TOTAL DEPTH: 28.75

Arrived at: 1505

Initial PID = NA

Bailing PID = __________

PURGE VOLUME: 10.59x0.163 = DH ~~1~~ 1.73x3
5.2 gal

WELL DIAMETER (inches): 2-inch

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 1520		3.82	19.4	0.57	1041	440 ( )	
1530	1.5	4.01	19.8	0.63	1626	400	18.93
1540	2.5	3.95	19.4	0.51	1076	380	18.88
1550	3.5	4.11	19.8	0.57	1453	300	18.75
1600	4.5	4.00	20.0	0.53	1317	300	18.79
1610	5.5	3.97	20.5	0.43	872	200	18.67
1620	6.0	3.96	20.9	0.67	703	200	18.63
1630	6.5	3.95	21.3	0.72	553	200	18.59
1650	8.0	3.97	22.1	0.76	366	200	18.60
1700					22.4		
1705	12.0				6.8		

COMMENTS: Water is milky white.

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL	1	Nitric acid	6020	Metals: Total Arsenic and Lead
1 L	2	none	8081A	Total organochlorine Pesticides

GENERAL INFORMATION

WEATHER: Hot Humid, Overcast, change of rain Temp 85°F

SHIPPED VIA: FedEX

SHIPPED TO: Test Americal Labs -Savannah, GA

SAMPLER: Daniel Howard

OBSERVER:

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.367 x water column height (ft) x 3 (well volumes) for 3" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]
[1.02 x water column height (ft) x 3 (well volumes) for 5" wells]
[1.47 x water column height (ft) x 3 (well volumes) for 6" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-22

DEPTH TO PRODUCT: N/A

DATE: 9-13-10

PURGE METHOD: Low Flow/Low Stress :Pump

TIME: 14:40

SAMPLE METHOD: Pump per SESDPROC 301-R1

GRAB (x) COMPOSITE ( )

DUP./REP. OF: /

DEPTH TO WATER: 19.46'

DEPTH TO PASSIVE DIFFUSION BAG (btoc)

TOTAL DEPTH: 28.75

water column ≈ 9.29 ft. x 0.163 gal/ft. = 1.51 x 3 =

Arrived at: 13:45

PURGE VOLUME: 4.5

WELL DIAMETER (inches): 2-inch

Initial PID = N/A

Bailing PID = ↓

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 14:17		3.78	20.1	1.10	38.2	1,100 ( )	
14:24	2.0	4.00	18.3	1.03	15.2	900	20.92
14:29	3.0	4.01	18.1	1.01	6.65	900	20.93
14:33	4.0	4.01	18.1	1.04	2.24	900	20.94
14:36	5.0	4.01	18.1	1.03	1.98	900	20.94

COMMENTS:

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL PL	1	Nitric acid	6020	Metals: Total ~~Arsenic Lead~~ Copper Zinc
1 L GL Amber	2	none	8081A	~~Total organochlorine Pesticides~~
125 ML PL	1	none	9056	Nitrate and Sulfate
~~1 L GL Amber~~	~~2~~	~~none~~	~~8081A~~	123 Trichlorobenzene 124 Trichlorobenzene
40ml GL	3	HCl	8260B	Site Specific VOCs
1L GL Amb	2	none	8270C	Site Specific SVOCs including

GENERAL INFORMATION			
WEATHER:	Clear, Sunny, light breeze, 82°F		
SHIPPED VIA:	FedEX		
SHIPPED TO:	Test Americal Labs -Savannah, GA		
SAMPLER:	T. PARKER	OBSERVER:	N/A

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

(MW-22)

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: Duplicate

DEPTH TO PRODUCT: N/A

DATE: 9-13-10

PURGE METHOD: Low Flow/Low Stress :Pump

TIME: 14:40

SAMPLE METHOD: Pump per SESDPROC 301-R1

GRAB (x) COMPOSITE ( )

DUP./REP. OF: MW-22

DEPTH TO WATER: ____________

DEPTH TO PASSIVE DIFFUSION BAG (btoc)

TOTAL DEPTH: ____________

____

Arrived at: ____________

PURGE VOLUME: ____________

WELL DIAMETER (inches):
2-inch

Initial PID = ____________

Bailing PID = ____________

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial:						( )	
			See	MW-22			

COMMENTS:

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
~~250 mL PL~~	~~1~~	~~Nitric acid~~	~~6020~~	~~Metals: Total Arsenic Lead Copper Zinc~~
~~1 L GL Amber~~	~~2~~	~~none~~	~~8081A~~	~~Total organochlorine Pesticides~~
~~125 ML PL~~	~~1~~	~~none~~	~~9056~~	~~Nitrate and Sulfate~~
1 L GL Amber	2	none	~~8081A~~ 8270S	123 Trichlorobenzene 124 Trichlorobenzene
				Site Specific SVOCs including
40ml GL	3	HCl	8260B	Site Specific VOCs

GENERAL INFORMATION			
WEATHER:	Clear, Sunny, light breeze, 82°F		
SHIPPED VIA:	FedEX		
SHIPPED TO:	Test Americal Labs -Savannah, GA		
SAMPLER:	V Parker	OBSERVER:	N/A

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-25

DEPTH TO PRODUCT: ________

DATE: 9/14/10

PURGE METHOD: Low Flow/Low Stress :Pump

TIME: 1745

SAMPLE METHOD: Pump per SESDPROC 301-R1

GRAB (x) COMPOSITE ( )

DUP./REP. OF: ________

DEPTH TO WATER: 25.56

DEPTH TO PASSIVE DIFFUSION BAG (btoc) ________

TOTAL DEPTH: 29.5 = 3.94 x .163 =

Arrived at: 1530

PURGE VOLUME: 0.64 = 1.93

WELL DIAMETER (inches): 2-inch

Initial PID = ________

Bailing PID = ________

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 1600		4.07	19.2	0.43	5.57	NA ( )	
1604	0.6	4.06	17.3	0.47	496		
1607	1.2	4.09	17.0	0.48			
1610	2.0	4.07	16.9	0.49			
1655	2.5				105.7		
1708	3.0				54.8		25.72
1718	3.5				40.6		25.91
1723	3.75				28.1		25.81
1728	4.0				20.0		25.75
1735	4.25				9.7		25.9

COMMENTS: This well will be bailed to purge + sample
1610 I will let well recharge before sampling
Water is very turbid. I will use grundfos pump in well to try to low turbidity and than sample with grundFos. All parameters stable except turbidity is >10NTU

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL PL	1	Nitric acid	6020	Metals: Total Arsenic Lead Copper Zinc
1 L GL Amber	2	none	8081A	Total organochlorine Pesticides
125 ML PL	1	none	9056	Nitrate and Sulfate
1 L GL Amber	2	none	~~8081A~~ 8270C	123 Trichlorobenzene 124 Trichlorobenzene

GENERAL INFORMATION		
WEATHER:	Hot + Humid ; 86°F	
SHIPPED VIA:	FedEX	
SHIPPED TO:	Test Americal Labs -Savannah, GA	
SAMPLER: Daniel Howard		OBSERVER:

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-26

DEPTH TO PRODUCT: N/E

DATE: 7-28-10

PURGE METHOD: Low Flow/Low Stress :Pump

TIME: 1050

SAMPLE METHOD: Pump per SESDPROC 301-R1

GRAB (x) COMPOSITE ( )

DUP./REP. OF: ________

DEPTH TO WATER: 10,04

DEPTH TO PASSIVE DIFFUSION BAG (btoc) N/A

TOTAL DEPTH: 20,70

20.7-10,04=10,66×0,17=1,81×3=5,43

Arrived at: 0930

PURGE VOLUME: 5,43

WELL DIAMETER (inches): 2-inch

Initial PID = ________

Bailing PID = ________

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 0944	0.5	4,67	18.8	0.51	377.0	1000 ( )	11,70
0952	1,5	4,48	17,9	0,51	149,0	900	11,77
1004	3,0	4,43	17,8	0,50	49,3	500	11,30
1012	4,0	4,46	18,2	0.50	32,1	500	10,92
1020	5,0	4,46	18,2	0.51	27,0	500	10,94
1024	5,5	4,47	18.2	0,51	20,7	500	↓
1028	6.0	4,48	18,2	0.51	17,1	↓	
1032	6,5	4,46	18,1	0,50	13.8		
1034	7,0	4,47	18,3	0,50	10,2		
1038	7,5	4,47	18,4	0,51	7,4		
1042	8.0	4,47	18,4	0,51	7,1		
1050	Collect		Sample				

COMMENTS:

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL	1	Nitric acid	6020	Metals: Total Arsenic and Lead
1 L	2	none	8081A	Total organochlorine Pesticides

GENERAL INFORMATION	
WEATHER:	HOT - HUMID
SHIPPED VIA:	FedEX
SHIPPED TO:	Test Americal Labs -Savannah, GA
SAMPLER: EVER GUILLEN	OBSERVER:

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.367 x water column height (ft) x 3 (well volumes) for 3" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]
[1.02 x water column height (ft) x 3 (well volumes) for 5" wells]
[1.47 x water column height (ft) x 3 (well volumes) for 6" wells]

Pump # 16306

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW26
DEPTH TO PRODUCT: NE
DATE: 9/13/10
PURGE METHOD: Low Flow/Low Stress :Pump
TIME: 1625
SAMPLE METHOD: Pump per SESDPROC 301-R1
GRAB (x) COMPOSITE ( )
DUP./REP. OF: ___________
DEPTH TO WATER: 11,75
DEPTH TO PASSIVE DIFFUSION BAG (btoc) N/A
TOTAL DEPTH: 20,7
8,95 x,17 = 1,52 x 3 = 4,56
Arrived at: 1510
PURGE VOLUME: 4,56
WELL DIAMETER (inches): 2-inch
Initial PID = ___________
Bailing PID = ___________

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 1540	0,5	5,20	19,1	0,31	500	500 ( )	12,34
1545	1,0	5,21	18,5	0,34	420	400	12,35
1550	1,5	5,20	18,5	0,35	143	400	12,33
1555	2,0	5,07	19,1	0,43	35,8	400	12,31
1600	2,5	5,02	19,2	0,44	20,9	400	12,31
1605	3,0	5,01	19,2	0,41	14,1	400	12,31
1610	3,5	5,00	19,2	0,41	7,78	400	12,31
1615	4,0	4,99	19,3	0,42	6,00	400	12,31
1620	4,5	4,99	19,3	0,42	5,14	400	12,31
1625	collect sample						

COMMENTS:

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL PL	1	Nitric acid	6020	Metals: Total ~~Arsenic Lead~~ Copper Zinc
1 L GL Amber	2	none	8081A	~~Total organochlorine Pesticides~~
125 ML PL	1	none	9056	Nitrate and Sulfate
1 L GL Amber	2	none	~~8081A~~ 8270C	123 Trichlorobenzene 124 Trichlorobenzene

GENERAL INFORMATION		
WEATHER:	HOT - HUMID - Clear	
SHIPPED VIA:	FedEX	
SHIPPED TO:	Test Americal Labs -Savannah, GA	
SAMPLER:	E. GUILLEN	OBSERVER:

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-101

DEPTH TO PRODUCT: NA

DATE: 7/28/10

PURGE METHOD: Low Flow/Low Stress :Pump

TIME: 1440

SAMPLE METHOD: Pump per SESDPROC 301-R1

GRAB (x) COMPOSITE ( )

DUP./REP. OF: ___________

DEPTH TO WATER: 15.12

DEPTH TO PASSIVE DIFFUSION BAG (btoc) ___________

TOTAL DEPTH: 27,03

Arrived at: 1320

Initial PID = NA

Bailing PID = ___________

PURGE VOLUME: 11.91x0.163=1.94x3
5.8

WELL DIAMETER (inches): 2-inch

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 1340		4.36	22.8	0.18	22.1	420( )	
1350	1.5	4.36	21.8	0.18	17.6	420	16.35
1400	2.5	4.35	21.4	0.19	2.66	420	16.35
1410	4.0	4.35	21.3	0.23	3.70	420	16.30
1420	5.0	4.33	21.5	0.23	2.50	420	16.27
1430	6.0	4.32	20.6	0.22	2.44	420	16.50

COMMENTS:

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL	1	Nitric acid	6020	Metals: Total Arsenic and Lead
1 L	2	none	8081A	Total organochlorine Pesticides

GENERAL INFORMATION	
WEATHER:	Hot Humid, Temp 90°F
SHIPPED VIA:	FedEX
SHIPPED TO:	Test Americal Labs -Savannah, GA
SAMPLER: Daniel Howard	OBSERVER:

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.367 x water column height (ft) x 3 (well volumes) for 3" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]
[1.02 x water column height (ft) x 3 (well volumes) for 5" wells]
[1.47 x water column height (ft) x 3 (well volumes) for 6" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-101

DEPTH TO PRODUCT: N/A

DATE: 9-13-10

PURGE METHOD: Low Flow/Low Stress :Pump

TIME: 16:45

SAMPLE METHOD: Pump per SESDPROC 301-R1

GRAB (x) COMPOSITE ( )

DUP./REP. OF:

DEPTH TO WATER: ~~19.46~~ 16.80'

(2" pvc)

DEPTH TO PASSIVE DIFFUSION BAG (btoc)

TOTAL DEPTH: 27.03' 10.25 x 0.163 = 1.67 gal x 3 = 5.00

water column ~~7.57~~ x 0.163 = 1.23 gal. x 3 =

Arrived at: ~~15:45~~ 16:05

PURGE VOLUME: ~~3.7 Gal~~ DP 9-13-10 5.0 gal.

WELL DIAMETER (inches): 2-inch

Initial PID = N/A

Bailing PID = ↓

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: ~~14:47~~		~~3.78~~	~~20.1~~	~~1.10~~		( )	
16:17	1.5	4.43	20.4	0.25	29.9	800	18.88'
16:24	2.5	4.49	19.7	0.28	10.46	800	18.87'
16.27	3.0	4.49	19.5	0.27	6.90	800	18.87'
16:32	4.0	4.51	19.5	0.26	3.27	800	18.86'
16:34	4.5	4.51	19.4	0.27	1.94	800	18.88
16:37	5.0	4.50	19.4	0.26	0.89	800	18.90

COMMENTS:

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL PL	1	Nitric acid	6020	Metals: Total ~~Arsenic Lead~~ Copper Zinc
1 L GL Amber	2	none	8081A	~~Total organochlorine Pesticides.~~
125 ML PL	1	none	9056	Nitrate and Sulfate
1 L GL Amber	2	none	~~8081A~~ 8270C	123 Trichlorobenzene 124 Trichlorobenzene

GENERAL INFORMATION

WEATHER:	Clear, Sunny, light breeze, 81°F
SHIPPED VIA:	FedEX
SHIPPED TO:	Test Americal Labs -Savannah, GA
SAMPLER: T. PARKER	OBSERVER: N/A

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-102

DEPTH TO PRODUCT: NA

DATE: 7/29/10

PURGE METHOD: Low Flow/Low Stress :Pump

TIME: 1520

SAMPLE METHOD: Pump per SESDPROC 301-R1

GRAB (x) COMPOSITE ( )

DUP./REP. OF:

DEPTH TO WATER: 23.58

TOTAL DEPTH: 32.73

DEPTH TO PASSIVE DIFFUSION BAG (btoc)

Arrived at: 1355

Initial PID = NA

Bailing PID =

PURGE VOLUME: 9.15X0.163=1.5X3= 4.5

WELL DIAMETER (inches): 2-inch

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 1415		4.35	21.7	0.63	53.5	700 ( )	
1425	1.5	4.75	22.9	0.64	14.3	400	24.01
1435	2.25	4.75	23.5	0.60	2.49	400	24.0
1445	2.75	4.75	23.0	0.40	DH 1.40	400	24.09
1455	3.25	4.84	24.2	0.41	0.42	400	23.92
1505	4.00	4.84	24.3	0.41	1.11	400	23.94

COMMENTS:

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL	1	Nitric acid	6020	Metals: Total Arsenic and Lead
1 L	2	none	8081A	Total organochlorine Pesticides

GENERAL INFORMATION

WEATHER: Hot + Humid, 95°F

SHIPPED VIA: FedEX

SHIPPED TO: Test Americal Labs -Savannah, GA

SAMPLER: D Howard/E Guillen

OBSERVER:

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.367 x water column height (ft) x 3 (well volumes) for 3" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]
[1.02 x water column height (ft) x 3 (well volumes) for 5" wells]
[1.47 x water column height (ft) x 3 (well volumes) for 6" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-102 091410 **DEPTH TO PRODUCT:** NE **DATE:** 9/~~13~~ 14/10

PURGE METHOD: Low Flow/Low Stress :Pump **TIME:** 1010

SAMPLE METHOD: Pump per SESDPROC 301-R1 **GRAB (x) COMPOSITE ( )**

DUP./REP. OF: ________ **DEPTH TO WATER:** 24.82 **DEPTH TO PASSIVE DIFFUSION BAG (btoc)**

TOTAL DEPTH: 32.7
7.88 X 0.17 = 1.33 X 3 = 4.01

Arrived at: 0905 **PURGE VOLUME:** 4.01 **WELL DIAMETER (inches):** 2-inch

Initial PID = ________

Bailing PID = ________

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 0930	0.5	5.22	19.9	0.64	65.8	600 ( )	25.05
0935	1.0	5.15	19.8	0.55	19.0	400	25.61
0940	1.5	5.21	19.4	0.49	15.4	200	25.18
0945	2.0	5.29	20.4	0.40	4.18	400	25.20
0950	2.5	5.53	20.7	0.36	1.61	400	25.23
0955	3.0	5.54	20.7	0.37	0.30	400	25.24
1000	3.5	5.54	20.6	0.37	0.12	400	25.25
1005	4.0	5.54	20.6	0.37	0.03	400	25.26
1010	Collect Sample						

COMMENTS:

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL PL	1	Nitric acid	6020	Metals: Total ~~Arsenic Lead~~ [✓ Copper Zinc]
1 L GL Amber	2	none	8081A	~~Total organochlorine Pesticides~~
125 ML PL	1	none	9056	Nitrate and Sulfate
1 L GL Amber	2	none	~~8081A~~ 8270C	123 Trichlorobenzene 124 Trichlorobenzene

GENERAL INFORMATION

WEATHER:	HOT - HUMID - ~~CL~~ Clear
SHIPPED VIA:	FedEX
SHIPPED TO:	Test Americal Labs -Savannah, GA
SAMPLER:	EVER GUILLEN
OBSERVER:	

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-104A **DEPTH TO PRODUCT:** ________ **DATE:** 9/15/10

PURGE METHOD: Low Flow/Low Stress :Pump **TIME:** 1140

SAMPLE METHOD: Pump per SESDPROC 301-R1 **GRAB (x) COMPOSITE ( )**

DUP./REP. OF: ________ **DEPTH TO WATER:** 14.63 **DEPTH TO PASSIVE DIFFUSION BAG (btoc)** ________

TOTAL DEPTH: 39.6

Arrived at: 1020 **PURGE VOLUME:** 24.97 x .163 = 4.1 x 3 12.3 gal **WELL DIAMETER (inches):** 2-inch

Initial PID = ________

Bailing PID = ________

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 1042	▨	6.10	23.1	0.72	13.8	800 ( )	▨
1050	2.5	6.21	20.1	0.78	9.16	800	16.27
1100	5.0	6.21	20.1	0.78	4.97	800	16.27
1110 ~~1109~~ DH	7.5	6.25	20.3	0.77	6.52	800	16.32
1120	10.0	6.25	20.2	0.77	7.51	800	16.34
1130	12.0	6.23	20.6	0.74	5.23	800	16.35
1132	12.5	6.24	20.4	0.74	1.49	800	16.36

COMMENTS:

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL PL	1	Nitric acid	6020	Metals: Total Arsenic Lead Copper Zinc
1 L GL Amber	2	none	8081A	Total organochlorine Pesticides
125 ML PL	1	none	9056	Nitrate and Sulfate
~~1 L GL Amber~~	~~2~~	~~none~~	~~8081A~~ ~~8270C~~	123 Trichlorobenzene 124 Trichlorobenzene
40ml GL	3	HCl	8260B	Site Specific VOCs
1L GL Amb	2	none	8270C	Site Specific SVOC includes

GENERAL INFORMATION		
WEATHER:	Clear + Sunny, Temp 80°F	
SHIPPED VIA:	FedEX	
SHIPPED TO:	Test Americal Labs -Savannah, GA	
SAMPLER: Daniel Howard		OBSERVER:

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-104D
DEPTH TO PRODUCT: N/A
DATE: 9-15-10
PURGE METHOD: Low Flow/Low Stress :Pump
pump set AT 43'
TIME: 16:55
SAMPLE METHOD: Pump per SESDPROC 301-R1
GRAB (x) COMPOSITE ( )
DUP./REP. OF:
DEPTH TO WATER: 16.77'
DEPTH TO PASSIVE DIFFUSION BAG (btoc)
TOTAL DEPTH: 80.0'
WATER Column = 63.23 ft. X 0.163 gal/ft. = 10.3 gAL x 3 = 31 gAL
Arrived at: 09:10
PURGE VOLUME: 31 gAL.
WELL DIAMETER (inches): 2-inch
Initial PID = N/A
Bailing PID = "

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial:						( )	
09:30	1.50	6.61	20.2	2.84	4.33	850	25.75'
09:40	2.50	6.64	20.3	2.81	5.62	850	32.02'
09:50	3.0	6.61	21.1	2.86	12.2	600	41.30'
10:10	5.0	6.38	19.8	3.18	32.7	VARIOUS	47.97'
10:27	7.5	6.42	20.9	3.12	13.6		59.6'
10:37	8.0	6.47	21.7	3.04	16.0		68.6'
10:45	10.0	6.52	22.3	3.04	20.3	500	74.5'
10:52	11.0	6.51	22.3	3.02	23.6	500	76.15'
10:59	12.0	6.51	25.8	3.13	18.0	300	79.75
11:03	Turn OFF pump-water in tubing Re-enters well Final						=78.50'
well DRY	will Allow to Recharge and check AT END OF DAY.						
	for recovery.						
16:47							19.78'
16:55	Collect groundwater Samples						

*pump is pre-heating water.

COMMENTS: * well groundwater has inorganic/organic odor. skunk odor – mercaptan? much gAS bubbles accumulating on pH/cond. probe + inside cup. well keeps drawing down, causing much pump Adjustment.

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL PL	1	Nitric acid	6020	Metals: Total Arsenic Lead Copper Zinc
1 L GL Amber	2	none	8081A	Total organochlorine Pesticides
125 ML PL	1	none	9056	Nitrate and Sulfate
~~1 L GL Amber~~	~~2~~	~~none~~	~~8081A~~	123 Trichlorobenzene 124 Trichlorobenzene
40 mL GL	3	HCl	8260B	Site specific VOCs
1L GL A	2	none	8270C	Site specific SVOCs including

GENERAL INFORMATION			
WEATHER:	Clear, Sunny, 75°F		
SHIPPED VIA:	FedEX		
SHIPPED TO:	TestAmerical Labs -Savannah, GA		
SAMPLER:	J. PARKER	OBSERVER:	D. HOWARD

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-105 **DEPTH TO PRODUCT:** N/A **DATE:** 9-15-10

PURGE METHOD: Low Flow/Low Stress :Pump **TIME:** 15:17

SAMPLE METHOD: Pump per SESDPROC 301-R1 **GRAB (x) COMPOSITE ( )**

DUP./REP. OF: **DEPTH TO WATER:** 15.00' **DEPTH TO PASSIVE DIFFUSION BAG (btoc)**

TOTAL DEPTH: 25.0'

WATER Column = 10.0' X 0.163 gal/ft. = 1.63 X 3 = 4.89 gAL.

Arrived at: 13:35 **PURGE VOLUME:** 5 gAL. **WELL DIAMETER (inches):** 2-inch

Initial PID = N/A

Bailing PID = ↓

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 13:55		5.50	22.0	0.33	1,118	( )	
14:05	1.0	5.58	19.6	0.32	264	250	16.85
14:12	2.5	5.58	19.8	0.35	162	400	17.90'
14:24	3.0	5.52	21.4	0.36	67.2	250	19.20'
14:30	3.5	5.54	21.7	0.36	64.3	250	19.20'
14:44	4.0	5.55	20.7	0.34	24.3	350	21.26'
14:50	4.5	5.53	20.9	0.37	33.6	250	20.60'
15:02	5.0	5.56	20.5	0.35	23.1	250	21.08'
15:15	5.5	5.57	20.6	0.36	9.7	250	21.10'

COMMENTS:

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL PL	1	Nitric acid	6020	Metals: Total Arsenic Lead Copper Zinc
1 L GL Amber	2	none	8081A	Total organochlorine Pesticides
125 ML PL	1	none	9056	Nitrate and Sulfate
1 L GL Amber	2	none	~~8081A~~ 8270C	123 Trichlorobenzene 124 Trichlorobenzene

GENERAL INFORMATION		
WEATHER:	Clear, Sunny 89°F	
SHIPPED VIA:	FedEX	
SHIPPED TO:	Test Americal Labs -Savannah, GA	
SAMPLER:	T. PARKER	OBSERVER:

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-106D **DEPTH TO PRODUCT:** NE **DATE:** 9/15/10

PURGE METHOD: Low Flow/Low Stress :Pump **TIME:** 1700

SAMPLE METHOD: Pump per SESDPROC 301-R1 **GRAB (x) COMPOSITE ( )**

DUP./REP. OF: ______ **DEPTH TO WATER:** 25,78 **DEPTH TO PASSIVE DIFFUSION BAG (btoc)**

TOTAL DEPTH: 73,0 N/A

47,22 x 0,17 = 8,02 x 3 = 24,08

Arrived at: 1500 **PURGE VOLUME:** 24,08 **WELL DIAMETER (inches):** 2-inch

Initial PID = ______

Bailing PID = ______

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 1515	0.5	6,32	21,4	1,31	8,15	800 ( )	26,21
1540	5,0	6,28	21,7	1,28	1,37	800	33,98
1555	8,0	6,28	21,9	1,27	0,23	800	39,38
1605	10,0	6,27	20,9	1,27	0,0	800	50,33
1615	12,0	6,28	20,7	1,25	0,0	800	63,42
1625	14,0	6,28	21,0	1,25	0,0	800	68,21
1630	15,0	Well Dry @15,0 Gallons - will allow recharge					DRY
1700	Collected Sample						

COMMENTS: Note well dry @ 15,0 Gallons - allowed recharge before Collecting Sample

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL PL	1	Nitric acid	6020	Metals: Total Arsenic Lead Copper Zinc
1 L GL Amber	2	none	8081A	Total organochlorine Pesticides
125 ML PL	1	none	9056	Nitrate and Sulfate
1 L GL Amber	2	none	~~8081A~~ 8270C	123 Trichlorobenzene 124 Trichlorobenzene

GENERAL INFORMATION	
WEATHER:	Hot - Humid - Clear
SHIPPED VIA:	FedEX
SHIPPED TO:	Test Americal Labs -Savannah, GA
SAMPLER: Ever Guillen	OBSERVER:

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-107D

DEPTH TO PRODUCT: ______

DATE: 9/15

PURGE METHOD: Low Flow/Low Stress :Pump

TIME: 1600

SAMPLE METHOD: Pump per SESDPROC 301-R1

GRAB (x) COMPOSITE ( )

DUP./REP. OF: ______

DEPTH TO WATER: 50.0

TOTAL DEPTH: 22.99

DEPTH TO PASSIVE DIFFUSION BAG (btoc) ______

Arrived at: 1325

Initial PID = ______

Bailing PID = ______

PURGE VOLUME: 27.01 x 0.163 = 4.4 x 3 = 13.2 gal

WELL DIAMETER (inches): 2-inch

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 1355		5.96	25.1	0.41	4.19	525 ( )	
1415 1315	2.0	5.57	21.9	0.56	2.74	525	26.09
1435 1335	4.5	5.55	22.6	0.59	2.22	500	26.09
1455 1355	6.5	5.52	22.6	0.58	2.08	500	26.42
~~13~~1520	9.0	5.52	22.4	0.58	1.88	500	26.41
1535	11.0	5.52	22.2	0.56	0.0	500	26.41
1545	12.0	5.52	22.3	0.56	0.0	500	26.41
1555	13.25	5.52	22.0	0.58	0.0	500	26.40

COMMENTS:

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL PL	1	Nitric acid	6020	Metals: Total Arsenic Lead Copper Zinc
1 L GL Amber	2	none	8081A	Total organochlorine Pesticides
125 ML PL	1	none	9056	Nitrate and Sulfate
1 L GL Amber	2	none	~~8081A~~ 8270C	123 Trichlorobenzene 124 Trichlorobenzene

GENERAL INFORMATION	
WEATHER:	Hot + Humid, Temp 90°F
SHIPPED VIA:	FedEX
SHIPPED TO:	Test Americal Labs -Savannah, GA
SAMPLER: Daniel Howard	OBSERVER:

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-108
DEPTH TO PRODUCT: NA
DATE: 7/29/10
PURGE METHOD: Low Flow/Low Stress :Pump
TIME: 1015
SAMPLE METHOD: Pump per SESDPROC 301-R1
GRAB (x) COMPOSITE ( )
DUP./REP. OF: ____
DEPTH TO WATER: 19.69
DEPTH TO PASSIVE DIFFUSION BAG (btoc) NA
TOTAL DEPTH: 35.65
Arrived at: ~~NA~~ 0900
PURGE VOLUME: 15.96x0.163 = 2.6x3 7.8 gal
WELL DIAMETER (inches): 2-inch
Initial PID = NA
Bailing PID = ____

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 0925	0,5	4,39	19,1	0,60	50,9	500 ( )	20,42
0933	1,5	4,47	17,9	0,64	24,2	500	20,42
0941	2,5	4,69	17,0	0,59	5,58	500	20,42
0949	3,5	4,74	16,8	0,64	5,12	500	20,42
0958	4,5	4,81	16,6	0,64	3,55	500	20,42
1002	5,5	4,83	16,6	~~0.~~ 0.72	2,04	1000	20,42
1006	6,5	4,83	16,6	0,72	2,05	1000	20,42
1010	7,5	4.3	16,6	0,72	2,15	1000	20,42
1015	Collect Sample						

COMMENTS:

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL	1	Nitric acid	6020	Metals: Total Arsenic and Lead
1 L	2	none	8081A	Total organochlorine Pesticides

GENERAL INFORMATION	
WEATHER:	Hot-Humid
SHIPPED VIA:	FedEX
SHIPPED TO:	Test Americal Labs -Savannah, GA
SAMPLER:	EVER GUILLEN OBSERVER:

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.367 x water column height (ft) x 3 (well volumes) for 3" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]
[1.02 x water column height (ft) x 3 (well volumes) for 5" wells]
[1.47 x water column height (ft) x 3 (well volumes) for 6" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-108

DEPTH TO PRODUCT: N/A

DATE: 9-14-10

PURGE METHOD: Low Flow/Low Stress :Pump

TIME: 10:12

SAMPLE METHOD: Pump per SESDPROC 301-R1

GRAB (x) COMPOSITE ( )

DUP./REP. OF: N/A

DEPTH TO WATER: 21.23'

DEPTH TO PASSIVE DIFFUSION BAG (btoc)

TOTAL DEPTH: 35.65

WATER Column = 14.42' x 0.163 gal/ft. = 2.35 GAL x 3 =

Arrived at: 09:30

PURGE VOLUME: 7.0 gAL.

WELL DIAMETER (inches): 2-inch

Initial PID = N/A

Bailing PID = 〃

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 09:37		4.59	16.6	0.69	115	900 ( )	21.88
09:44	1.5	4.75	16.4	0.65	26.0	900	21.87'
09:49	2.5	4.81	16.5	0.66	7.74	900	21.88'
09:55	4.0	4.91	16.5	0.66	5.58	900	21.87'
10:00	5.0	4.95	16.6	0.67	3.05	900	21.88'
10:04	6.0	5.00	16.6	0.67	1.61	900	21.88'
10:07	7.0	5.18	16.6	0.67	1.53	900	21.88'
10:09	7.5	5.14	16.6	0.69	1.41	900	21.88'
10:11	8.0	5.14	16.6	0.68	0.80	900	21.88'

COMMENTS:

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL PL	1	Nitric acid	6020	Metals: Total ~~Arsenic Lead~~ Copper Zinc
1 L GL Amber	2	none	8081A	~~Total organochlorine Pesticides~~
125 ML PL	1	none	9056	Nitrate and Sulfate
1 L GL Amber	2	none	~~8081A~~ 8270C	123 Trichlorobenzene 124 Trichlorobenzene

GENERAL INFORMATION			
WEATHER:	Clear, Sunny, 69°F		
SHIPPED VIA:	FedEX		
SHIPPED TO:	Test America Labs -Savannah, GA		
SAMPLER:	T. PARKER	OBSERVER:	N/A

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-109 **DEPTH TO PRODUCT:** N/A **DATE:** 9-14-10

PURGE METHOD: Low Flow/Low Stress :Pump **TIME:** 11:15

SAMPLE METHOD: Pump per SESDPROC 301-R1 **GRAB (x) COMPOSITE ( )**

DUP./REP. OF:________ **DEPTH TO WATER:** 15.57' **DEPTH TO PASSIVE DIFFUSION BAG (btoc)**

TOTAL DEPTH: 31.5

WATER Column = 15.93' X 0.163 gal/ft = 2.6 gal. x 3 = 7.8 GAL

Arrived at: 10:35
PURGE VOLUME: 8.0
WELL DIAMETER (inches): 2-inch

Initial PID = N/A
Bailing PID = ↓

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 10:47		4.62	17.9	2.52	4.63	1,200 ( )	
10:55	2.5	4.65	18.2	2.54	9.01	1,200	15.87'
10:59	4.0	4.64	18.3	2.66	0.70	1,100	16.11
11:02	5.0	4.60	18.3	2.67	0.21	1,100	16.12'
11:05	6.0	4.58	18.3	2.67	0.05	1,000	16.11'
11:08	7.0	4.57	18.3	2.72	0.12	1,000	16.10'
11:12	8.0	4.56	18.4	2.71	0.10	1,000	16.10'

COMMENTS: WATER HAS A pungent odor!!

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL PL	1	Nitric acid	6020	Metals: Total Arsenic Lead Copper Zinc
1 L GL Amber	2	none	8081A	Total organochlorine Pesticides
125 ML PL	1	none	9056	Nitrate and Sulfate
1 L GL Amber	2	none	~~8081A~~ 8270C	123 Trichlorobenzene 124 Trichlorobenzene

GENERAL INFORMATION			
WEATHER:	Clear, Sunny, 75°F		
SHIPPED VIA:	FedEX		
SHIPPED TO:	Test Americal Labs -Savannah, GA		
SAMPLER: T. PARKER		OBSERVER:	N/A

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

(MW-109)

WELL ID: Duplicate CSX
DEPTH TO PRODUCT: N/A
DATE: 9-14-10
PURGE METHOD: Low Flow/Low Stress :Pump
TIME: 12:00
SAMPLE METHOD: Pump per SESDPROC 301-R1
GRAB (x) COMPOSITE ( )
DUP./REP. OF: MW-109
DEPTH TO WATER: 15.57'
DEPTH TO PASSIVE DIFFUSION BAG (btoc)
TOTAL DEPTH: 31.5'
Arrived at: 10:35
PURGE VOLUME: 8 gal
WELL DIAMETER (inches): 2-inch
Initial PID = N/A
Bailing PID = 0

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial:						( )	

See MW-109

COMMENTS:

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL PL	1	Nitric acid	6020	Metals: Total Arsenic Lead Copper Zinc
1 L GL Amber	2	none	8081A	Total organochlorine Pesticides
125 ML PL	1	none	9056	Nitrate and Sulfate
~~1 L GL Amber~~	~~2~~	~~none~~	~~8081A~~	~~123 Trichlorobenzene, 124 Trichlorobenzene~~ STET according to Table 9-14-10

GENERAL INFORMATION		
WEATHER:	Clear, Sunny, 74°F	
SHIPPED VIA:	FedEX	
SHIPPED TO:	Test Americal Labs -Savannah, GA	
SAMPLER: T. PARKER		OBSERVER: N/A

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-110

DEPTH TO PRODUCT: NA

DATE: 7/29/10

PURGE METHOD: Low Flow/Low Stress :Pump

TIME: 1215

SAMPLE METHOD: Pump per SESDPROC 301-R1

GRAB (x) COMPOSITE ( )

DUP./REP. OF: ____

DEPTH TO WATER: 27.11

DEPTH TO PASSIVE DIFFUSION BAG (btoc) ____

TOTAL DEPTH: 78.87

Arrived at: 0920

Initial PID = NA

Bailing PID = ____

PURGE VOLUME: 51.76 x 0.163 = 8.44 x 3
25.3

WELL DIAMETER (inches):
2-inch

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 0945		5.01	21.2	0.03	2.50	550 ( )	
0955	2.5	5.06	20.3	0.03	3.26	550	32.49
1005	5.0	5.04	20.5	0.00	3.95	550	32.53
1035	10.0	5.03	20.0	0.00	2.12	550	33.21
1105	15.0	5.03	20.6	0.00	0.89	550	33.24
1135	20.0	5.04	20.3	0.00	0.71	550	33.24
1210	25.3	5.03	20.6	0.00	0.22	550	33.45

COMMENTS:

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL	1	Nitric acid	6020	Metals: Total Arsenic and Lead
1 L	2	none	8081A	Total organochlorine Pesticides

GENERAL INFORMATION	
WEATHER:	Hot + Humid Temp 82°F
SHIPPED VIA:	FedEX
SHIPPED TO:	Test Americal Labs -Savannah, GA
SAMPLER: Daniel Howard	OBSERVER:

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.367 x water column height (ft) x 3 (well volumes) for 3" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]
[1.02 x water column height (ft) x 3 (well volumes) for 5" wells]
[1.47 x water column height (ft) x 3 (well volumes) for 6" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-110
DEPTH TO PRODUCT: ________
DATE: 9/14/10

PURGE METHOD: Low Flow/Low Stress :Pump
TIME: 1220

SAMPLE METHOD: Pump per SESDPROC 301-R1
GRAB (x) COMPOSITE ( )

DUP./REP. OF: ________
DEPTH TO WATER: 28.31
DEPTH TO PASSIVE DIFFUSION BAG (btoc) ________

TOTAL DEPTH: 78.87

Arrived at: 0920
PURGE VOLUME: 50.56x0.163= 8.24x3
24.7 gal
WELL DIAMETER (inches): 2-inch

Initial PID = ________
Bailing PID = ________

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 1000		5.0	18.3	0.92	0.18	400 ( )	
1028	5.0	5.08	19.0	0.95	0.0	650	34.96
1055	10	5.04	19.3	0.95	0.0	650	34.95
1122	15	5.05	19.6	0.95	0.0	650	35.06
1148	20	5.02	19.8	0.94	0.0	650	35.17
1200	21.5	5.02	19.8	0.92	0.09	650	35.25
1205	22.5	5.04	19.7	0.92	0.37	650	35.32
1210	23.5	5.02	19.8	0.94	0.71	650	35.45
1218	24.8	5.04	19.8	0.94	0.60	650	35.45

COMMENTS:

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL PL	1	Nitric acid	6020	Metals: Total A~~rsenic Lead~~ [✓ Copper Zinc]
1 L GL Amber	2	none	8081A	~~Total organochlorine Pesticides~~
125 ML PL	1	none	9056	Nitrate and Sulfate
1 L GL Amber	2	none	~~8081A~~ 8270C	123 Trichlorobenzene 124 Trichlorobenzene

GENERAL INFORMATION		
WEATHER:	Clear + Sunny Temp 75°F	
SHIPPED VIA:	FedEX	
SHIPPED TO:	Test Americal Labs -Savannah, GA	
SAMPLER: Daniel Howard		OBSERVER:

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-111

DEPTH TO PRODUCT: N/A

DATE: 9-14-10

PURGE METHOD: Low Flow/Low Stress :Pump

TIME: 13:50

SAMPLE METHOD: Pump per SESDPROC 301-R1

GRAB (x) COMPOSITE ( )

DUP./REP. OF: ___________

DEPTH TO WATER: 20.33'

DEPTH TO PASSIVE DIFFUSION BAG (btoc)

TOTAL DEPTH: 43.2

WATER Column = 22.87' x 0.163 gal/ft. = 3.73 gal. x 3 =

Arrived at: 12:00

PURGE VOLUME: 11.2 gal.

WELL DIAMETER (inches): 2-inch

Initial PID = N/A

Bailing PID = N/A

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 12:30						( )	21.02'
12:37	0.5	5.89	19.7	1.33	97.9		21.52'
12:41	1.0	5.86	18.9	1.24	31.6	650	22.18'
	~~2.5~~ TP 9-14-10						
13:02	5.0	5.79	19.0	1.25	1.68	650	22.10'
13:15	7.5	5.80	19.4	1.21 ~~1.31~~	0.96	650	21.96 *
13:37	10.0	5.79	19.5	1.23	0.44	650	21.90'
13:41	10.5	5.79	19.5	1.22	0.42	650	21.99
13:45	11.0	5.79	19.5	1.22	0.81	650	21.99

COMMENTS: * Tubing had slipped out of cup and was flowing into bucket instead of cup!

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL PL	1	Nitric acid	6020	Metals: Total Arsenic Lead Copper Zinc
1 L GL Amber	2	none	8081A	Total organochlorine Pesticides
125 ML PL	1	none	9056	Nitrate and Sulfate
1 L GL Amber	2	none	~~8081A~~ 8270C	123 Trichlorobenzene 124 Trichlorobenzene

GENERAL INFORMATION

WEATHER:	Clear, Sunny, 84°F
SHIPPED VIA:	FedEX
SHIPPED TO:	Test Americal Labs -Savannah, GA
SAMPLER: T. PARKER	OBSERVER: N/A

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-112

DEPTH TO PRODUCT: NA

DATE: 7/28/10

PURGE METHOD: Low Flow/Low Stress :Pump

TIME: 1050

SAMPLE METHOD: Pump per SESDPROC 301-R1

GRAB (x) COMPOSITE ( )

DUP./REP. OF: ____

DEPTH TO WATER: 14.31

TOTAL DEPTH: 25.13

DEPTH TO PASSIVE DIFFUSION BAG (btoc) ____

Arrived at: 0940

Initial PID = NA

Bailing PID = ____

PURGE VOLUME: 10.82x0.163= 1.76x3
5.3 gal

WELL DIAMETER (inches): 2-inch

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 1000		5,43	19,9	0.62	11.4	300 ( )	
1010	1.5	5.61	20.3	0.64	6.39	400	14.73
1020	2.5	5.52	21.1	0.62	5.24	400	14.71
1030	3.75	5.53	DH 19,7	0.56	6.33	400	15.12
1040	5.0	5.51	19,5	0.52	4.87	400	15.05
1045	5.5	5.52	19.8	0.55	5.10	400	14.97

COMMENTS:

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL	1	Nitric acid	6020	Metals: Total Arsenic and Lead
1 L	2	none	8081A	Total organochlorine Pesticides

GENERAL INFORMATION	
WEATHER:	Hot Humid, Temp 85°F
SHIPPED VIA:	FedEX
SHIPPED TO:	Test Americal Labs -Savannah, GA
SAMPLER: Daniel Howard	OBSERVER:

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.367 x water column height (ft) x 3 (well volumes) for 3" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]
[1.02 x water column height (ft) x 3 (well volumes) for 5" wells]
[1.47 x water column height (ft) x 3 (well volumes) for 6" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-112

DEPTH TO PRODUCT: ________

DATE: 9/13/10

PURGE METHOD: Low Flow/Low Stress :Pump

TIME: 1720

SAMPLE METHOD: Pump per SESDPROC 301-R1

GRAB (x) COMPOSITE ( )

DUP./REP. OF: ________

DEPTH TO WATER: 16.35

TOTAL DEPTH: 25.13

DEPTH TO PASSIVE DIFFUSION BAG (btoc) ________

Arrived at: 1610

Initial PID = ________

Bailing PID = ________

PURGE VOLUME: 8.78x.163=1.4x3 ≈ 4.2

WELL DIAMETER (inches): 2-inch

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 1635		5.38	21.3	0.51	27.1	300 ( )	
1645	1.0	5.48	19.5	0.47	9.87	300	16.70
1655	1.75	5.46	19.6	0.48	6.43	300	16.76
1205	275	5.49	19.4	0.57	5.00	450	16.88
1710	3.5	5.51	19.3	0.57	4.34	400	16.89
1715	4.2	5.51	19.2	0.57	4.04	400	16.88

COMMENTS:

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL PL	1	Nitric acid	6020	Metals: Total ~~Arsenic Lead~~ Copper Zinc
1 L GL Amber	2	none	8081A	~~Total organochlorine Pesticides~~
125 ML PL	1	none	9056	Nitrate and Sulfate
1 L GL Amber	2	none	~~8081A~~ 8270C	123 Trichlorobenzene 124 Trichlorobenzene

GENERAL INFORMATION	
WEATHER:	Hot + Humid, Temp 88°F
SHIPPED VIA:	FedEX
SHIPPED TO:	Test Americal Labs -Savannah, GA
SAMPLER: Daniel Howard	OBSERVER:

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-113 091510 DEPTH TO PRODUCT: NE

DATE: 9/15/10

PURGE METHOD: Low Flow/Low Stress :Pump

TIME: 1220

SAMPLE METHOD: Pump per SESDPROC 301-R1

GRAB (x) COMPOSITE ( )

DUP./REP. OF: ___________

DEPTH TO WATER: 29,21

DEPTH TO PASSIVE DIFFUSION BAG (btoc)

TOTAL DEPTH: 44,0

14,79 x 0,17 = 2,51 x 3 = 7,54

N/A

Arrived at: 0930

PURGE VOLUME: 7,54

WELL DIAMETER (inches):
2-inch

Initial PID = ___________

Bailing PID = ___________

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 0950	0.5	3.69	22.7	2.74	>1000	500 ( )	31.62
1000	1.0	3.69	22.8	2.69	814.0	200	31.85
1010	1.5	3.69	22.9	2.61	5093	200	31.85
1020	2.0	3.69	23.2	2.60	433	200	31.72
1030	2.5	3.69	23.7	2.61	281	200	31.78
1040	3.0	3.69	23.6	2.60	50.7	200	31.82
1050	3.5	3.70	23.7	2.58	43.0	200	31.92
1100	4.0	3.70	23.6	2.58	23.1	200	31.98
1120	5.0	3.69	24.0	2.58	16.6	200	32.02
1140	6.0	3.69	23.8	2.57	12.0	200	32.06
1200	7.0	3.69	23.9	2.58	8.17	200	32.12
1210	7.5	3.69	23.9	2.58	5.21	200	32.18
1220	Collect Sample						

COMMENTS:

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL PL	1	Nitric acid	6020	Metals: Total Arsenic Lead Copper Zinc
1 L GL Amber	2	none	8081A	Total organochlorine Pesticides
125 ML PL	1	none	9056	Nitrate and Sulfate
1 L GL Amber	2	none	~~8081A~~ 8270C	123 Trichlorobenzene 124 Trichlorobenzene

GENERAL INFORMATION	
WEATHER:	HOT - HUMID - CLEAR
SHIPPED VIA:	FedEX
SHIPPED TO:	Test Americal Labs -Savannah, GA
SAMPLER: EVER GUILLEN	OBSERVER:

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-114

DEPTH TO PRODUCT: N/A

DATE: 9-14-10

PURGE METHOD: Low Flow/Low Stress :Pump

TIME: 16:30

SAMPLE METHOD: Pump per SESDPROC 301-R1

GRAB (x) COMPOSITE ( )

DUP./REP. OF:

DEPTH TO WATER: 25.14'

DEPTH TO PASSIVE DIFFUSION BAG (btoc)

TOTAL DEPTH: 43.8'

WATER Column = 18.66' X 0.163 gal/ft. = 3.04 gal. X 3 = 9.12 gal.

Arrived at: 15:40

PURGE VOLUME: 9 Gal.

WELL DIAMETER (inches): 2-inch

Initial PID = N/A

Bailing PID = ↓

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 15:52		3.87	19.1	1.00	58.8	( )	
16:00	2.0	4.02	18.1	1.09	22.6	1,100	26.03'
16:05	3.0	4.02	17.9	1.13	11.9	1,100	26.04'
16:08	4.0	4.03	17.7	1.14	10.20	1,100	26.04'
16:11	5.0	4.02	17.7	1.14	8.88	1,100	26.03'
16:17	7.5	4.04	17.7	1.14	8.53	1,100	26.07'
	~~8.0~~						
	~~8.5~~	9-14-10					
16:26	9.0	4.05	17.6	1.13	4.97	1,100	26.07'

COMMENTS:

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL PL	1	Nitric acid	6020	Metals: Total Arsenic Lead Copper Zinc
1 L GL Amber	2	none	8081A	Total organochlorine Pesticides
125 ML PL	1	none	9056	Nitrate and Sulfate
1 L GL Amber	2	none	~~8081A~~ 8270 C	123 Trichlorobenzene 124 Trichlorobenzene

GENERAL INFORMATION

WEATHER:	Clear, Sunny, 91°F		
SHIPPED VIA:	FedEX		
SHIPPED TO:	Test Americal Labs -Savannah, GA		
SAMPLER:	T. PARKER	OBSERVER:	N/A

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-115
DEPTH TO PRODUCT: NE
DATE: 9/14/10
PURGE METHOD: Low Flow/Low Stress :Pump
TIME: 1620
SAMPLE METHOD: Pump per SESDPROC 301-R1
GRAB (x) COMPOSITE ( )
DUP./REP. OF: ____________
DEPTH TO WATER: 15,16
DEPTH TO PASSIVE DIFFUSION BAG (btoc) N/A
TOTAL DEPTH: 22,32
7,16x0,17=1,21x3=3,65
Arrived at: 1530
PURGE VOLUME: 3,65
WELL DIAMETER (inches): 2-inch
Initial PID = ____________
Bailing PID = ____________

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 1540	0,5	3.65	18,9	1,15	52,3	400 ( )	1523
1545	1,0	3,65	18,8	1,15	33,1	400	1538
1550	1,5	3,70	18,3	1,16	22,7	400	1538
1555	2,0	3,72	18,4	1,16	5,66	400	1538
1600	2,5	3,75	18,1	1,16	2,35	400	1538
1605	3,0	3,75	18,1	1,16	1,88	400	1538
1610	3,5	3,76	18,2	1,18	1,22	400	1538
1615	4,0	3,76	18,2	1,18	0,21	400	1538
1620	collect Sample						

COMMENTS:

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL PL	1	Nitric acid	6020	Metals: Total Arsenic Lead Copper Zinc
1 L GL Amber	2	none	8081A	Total organochlorine Pesticides
125 ML PL	1	none	9056	Nitrate and Sulfate
1 L GL Amber	2	none	~~8081A~~ 8270C	123 Trichlorobenzene 124 Trichlorobenzene

GENERAL INFORMATION		
WEATHER:	HOT - HUMID - Clear	
SHIPPED VIA:	FedEX	
SHIPPED TO:	Test Americal Labs -Savannah, GA	
SAMPLER: Gven Guillen		OBSERVER:

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-116

DEPTH TO PRODUCT: NE

DATE: 7-28-10

PURGE METHOD: Low Flow/Low Stress :Pump

TIME: 1610

SAMPLE METHOD: Pump per SESDPROC 301-R1

GRAB (x) COMPOSITE ( )

DUP./REP. OF:

DEPTH TO WATER: 23,20

DEPTH TO PASSIVE DIFFUSION BAG (btoc) N/A

TOTAL DEPTH: 33,40

Arrived at: 1515

Initial PID =

Bailing PID =

PURGE VOLUME: 5,20

10,2 x 0,17 = 1,73 x 3 = 5,20

WELL DIAMETER (inches): 2-inch

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 1520	0,5	3,93	19,9	2,03	26,8	500 ( )	24,10
1528	1,5	3,92	19,1	2,05	35,3	↓	2911
1536	2,5	3,93	19,7	2,08	24,1		24,13
1544	3,5	3,87	19,9	2,13	22,2		24,17
1552	4,5	3,92	19,1	2,13	7,66		~~7,66~~ 24,20
1600	5,5	3,92	18,8	2,08	8,82		24,23
1604	6,0	3,91	18,7	2,03	8,09		2428
1608	6,5	3,92	18,6	2,06	3,75		24,33
1610	Collected		Sample				

COMMENTS:

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL	1	Nitric acid	6020	Metals: Total Arsenic and Lead
1 L	2	none	8081A	Total organochlorine Pesticides

GENERAL INFORMATION

WEATHER: HOT-HUMID

SHIPPED VIA: FedEX

SHIPPED TO: Test Americal Labs -Savannah, GA

SAMPLER: EVER GUILLEN

OBSERVER:

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.367 x water column height (ft) x 3 (well volumes) for 3" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]
[1.02 x water column height (ft) x 3 (well volumes) for 5" wells]
[1.[illegible] water column height (ft) x 3 (well volumes) for 6" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-116

DEPTH TO PRODUCT: ________

DATE: 9/13/10

PURGE METHOD: Low Flow/Low Stress :Pump GrundFos

TIME: 1530

SAMPLE METHOD: Pump per SESDPROC 301-R1

GRAB (x) COMPOSITE ( )

DUP./REP. OF: __________

DEPTH TO WATER: 25.44

TOTAL DEPTH: 33.40

DEPTH TO PASSIVE DIFFUSION BAG (btoc) __________

Arrived at: 1355

Initial PID = __________

Bailing PID = __________

PURGE VOLUME: 7.96 x 0.163 = 1.3 x 3 = 3.9 gal

WELL DIAMETER (inches): 2-inch

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 1415	▨	3.92	22.0	2.18	35.5	200 ( )	▨
1430	0.5	3.94	21.8	2.18	23.0	260	DH ~~25.80~~ 25.80
1445	1.0	3.91	22.9	2.19	11.9	320	DH ~~25.94~~ 25.94
1455	1.75	3.90	23.8	2.19	6.91	320	DH ~~25.74~~ 25.74
1505	2.50	3.90	22.4	2.23	6.28	320	26.16
1515	3.25	3.93	21.4	2.28	6.04	320	26.15
1520	3.6	3.93	21.1	2.30	5.33	320	26.15
1525	4.0	3.94	21.0	2.30	4.95	320	26.15

COMMENTS:

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL PL	1	Nitric acid	6020	Metals: Total ~~Arsenic Lead~~ [✓ Copper Zinc]
1 L GL Amber	2	none	8081A	~~Total organochlorine Pesticides~~
125 ML PL	1	none	9056	Nitrate and Sulfate
1 L GL Amber	2	none	8081A	123 Trichlorobenzene 124 Trichlorobenzene

GENERAL INFORMATION	
WEATHER:	Clear + sunny, Temp 85°F
SHIPPED VIA:	FedEX
SHIPPED TO:	Test Americal Labs -Savannah, GA
SAMPLER: Daniel Howard	OBSERVER:

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: MW-117 **DEPTH TO PRODUCT:** NE **DATE:** 9/14/10

PURGE METHOD: Low Flow/Low Stress :Pump **TIME:** 1450

SAMPLE METHOD: Pump per SESDPROC 301-R1 **GRAB (x) COMPOSITE ( )**

DUP./REP. OF: ____ **DEPTH TO WATER:** 13.17 **DEPTH TO PASSIVE DIFFUSION BAG (btoc)** N/A

TOTAL DEPTH: 24.7

11,53x0,17=1,96x3=5,88

Arrived at: 1245 **PURGE VOLUME:** 5,88 **WELL DIAMETER (inches):** 2-inch

Initial PID = ____

Bailing PID = ____

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial: 1310	0,5	4,24	19,0	0,53	<1000	250 ( )	13,58
1318	1,0	4,24	18,9	0,53	644	250	13,58
1326	1,5	4,26	18,6	0,51	350	250	13 60
1334	2,0	4,27	18,3	0.52	315	250	13,62
1342	2,5	4,26	18,1	0,52	120	250	13,64
1350	3,0	4,25	17,7	0, 52	60,6	250	13,66
1358	3,5	4,24	17,7	0,52	71,7	250	13,64
1406	4,0	4,24	17,7	0,52	65,5	250	13,61
1414	4,5	4,24	17,9	0,51	49,9	250	13,58
1422	5,0	4,24	17,9	0,51	32,7	250	13,55
1430	5,5	4,24	17,9	0,51	24,3	250	1358
1438	6,0	4,24	17,9	0,51	12,5	250	1360
1446	6.5	4,24	17,9	0,51	8.19	250	1362
1450	collect sample						

COMMENTS:

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL PL	1	Nitric acid	6020	Metals: Total Arsenic Lead Copper Zinc
1 L GL Amber	2	none	8081A	Total organochlorine Pesticides
125 ML PL	1	none	9056	Nitrate and Sulfate
1 L GL Amber	2	none	~~8081A~~ 8270C	123 Trichlorobenzene 124 Trichlorobenzene

GENERAL INFORMATION

WEATHER:	HOT - HUMID - Clear
SHIPPED VIA:	FedEX
SHIPPED TO:	Test Americal Labs -Savannah, GA
SAMPLER:	EVER BUILLEN
OBSERVER:	

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]

GROUNDWATER FIELD SAMPLING REPORT

PROJECT NO: 6122-08-0154.04

MACTEC ENGINEERING AND CONSULTING OF GEORGIA, INC.
3200 TOWN POINT DRIVE SUITE 100 KENNESAW GA 30144
PHONE: (770) 421-3400 / FAX: (770) 421-3486

WELL ID: Equipment Rinse Blank

DEPTH TO PRODUCT: ______

DATE: 9/15/10

PURGE METHOD: Low Flow/Low Stress :Pump

TIME: 1000

SAMPLE METHOD: Pump per SESDPROC 301-R1

GRAB (x) COMPOSITE ( )

DUP./REP. OF: ______

DEPTH TO WATER: ______

DEPTH TO PASSIVE DIFFUSION BAG (btoc) ______

TOTAL DEPTH: ______

Arrived at: ______

PURGE VOLUME: ______

WELL DIAMETER (inches): 2-inch

Initial PID = ______

Bailing PID = ______

TIME	VOL. PURGED (gal)	pH	TEMPERATURE (°C)	SPEC. COND. (mS/cm)	TURB. (NTU)	Pump Rate ml/min. (& pump setting)	New Water Level
Initial:	▨					( )	▨

COMMENTS: Water was poured over GrundFos pump and collected in sample bottles

CONTAINER SIZE/TYPE	NO.	PRESERVATIVE	ANALYTICAL METHOD	ANALYSIS
250 mL PL	1	Nitric acid	6020	Metals: Total Arsenic Lead Copper Zinc
1 L GL Amber	2	none	8081A	Total organochlorine Pesticides
125 ML PL	1	none	9056	Nitrate and Sulfate
1 L GL Amber	2	none	~~8081A~~ 8270	123 Trichlorobenzene 124 Trichlorobenzene
				Site Specific SVOCs including
40ml GL	3	HCl	8260B	Site Specific VOCs

GENERAL INFORMATION

WEATHER:	Sunny, Temp 75°F
SHIPPED VIA:	FedEX
SHIPPED TO:	Test Americal Labs -Savannah, GA
SAMPLER: Daniel Howard	OBSERVER:

[0.163 x water column height (ft) x 3 (well volumes) for 2" wells]
[0.653 x water column height (ft) x 3 (well volumes) for 4" wells]

APPENDIX G

RESULTS OF SAMPLING FOR M&J SOLVENTS SITE CONSTITUENTS

APPENDIX G
INVESTIGATION OF M & J SOLVENTS SITE VOCs AND SVOCs CONSTITUENTS IN FORMER ESTECH GENERAL CHEMICALS SITE MONITORING WELLS

EPD requested in their July 23, 2010 Comments on the Voluntary Remediation Program Application to sample monitoring wells MW-104A, MW-104D, and MW-21and analyzed for the M&J Solvents site-specific list of volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs). Monitoring well MW-21 was dry during the July and September 2010 sampling events and adjacent monitoring well MW-22 was sampled instead. The analytical results from the three wells are summarized on Table G-1 and shown on Figure G-1.

Monitoring well MW-22, which screens the water table, had a concentration of cis-1,2-dichloroethene (2.7 µg/L) (well below the MCL of 70 ug/L) and no SVOCs were detected. Cis-1,2-dichloroethene was detected in M&J Solvent monitoring wells, upgradient of the BFEL site, at concentrations up to 32,000 µg/L (well MW-17). Well MW-104A, which screens the water table, had a detection of 1,4-dioxane and no detection of other VOCs or SVOCs. 1,4-Dioxane was detected in M&J Solvent monitoring wells (MW01, MW03QC, and MW05) upgradient of the BFEL site, at concentrations up to 730,000 µg/L (MW05). Well MW-104D, which screens the uppermost fractured bedrock, also had a detection of 1,4-dioxane, ketones, benzene, ethylbenzene, toluene, xylenes, and tetrahydrofuran. These constituents were also detected in the M&J Solvent monitoring wells at similar concentrations as shown on Table G-1 and Figure G-1. Also shown on Figure G-1 is M&J Solvent's potentiometric surface map which shows groundwater flowing from the M&J Solvent property toward the east, south and west, radial flow away from the property. Based on this potentiometric surface map, groundwater appears to be flowing from the M&J Solvent property toward the BFEL and CSX properties. The detection of the same VOCs and SVOCs in wells MW-22, MW-104A, and MW-104D as detected in the M&J Solvents wells is therefore proven to be attributed to the M&J Solvents site based on the groundwater flow direction and the detection of the same constituents at similar concentrations. As such, BFEL maintains that the investigation and remediation of the VOC/SVOC groundwater plume is M&J Solvents' responsibility and not BFEL's responsibility.

There are no plans for re-development of the property with building structures and as such a vapor intrusion pathway is not applicable to the BFEL property. Environmental covenant(s) will have restrictions on the use of groundwater on the BFEL and CSX properties.

TABLE G-1: SUMMARY OF M & J SOLVENTS SITE-SPECIFIC VOCs and SVOCs ANALYZED IN BFEL MONITORING WELLS

Well		**MW-22**	**MW-104A**	**MW-104D**	**Highest Concentration Detected in M &J Solvent Wells (1)**		
Date Sampled		**9/13/2010**	**9/15/2010**	**9/15/2010**			
Lithology Screened		Residual Soil	Residual Soil	Shallow Fractured Bedrock		M & J Solvent Wells Are Screened in Residual Soil and Bedrock	
Constituent	**Units**				**Constituent**	**Units**	
1,1,1,2-Tetrachloroethane	ug/L	<1	<1	<200	1,1,1,2-Tetrachloroethane	ug/L	<5000
1,1,1-Trichloroethane	ug/L	<1	<1	<200	1,1,1-Trichloroethane	ug/L	**87,000**
1,1,2,2-Tetrachloroethane	ug/L	<1	<1	<200	1,1,2,2-Tetrachloroethane	ug/L	<5000
1,1,2-Trichloroethane	ug/L	<1	<1	<200	1,1,2-Trichloroethane	ug/L	**8,600**
1,1-Dichloroethane	ug/L	<1	<1	<200	1,1-Dichloroethane	ug/L	**18,000**
1,1-Dichloroethene	ug/L	<1	<1	<200	1,1-Dichloroethene	ug/L	**21,000**
1,1-Dichloropropene	ug/L	<1	<1	<200	1,1-Dichloropropene	ug/L	<5000
1,2,3-Trichlorobenzene	ug/L	<9.5	<9.4	<1000	1,2,3-Trichlorobenzene	ug/L	NA
1,2,3-Trichloropropane	ug/L	<1	<1	<200	1,2,3-Trichloropropane	ug/L	<5000
1,2,4-Trichlorobenzene	ug/L	<1	<1	<200	1,2,4-Trichlorobenzene	ug/L	<5000
1,2,4-Trichlorobenzene	ug/L	<9.5	<9.4	<1000	1,2,4-Trichlorobenzene	ug/L	<10
1,2-Dibromoethane	ug/L	<1	<1	<200	1,2-Dibromoethane	ug/L	<5000
1,2-Dichlorobenzene	ug/L	<1	<1	<200	1,2-Dichlorobenzene	ug/L	<5000
1,2-Dichlorobenzene	ug/L	<9.5	<9.4	<1000	1,2-Dichlorobenzene	ug/L	<10
1,2-Dichloroethane	ug/L	<1	<1	<200	1,2-Dichloroethane	ug/L	**170**
1,2-Dichloropropane	ug/L	<1	<1	<200	1,2-Dichloropropane	ug/L	<5000
1,2-Diphenylhydrazine	ug/L	<9.5	<9.4	<1000	1,2-Diphenylhydrazine	ug/L	<20
1,3-Dichlorobenzene	ug/L	<1	<1	<200	1,3-Dichlorobenzene	ug/L	<5000
1,3-Dichlorobenzene	ug/L	<9.5	<9.4	<1000	1,3-Dichlorobenzene	ug/L	<10
1,3-Dichloropropane	ug/L	<1	<1	<200	1,3-Dichloropropane	ug/L	<5000
1,4-Dichlorobenzene	ug/L	<1	<1	<200	1,4-Dichlorobenzene	ug/L	<5000
1,4-Dichlorobenzene	ug/L	<9.5	<9.4	<1000	1,4-Dichlorobenzene	ug/L	<10
1,4-Dioxane	ug/L	<9.5	**73**	**11000**	**1,4-Dioxane**	ug/L	**730,000**
2,4,5-Trichlorophenol	ug/L	<9.5	<9.4	<1000	2,4,5-Trichlorophenol	ug/L	**5.3**
2,4,6-Trichlorophenol	ug/L	<9.5	<9.4	<1000	2,4,6-Trichlorophenol	ug/L	**3.3**
2,4-Dichlorophenol	ug/L	<9.5	<9.4	<1000	2,4-Dichlorophenol	ug/L	**4.8**
2,4-Dimethylphenol	ug/L	<9.5	<9.4	<1000	2,4-Dimethylphenol	ug/L	**11**
2,4-Dinitrophenol	ug/L	<48	<47	<5000	2,4-Dinitrophenol	ug/L	**14**
2,4-Dinitrotoluene	ug/L	<9.5	<9.4	<1000	2,4-Dinitrotoluene	ug/L	<10
2,6-Dinitrotoluene	ug/L	<9.5	<9.4	<1000	2,6-Dinitrotoluene	ug/L	<10
2-Butanone	ug/L	<10	<10	**380000**	**2-Butanone**	ug/L	**380,000**
2-Chloronaphthalene	ug/L	<9.5	<9.4	<1000	2-Chloronaphthalene	ug/L	<10
2-Chlorophenol	ug/L	<9.5	<9.4	<1000	2-Chlorophenol	ug/L	**7.4**
2-Methylphenol	ug/L	<9.5	<9.4	<1000	2-Methylphenol	ug/L	**25**
2-Nitrophenol	ug/L	<9.5	<9.4	<1000	2-Nitrophenol	ug/L	**3.2**
3 & 4 Methylphenol	ug/L	<9.5	<9.4	<1000	3 & 4 Methylphenol	ug/L	**130**
3,3'-Dichlorobenzidine	ug/L	<57	<57	<6000	3,3'-Dichlorobenzidine	ug/L	<20
4,6-Dinitro-2-methylphenol	ug/L	<48	<47	<5000	4,6-Dinitro-2-methylphenol	ug/L	**3.6**
4-Bromophenyl phenyl ether	ug/L	<9.5	<9.4	<1000	4-Bromophenyl phenyl ether	ug/L	<10
4-Chloro-3-methylphenol	ug/L	<9.5	<9.4	<1000	4-Chloro-3-methylphenol	ug/L	**5.8**
4-Chloroaniline	ug/L	<19	<19	<2000	4-Chloroaniline	ug/L	<20
4-Chlorophenyl phenyl ether	ug/L	<9.5	<9.4	<1000	4-Chlorophenyl phenyl ether	ug/L	<10
4-Methyl-2-pentanone	ug/L	<10	<10	**140000**	**4-Methyl-2-pentanone**	ug/L	**120,000**
4-Nitroaniline	ug/L	<48	<47	<5000	4-Nitroaniline	ug/L	<50
4-Nitrophenol	ug/L	<48	<47	<5000	4-Nitrophenol	ug/L	**8.4**
Acenaphthene	ug/L	<9.5	<9.4	<1000	Acenaphthene	ug/L	**9.4**
Acenaphthylene	ug/L	<9.5	<9.4	<1000	Acenaphthylene	ug/L	<10
Acetone	ug/L	<25	<25	**370000**	**Acetone**	ug/L	**1,200,000**
Anthracene	ug/L	<9.5	<9.4	<1000	Anthracene	ug/L	<10
Benzene	ug/L	<1	<1	**330**	**Benzene**	ug/L	**760**
Benzo[a]anthracene	ug/L	<9.5	<9.4	<1000	Benzo[a]anthracene	ug/L	<10
Benzo[a]pyrene	ug/L	<9.5	<9.4	<1000	Benzo[a]pyrene	ug/L	1.6
Benzo[b]fluoranthene	ug/L	<9.5	<9.4	<1000	Benzo[b]fluoranthene	ug/L	<10
Benzo[g,h,i]perylene	ug/L	<9.5	<9.4	<1000	Benzo[g,h,i]perylene	ug/L	<10
Benzo[k]fluoranthene	ug/L	<9.5	<9.4	<1000	Benzo[k]fluoranthene	ug/L	<10
Benzoic acid	ug/L	<48	<47	<5000	Benzoic acid	ug/L	**180**

TABLE G-1: SUMMARY OF M & J SOLVENTS SITE-SPECIFIC VOCs and SVOCs ANALYZED IN BFEL MONITORING WELLS

Well		**MW-22**	**MW-104A**	**MW-104D**	**Highest Concentration Detected in M &J Solvent Wells (1)**		
Date Sampled		**9/13/2010**	**9/15/2010**	**9/15/2010**			
Lithology Screened		Residual Soil	Residual Soil	Shallow Fractured Bedrock		M & J Solvent Wells Are Screened in Residual Soil and Bedrock	
Bis(2-chloroethoxy)methane	ug/L	<9.5	<9.4	<1000	Bis(2-chloroethoxy)methane	ug/L	<10
Bis(2-chloroethyl)ether	ug/L	<9.5	<9.4	<1000	Bis(2-chloroethyl)ether	ug/L	<10
Bis(2-ethylhexyl) phthalate	ug/L	<9.5	<9.4	<1000	Bis(2-ethylhexyl) phthalate	ug/L	<10
bis(chloroisopropyl) ether	ug/L	<9.5	<9.4	<1000	bis(chloroisopropyl) ether	ug/L	<10
Butyl benzyl phthalate	ug/L	<9.5	<9.4	<1000	Butyl benzyl phthalate	ug/L	<10
Carbon tetrachloride	ug/L	<1	<1	<200	Carbon tetrachloride	ug/L	**120,000**
Chlorobenzene	ug/L	<1	<1	<200	Chlorobenzene	ug/L	<5000
Chloroethane	ug/L	<1	<1	**390**	**Chloroethane**	ug/L	**6,300**
Chloroform	ug/L	<1	<1	<200	Chloroform	ug/L	**1,600**
Chloromethane	ug/L	<1	<1	<200	Chloromethane	ug/L	**990**
Chrysene	ug/L	<9.5	<9.4	<1000	Chrysene	ug/L	**1.3**
cis-1,2-Dichloroethene	ug/L	**2.7**	<1	<200	**cis-1,2-Dichloroethene**	ug/L	**32,000**
Cyclohexane	ug/L	<1	<1	<200	Cyclohexane	ug/L	**19,000**
Dibenz(a,h)anthracene	ug/L	<9.5	<9.4	<1000	Dibenz(a,h)anthracene	ug/L	<10
Dibromochloromethane	ug/L	<1	<1	<200	Dibromochloromethane	ug/L	<5000
Dibromomethane	ug/L	<1	<1	<200	Dibromomethane	ug/L	<5000
Dichlorodifluoromethane	ug/L	<1	<1	<200	Dichlorodifluoromethane	ug/L	<5000
Diethyl phthalate	ug/L	<9.5	<9.4	<1000	Diethyl phthalate	ug/L	**9.4**
Dimethyl phthalate	ug/L	<9.5	<9.4	<1000	Dimethyl phthalate	ug/L	**36**
Di-n-octyl phthalate	ug/L	<9.5	<9.4	<1000	Di-n-octyl phthalate	ug/L	**1.9**
Ethylbenzene	ug/L	<1	<1	**3900**	**Ethylbenzene**	ug/L	**4,200**
Fluoranthene	ug/L	<9.5	<9.4	<1000	Fluoranthene	ug/L	**2.5**
Fluorene	ug/L	<9.5	<9.4	<1000	Fluorene	ug/L	**8.5**
Hexachloro-1,3-butadiene	ug/L	<1	<1	<200	Hexachloro-1,3-butadiene	ug/L	**3,100**
Hexachloro-1,3-butadiene	ug/L	<9.5	<9.4	<1000	Hexachloro-1,3-butadiene	ug/L	<10
Hexachlorobenzene	ug/L	<9.5	<9.4	<1000	Hexachlorobenzene	ug/L	<10
Hexachlorocyclopentadiene	ug/L	<9.5	<9.4	<1000	Hexachlorocyclopentadiene	ug/L	<10
Hexachloroethane	ug/L	<9.5	<9.4	<1000	Hexachloroethane	ug/L	<10
Indeno[1,2,3-cd]pyrene	ug/L	<9.5	<9.4	<1000	Indeno[1,2,3-cd]pyrene	ug/L	<10
Isophorone	ug/L	<9.5	<9.4	<1000	Isophorone	ug/L	**64**
Isopropylbenzene	ug/L	<1	<1	<200	Isopropylbenzene	ug/L	**210**
Methylene Chloride	ug/L	<5	<5	<1000	Methylene Chloride	ug/L	**88,000**
Naphthalene	ug/L	<5	<5	<1000	Naphthalene	ug/L	**190**
Naphthalene	ug/L	<9.5	<9.4	<1000	Naphthalene	ug/L	**88**
Nitrobenzene	ug/L	<9.5	<9.4	<1000	Nitrobenzene	ug/L	<10
Pentachlorophenol	ug/L	<48	<47	<5000	Pentachlorophenol	ug/L	<10
Phenanthrene	ug/L	<9.5	<9.4	<1000	Phenanthrene	ug/L	**12**
Phenol	ug/L	<9.5	<9.4	<1000	Phenol	ug/L	**9.6**
Pyrene	ug/L	<9.5	<9.4	<1000	Pyrene	ug/L	<10
Styrene	ug/L	<1	<1	<200	Styrene	ug/L	<5000
Tetrachloroethene	ug/L	<1	<1	<200	Tetrachloroethene	ug/L	**1,400**
Tetrahydrofuran	ug/L	<10	<10	**69000**	**Tetrahydrofuran**	ug/L	**86,000**
Toluene	ug/L	<1	<1	**62000**	**Toluene**	ug/L	**96,000**
trans-1,2-Dichloroethene	ug/L	<1	<1	<200	trans-1,2-Dichloroethene	ug/L	**74,000**
Trichloroethene	ug/L	<1	<1	<200	Trichloroethene	ug/L	**13,000**
Trichlorofluoromethane	ug/L	<1	<1	<200	Trichlorofluoromethane	ug/L	**36**
Vinyl chloride	ug/L	<1	<1	<200	Vinyl chloride	ug/L	**1,200**
Xylenes, Total	ug/L	<1	<2	**18000**	**Xylenes, Total**	ug/L	**2,400**

Notes:
ug/L = micrograms per liter
Bolded concentrations are detected constituents
Bolded constituents are detected in both BFEL and M & J Solvent Site Wells
VOCs = volatile organic compounds analyzed by USEPA method 8260B
SVOCs = Semi-volatile organic compounds analyzed by USEPA method 8270C
(1) M & J Solvents groundwater data is from the Corrective Action Plan Addendum dated October 30, 2006.

MW-104D	9/15/2010
Screen Interval	829.9-819.9 ft
1,4-Dioxane	11000
2-Butanone	380000
4-Methyl-2-pentanone	140000
Acetone	370000
Benzene	330
Chloroethane	390
cis-1,2-Dichloroethene	<200
Ethylbenzene	3900
Tetrahydrofuran	69000
Toluene	62000
Xylenes, Total	18000

MW-104A	9/15/2010
Screen Interval	868.3-858.8 ft
1,4-Dioxane	73
cis-1,2-Dichloroethene	<1

MW-13	October 2004
Screen Interval	897.5-882.5 ft
1,1,1-Trichlorethane	5,700
1,1-Dichloroethane	16,000
1,1 -Dichloroethene	9,900
1,4 Dioxane	NA
2-Butanone (MEK)	200,000
2-Methyl-2-Pentanone (MIBK)	100,000
3 &4 -Methylphenal	940
Acetone	120,000
Arsenic	0.023
Barium	1.5
Benzaic Acid	1,900
cis-1,2-Dichloroethene	11,000
Chloroethane	1,800
Chromium	0.0024
Ethylbenzene	3,800
Isophorone	1,700
Lead	0.028
Methylene Chloride	88,000
Naphthalene	240
Phenol	510
Toluene	48,000
Trichloroethene	4,600
Total Xylene	2,900
All Others	BDL

MW-CSX 2	July 2005
Screen Interval	888.1-873.1 ft
1,4 Dioxane	NA
Cis-1,2-Dichloroethene	1
Barium	100
Vinly Chloride	2.7
All Others	BDL

MW-CSX 1	July 2005
Screen Interval	892-877 ft
1,4 Dioxane	NA
Barium	53
All Others	BDL

MW-22	9/13/2010
Screen Interval	875.3-865.3 ft
2-Butanone	<10
Chloroform	<1
cis-1,2-Dichloroethene	2.7
Naphthalene	<5
1,4-Dioxane	<9.5

MW-14D	January 2004
Screen Interval	868.863 ft
1,1-Dichloroethane	570
1,4 Dioxane	<10,000
2-Butanone (MEK)	290,000
4-Methyl-2-Pentanone (MIBK)	76,000
Acetone	250,000
Arsenic	0.02
Barium	1.3
Chloroethane	2,700
cis-1,2-Dichloroethene	3,900
Lead	0.0066
J	0.017
Tetrahydafuran	49,000
Toluene	54,000
Ethylbenzene	2,600
Vinyl Chloride	1,200
All Others	BDL

MW-14	October 2004
Screen Interval	898-883 ft
1,1-Dichloroethane	180
1,4 Dioxane	NA
3&4-Methylphenol	10
4-Methyl-2-Pentanone (MIBK)	26,000
Acetone	78,000
Arsenic	0.012
Barium	0.12
Benzene	240
Benzoic acid	100
Chloroethane	430
Ethylbenzene	2,400
Isophorone	15
Methylene Chloride	230
Naphthalene	72
Toluene	20,000
Selenium	0.0052
All Others	BDL

MW-12	October 2004
1,1-Dichloroethane	3700
Acetone	45000
Benzene	200
2-Butanone	50000
Chloroethane	1100
cis-1,2-Dichloroethene	3700
Ethylbenzene	2200
4-Methyl-2-pentanone	30000
Toluene	33000
Xylenes, Total	720
1,4-Dioxane	NA

MW-18D	July 2005
Screen Interval	783.1-763.1 ft
1,1-Dichloroethane	58.6
1,4 Dioxane	NA
1,1-Dichloroethene	81.4
Cis-1,2-Dichloroethene	3.94
Toluene	3.02
Trichloroethene	10.3
Vinly Cloride	2.55
All Others	BDL

MW-WO 1	July 2005
Screen Interval	890.7-875.5 ft
Barium	114
1,4 Dioxane	NA
Benzene	1.8
Chromium	6
Cis-1,2-Dichloroethene	1.4
Ethylbenzene	10.9
Toluene	555
Total Xylene	18.1
Vinly Cloride	4
All Others	BDL

NOTES:

1. THE STRUCTURES ASSOCIATED WITH MARIETTA FERTILIZER WORKS ARE NO LONGER PRESENT. MARIETTA FERTILIZER WORKS WAS SHOWN TO BE PRESENT AND ACTIVE ON A 1911 SANBORN FIRE INSURANCE MAP. THE STRUCTURES FOR MARIETTA FERTILIZER WORKS WERE NOT PRESENT ON SANBORN FIRE INSURANCE MAPS DATED 1950 AND 1978.
2. SURVEYORS SURVEYED 4 CORNERS OF TANKAGE BUILDING AS REFERENCE TO TIE THE SITE PLAN IN W/ SURVEYED POINTS
3. ALL SOIL BORINGS AND MONITORING WELLS NEAR ACTIVE RAILROAD TRACKS MUST BE AT LEAST 25 FEET AWAY FROM THE TRACKS.

SOURCES:

1. T.M. GATES REPORTS 1986
2. NUS CORPORATION SITE INVESTIGATION REPORT, AUGUST 1988.
3. TOPOGRAPHIC SURVEY MAP PREPARED FOR BFEL BY TRAVIS PRUITT AND ASSOCIATES, DECEMBER 19, 1989.
4. AERIAL PHOTOGRAPH AND COMPOSITE PLAT BY BLUE RIDGE ENGINEERING, DECEMBER 10, 1996.
5. BOUNDARY SURVEY BY W.L. JORDEN AND COMPANY, APRIL 2, 1997. LAW CSR SOIL BORINGS AND MONITORING WELLS SURVEYED BY W.L. JORDEN IN 1997, 1998, 1999, AND 2000.
6. MARIETTA FERTILIZER WORKS STRUCTURES FROM SANBORN FIRE INSURANCE MAP 1911.
7. MACTEC/LAW CSR SOIL BORINGS AND MONITORING WELLS (2002–2007) AND SURFACE WATER LOCATIONS SURVEYED BY MACTEC ENGINEERING AND CONSULTING INC.
8. PROPERTY OWNERS SHOWN ARE BASED ON 1996 FULTON COUNTY TAX RECORDS
9. WHITAKER AND MARY L. McQUEEN PROPERTY BOUNDARIES WERE REVISED AND ARE APPROXIMATE AND ARE BASED ON FULTON COUNTY BOARD OF ASSESSORS RECORDS 2004–2005 AT www.fultonassessor.org

CADD NOTE: DRAWING XREFS ROTATED @ 0,0; 55° FROM SURVEY FILE COORDINATE POSITION.

ONLY THE M & J SOLVENTS WELLS THAT ARE CLOSEST TO THE BFEL SITE ARE SHOWN. THE M & J SOLVENTS WELL LOCATIONS ARE APPROXIMATE.

M & J SOLVENTS (HSI# 10096) DATA IS FROM THE CORRECTIVE ACTION PLAN ADDENDUM DATED OCTOBER 30, 2006.

LEGEND:

MW-104 ◑	LAW/MACTEC CSR MONITORING WELL LOCATIONS (MW-1A, MW-1B, MW-101 TO MW-105, MW-103D, MW-104A, MW-104D, MW-106D, MW-107D, MW-108, MW-109, AND MW-110, MW-111 THROUGH MW-118 (FEBRUARY, JUNE, JULY, DECEMBER 1997, MAY 1998, JANUARY 2000, NOVEMBER 2002 AND AUGUST 2007) (MW-106 AND MW-107 WERE NOT INSTALLED)
MW-10 ◕	T.M. GATES MONITORING WELL LOCATIONS (MW-1 TO MW-27, MW-7 WAS NOT INSTALLED) (AUGUST 1983, JANUARY 1984, JUNE 1985)
DW-1B ◕	T.M. GATES DEEP MONITORING WELL LOCATIONS (DW-1A, DW-1B, DW-2A, DW-2B) (AUGUST 1983, FEBRUARY 1984)
MW-1 ⊕	MONITORING WELLS ABANDONED BY LAW (MW-1, MW-1A, MW-2, MW-3, MW-4, MW-6, MW-8, MW-9, MW-11, MW-12, MW-13, MW-14, MW-15, MW-18, MW-19, MW-20, MW-23, MW-27, DW-1A, DW-2A, DW-2B, AND MW-104) (JUNE 1995, JUNE 1997, AUGUST 1998, JANUARY 2000, AND AUGUST 2007)
MW-1(BFI) ⊗	APPROXIMATE LOCATION OF MONITORING WELLS INSTALLED FOR 1993 DUE PHASE II INVESTIGATION.

MISSING WELL COULD NOT BE LOCATED BY LAW

WELL MW-1B REPLACED WELLS MW-1 AND MW-1A
WELL MW-108 REPLACED WELL MW-2
WELL MW-111 REPLACED WELLS MW-3 AND DW-2A
WELL MW-109 REPLACED WELLS MW-4 AND MW-6
WELL MW-115 REPLACED WELL MW-5
WELL MW-112 REPLACED WELLS MW-8, MW-13 AND MW-14
WELL MW-110 REPLACED WELL DW-2B
WELL MW-113 REPLACED WELL MW-16
WELL MW-116 REPLACED WELL MW-10

PROPERTY BOUNDARIES
ABOVEGROUND POWER TRANSMISSION LINES
BELOWGROUND FIBER OPTICS CABLE
FENCE
EXISTING STRUCTURE
FORMER STRUCTURE
TREE LINE
STREAM

ALL CONCENTRATIONS EXPRESSED IN MICROGRAMS PER LITER (UG/L)

SCALE IN FEET
0 100 200

REV	DATE	BY	SUB	APP	DESCRIPTION	REV	DATE	BY	SUB	APP	DESCRIPTION

DESIGNED R. QUINN
DRAWN T. GLADSTONE
CHECKED R. QUINN
IN CHARGE L. NEAL
DATE 11/9/2010

FORMER ESTECH GENERAL CHEMICALS SITE
ATLANTA, GEORGIA

MACTEC
MACTEC Engineering and Consulting, Inc.
3200 TOWN POINT DRIVE, SUITE 100
KENNESAW, GEORGIA 30144 (770) 421-3400

VOCS AND SVOCS DETECTED IN BFEL WELLS ASSOCIATED WITH M & J SOLVENTS SITES

SCALE AS SHOWN
CONTRACT 6122-08-0154
DWG. NO. G-1
REV
PAGE NO

J:\BFEL ATLANTA\SEPT 2010\VOC_SVOC-MJ SOLVENTS.dwg – Layout1 03/14/2011 2:50pm tgladsto

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Former Estech General Chemicals Site, Atlanta, GA HSI 10196

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